







AN

+ ILLUSTRATED + WEEKLY + MAGAZINE. +

FOR THE

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

CONDUCTED BY

H. H. STATHAM,

FELLOW OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

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

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

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

"Always be ready to speak your mind, and a base man will avoid you."—WILLIAM BLAKE.

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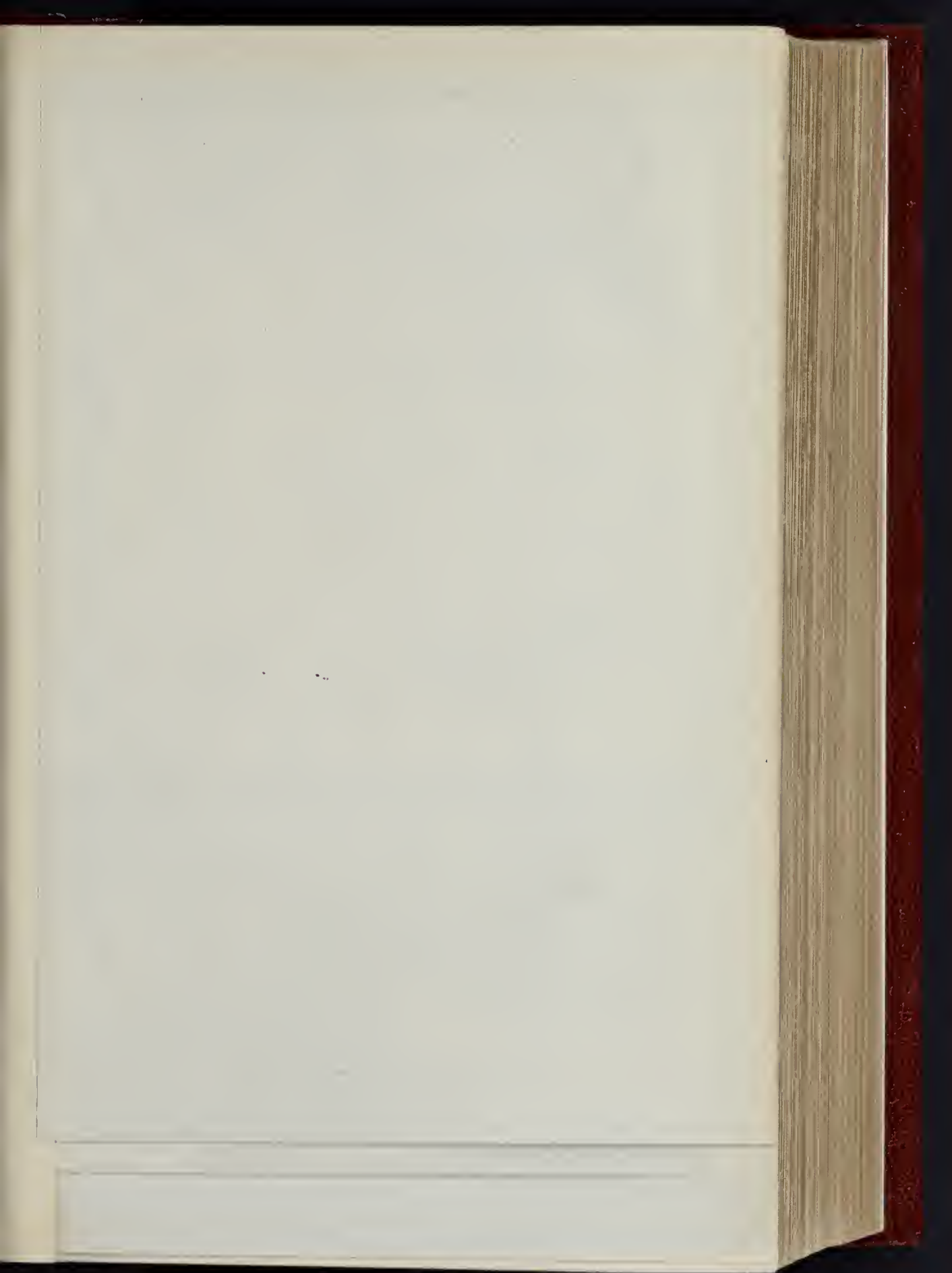
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\* \* A Map of London and Suburbs, showing the Boundaries of the various Surveyors' Districts under the Metropolitan Board of Works, was given in the first four numbers of this Volume, in four quarter sheets issued January 1, 8, 15, and 22. Where not mounted on rollers or strainers for hanging up, it is suggested that they may be pasted together and inserted as a folding-plate at the beginning or end of the Volume.







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GOLDERS GREEN

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MOLE GREEN

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# MAP OF

# ONDON

AND

# SUBURBS

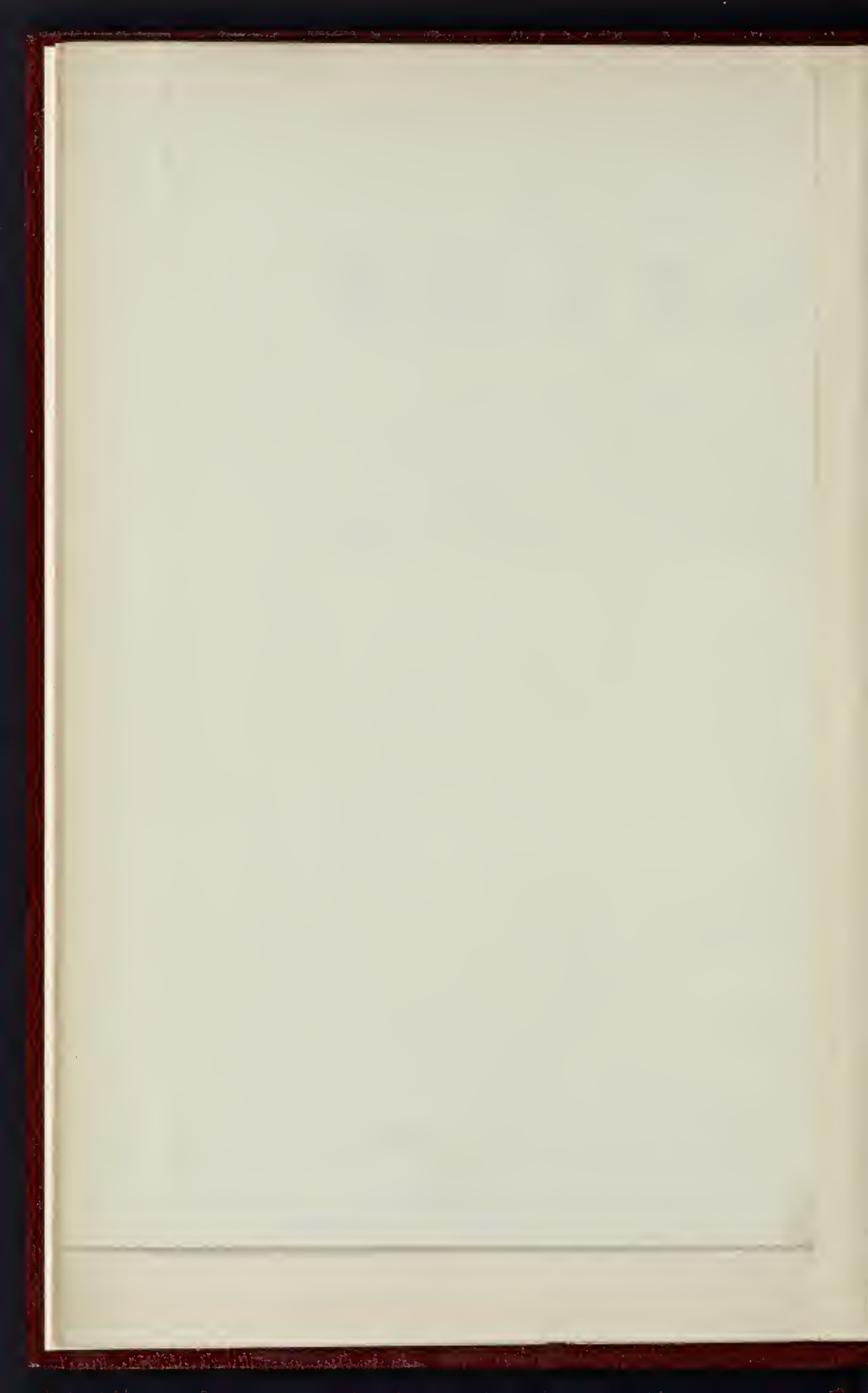
SHOWING THE BOUNDARIES OF THE  
VARIOUS SURVEYORS' DISTRICTS  
THE METROPOLITAN BOARD OF WORKS.

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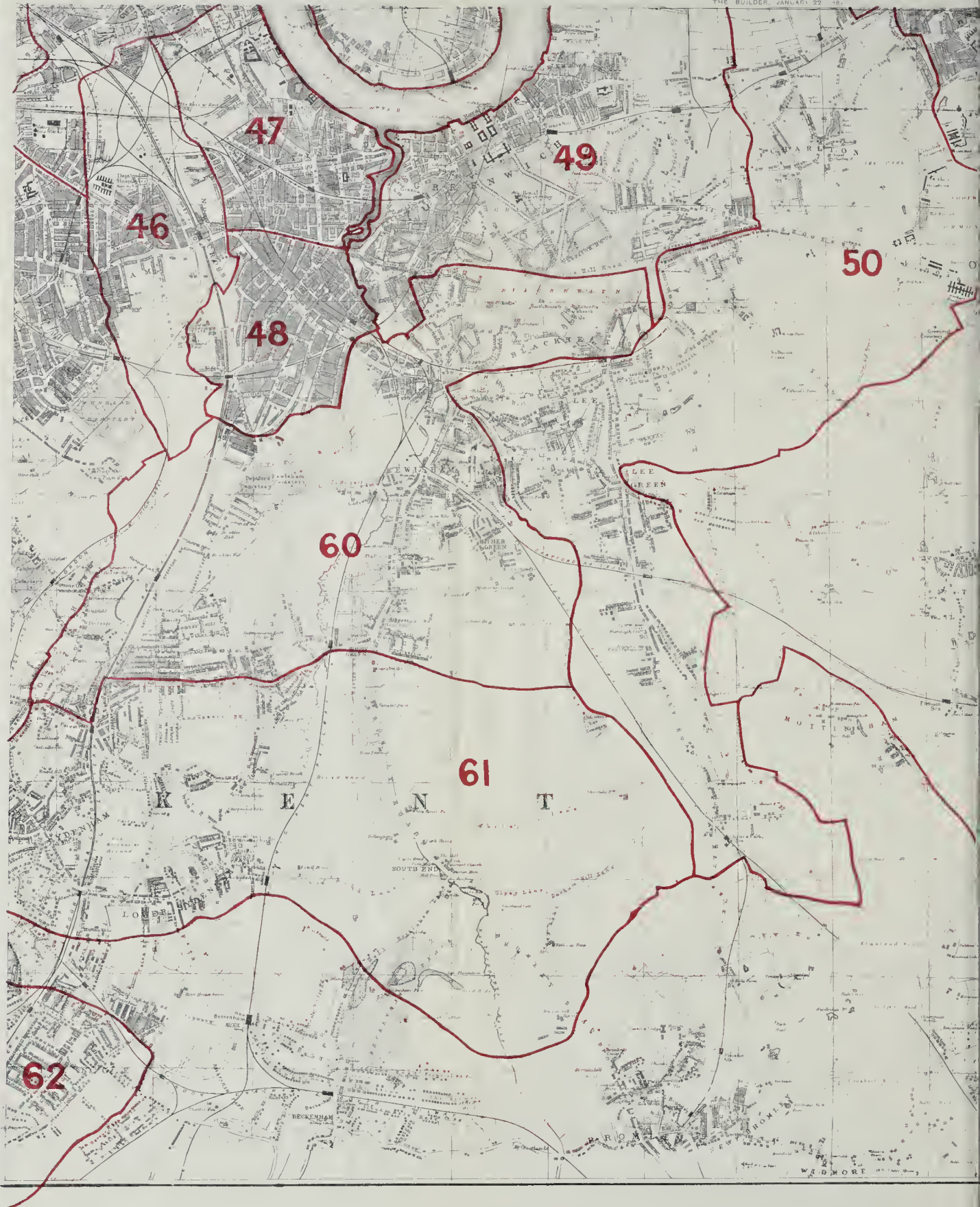
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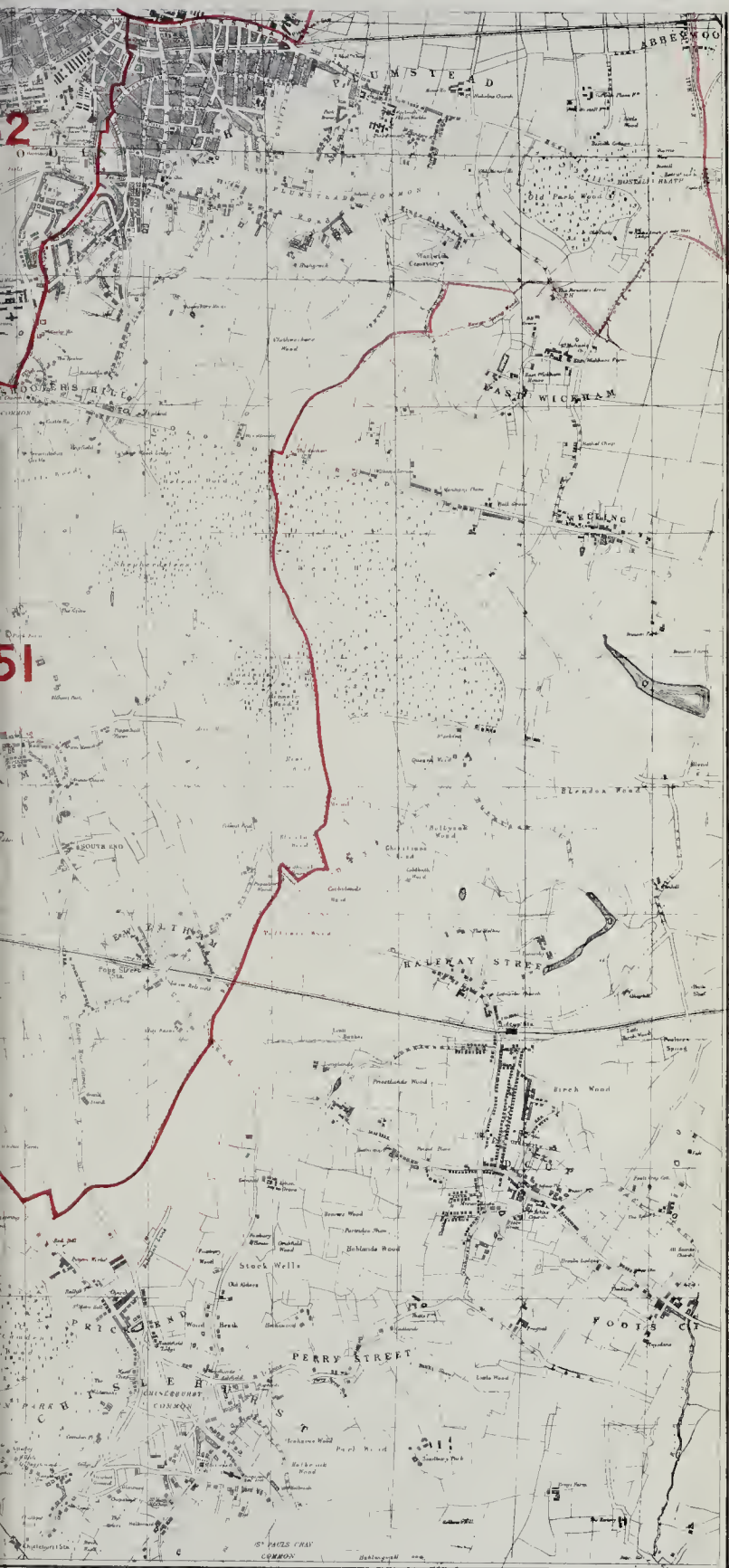
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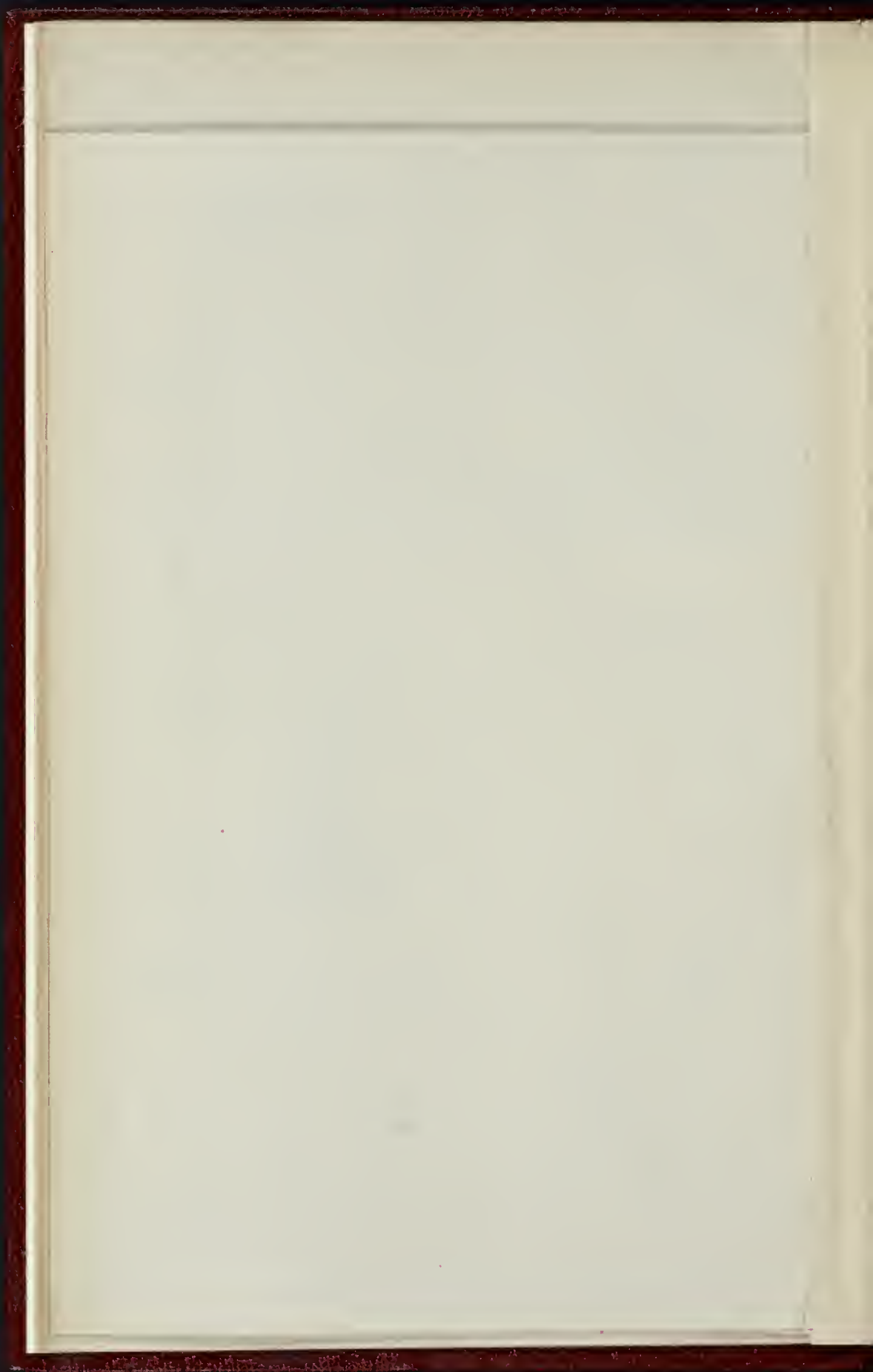
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K E N T

BECKENHAM

WIDMORE





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### Historic Towns: London.\*



ESSRS. LONGMAN & CO. are to be congratulated upon their present undertaking, which is to issue a series of volumes upon the widely-extended subject of the historic towns of our

kingdom. They are to be of readable size, and of such moderate cost as to place them within the means easily of every reader. Dr. Freeman and the Rev. Wm. Hunt are the editors, and the intention is to treat of such towns of our country as have played a conspicuous part in the general history of the kingdom. There are, to quote from the preface, "the old Roman cities, restored in some cases after a period of ruin, and the old head-towns of shires, some the same as the Roman cities, others different. There are towns, like Bristol in one age and Hull in another, which, without being heads of shires, rose to importance through commerce." There are towns which have gathered around a castle or church; there are others which have risen to great wealth within the last two centuries. "York, once imperial, then royal, has kept more than any other city the character of a local capital on to our own day. Exeter is the city which, as not becoming English till Christian times, has lived the most uninterrupted life."

Winchester is pre-eminently the city of both English and Norman royalty. Carlisle, the

\* Historic Towns. Edited by Edward A. Freeman, D.C.L., Regius Professor of Modern History at Oxford; and the Rev. William Hunt, M.A., of Trinity College, Oxford.—London. By W. J. Loftie, B.A., F.S.A. Longmans, Green, & Co. 1887.

bulwark against the Scot, Shrewsbury against the Briton. Twelve of these volumes are either nearly ready or in preparation, one of them being devoted to St. Andrews, showing that the intention is, we are glad to see, not to confine the volumes only and exclusively to English towns. In addition, another volume is actually ready. This is rightly devoted to London, and it is from the pen of Mr. W. J. Loftie.

It is hut right that the beginning should thus be made with the Capital city, not only on account of its long existence, from Roman, or earlier than Roman, times, and of the important part it has played in the annals of our country; but from the fact that its charters and its privileges have stood as models for the framing of similar ones by the Norman and later kings to other municipalities. Its history will therefore serve a good purpose for comparison with the others to follow, and its beginning this series of volumes will afford benefit in consequence, while this volume renders the post of honour, as hy right, to the metropolitan city.

The tale of the growth of London from its beginnings in such early times of the dim past that we can only dubiously trace them in still more dubious tradition, and by discoveries few and far between, is of so much interest that a new book on the subject is always welcome, even although the number of existing hooks is already legion. The author's intention and object are best stated by a rapid extract or two from the summary with which he closes it. "I have endeavoured," he says, "without writing a continuous narrative, to show, first, by the investigation of recently-discovered evidences, how London attained its paramount position in the kingdom; secondly, how its municipal institutions, the models on which

those of almost every other English city and town have been moulded, grew up from the combination of the English shire system with the foreign commune, and partakes of the characteristics derived from both; thirdly, how in spite of the legal snjhection of Middlesex and part of Surrey to the city, the suburbs grew and extended under the control, not of the citizens, but of the ecclesiastical land-owners and their successors." The work consists of 213 readable pages, each of which will at least set the reader thinking, even when he may fail to agree with several of the author's conclusions. There is undoubtedly a difficulty which must always be felt by a writer who would take London for his theme, and that is the impossibility for him to deal with it adequately in a hook of moderate size. The subject is so vast and the issues so important that hardly any single volume is sufficient to afford us all the information we may desire. In the moderate-sized work before us it is, therefore, impossible to expect very deep or full information, and we may be prepared for only reference to a general narrative such as an ordinary reader may be satisfied with. We consider that the series of volumes in contemplation may fairly be expected to address themselves mainly to ordinary readers, or not much more. On this account we must confess to a certain feeling of regret, not that the pages do not tell us all that we may wish to know, but that they are written as they are. The narrative form, which we consider has many advantages for the production of such histories as are proposed, is almost entirely laid aside, and the writer assumes that the reader already knows the subject that may be desecated upon. When the narrative form is adopted, as it is in parts of the two last chapters, the pages may

be followed with much more interest and satisfaction.

In the case even of some of the recent discoveries, too, the reader is supposed to know of them, and we obtain insight into their nature only by some stray allusions. Thus, for instance, we hear of the discovery of a part of the northern gate of the City, but we are not told of the whereabouts in Camomile-street, under what circumstances, or when. Similarly, it is only by some stray references, one on one page, another elsewhere, that we are made aware of the nature of Mr. Lyte's researches among the St. Paul's monuments. We are already supposed to know all about them.

The book consists of nine chapters, arranged as follows:—London before Alfred, the Portreeves, the Mayors and the Wardens, the Municipality, London and Middlesex, and the Church in London, come in for a chapter apiece, while London Trade and the Relation of the City to the Kingdom are treated of in the two last chapters. These subjects will be of interest to many others besides Londoners, but it is, perhaps, in the growth of the City and its buildings that our readers will be most interested. The author unfortunately has not gone at all deeply into architectural matters, and says so. Still, there are a great many references which fairly well come within the scope of architectural studies, and particularly the chapters upon the early settlement of the City and the church in London. The derivation of the name of London is traced to two British words, *Llyn-Din*, the lake fort, with which the author appears to be satisfied, and upon which he bases a description which might as well have been reserved or modified, as to what the locality was in the British period. The Roman settlement is illustrated by a map, which is, of course, as may be said of all the other and numerous maps which have appeared in other works, different from any of them. It might as well have been omitted. According to Mr. Loftie, the original Roman fort was in form a long parallelogram, extending from the east a little beyond London Bridge, westward to Wallbrook, where it terminated in three impossible bastions, which, when laid down to scale on a map of London, measure more than 300 ft. in diameter each.

After this plan and the description we are not a little startled to find that this was not altogether London. But, on this novel subject the author had better speak in his own words, which we briefly summarise. "It will be desirable to examine a statement made by Ptolemy, the geographer, whose extraordinary accuracy is not to be lightly doubted. He sets London in Cantium, that is, on the south side of the Thames where Southwark is now." "We may account for this assertion by remembering that, until much later than his time, the Roman settlement on the northern bank consisted of very little more than the small fort." "Moreover, there have always been very extensive Roman remains found in Southwark."

"It is very possible that at the time Ptolemy wrote the foundations of Southwark were considerably larger than those of London, which, as we shall presently see, owed a short-lived importance to one of the very last of the great works carried out in Britain by the Romans." "We need not follow the suggestion that if 'Wall-Worth' means the farm by the wall, and if a wall went there, the wall around Southwark would be larger than that around London, but we may glance at the statement. 'Ptolemy is, therefore, right, and London, until the end of the third century, was a city in Cantium, with an outlying fort and bridge-head on the opposite side of the Thames.'" Elsewhere he says,—"I have already shown that London was not a walled city in 314, when Restitutus attended the Council of Arles." "Restitutus is, in fact, more real than London." "We may well close this series of extracts with this statement. We really wish that writers on London topography would be a little more content to study the discoveries of their predecessors, as well as those of our own day. It would prevent much random writing. The discoveries made along the line of Sherbourne-lane and Lombard-street more than

100 years ago, well outside the area of Mr. Loftie's small fort, indicated beyond a doubt that a large number of timber buildings had suffered from a conflagration, and that this was of early date was indicated by the presence of a gold coin of Galba's, with earlier ones, found in the midst of the burned ashes. Similar evidences of conflagration have been found over a great part of the City, and indicate that it was a universal calamity, and that London was then of fairly large size. The older writers are, doubtless, correct in assigning this fire to the time of the revolt of Boadicea. If we go to the Guildhall Museum we shall see a number of bricks inscribed "PRB. LON., P.P.R. LON.," and others,\* indicating beyond doubt that they refer to London, whatever may be the exact meaning of the inscription. They were found in London. Not a single one of the series has been found in Southwark, and to the best of our knowledge, not a single brick so inscribed has been found on the south side of the Thames; although, had it been so found, it would not have been an extraordinary matter. Roman remains in Southwark are numerous enough, but only a moderate distance down High-street, and nothing has yet been found of special interest, or different from what might be expected to be found on the sites of what were doubtless those of suburban villas. We are glad that a Roman origin is granted to the City wall of London, which, notwithstanding the evidence of its construction, has been denied by a recent writer.

We pass on to another subject, of no little interest to all students of English history,—the descent of Roman institutions to our own time. To state the case briefly, with fitting regard for the space at our disposal,—it has been observed by several historians that the municipal system of government by a mayor and aldermen, common throughout the Middle Ages to our own time, is very similar to the old Roman administration, and the inquiry naturally suggested itself, Did the system survive the advent of the Saxons and the intervening time until recorded history shows it to us as being in existence? Or, did it come into being in Norman times without regard to the antecedent state of things?

Believers in the continuous existence naturally lay stress upon the widely-extended use of the system, let the officers be called by what names they may be, and upon its rapid development as soon as charters began to be granted by the Norman kings to the various cities and towns, and it does not appear to be an unreasonable belief. It derives some additional strength from the fact that the earliest Saxon settlers in England appear to have avoided the towns for the open country. That the towns did actually continue, with what security their Roman walls could give them, is sufficiently apparent by the existence of many of them to our own times. Side by side with the town's government is that of the trading guilds. Recent researches have helped to confirm the belief that the various craftsmen of Roman times were united together in companies so analogous to the guilds of Mediaeval times as to render it equally reasonable to believe that the guilds whose existence is apparent at an early date in Norman times, are more likely to have been a survival than a new creation. Our author is, however, decisive in his opinion upon both these subjects. Of the first he says that "not a single fact of any kind has yet been adduced that will go even a little way towards proving this romantic theory"; "we have the king's officer, the wick-reeve, or portreeve,"—"the two words mean exactly the same,"—"mentioned as existing at the latter part of the seventh century; and he was still the chief civil authority in the latter part of the eleventh." "There is not," as the late Mr. Toulmin Smith well remarked, "the shadow of an analogy between Saxon and Roman institutions of this kind." The belief is expressed elsewhere that London was so completely burned by the Danes that King Alfred's reparation amounted, in fact, to a new foundation.

If we turn to other portions of the book, we shall find, however, that there must have been other authorities in the City than that of the portreeve. On page 191 we read with satisfaction,—"In the election of a king, London had long taken a great constitutional part. The voice of her citizens had long been accepted as representative of the popular assent in the election of a king. When Æthelred died, all the witan that were in London, and the burgesses, chose Edmund to be their king, says the chronicle." "On the death of Cnut, the citizens joined with the Danes in raising Harold Harefoot to the throne." In these narrations of facts, and others could be referred to, there is, singularly enough for our author's decisive assertion, no reference whatever to the portreeve, but only to the burgesses and citizens. It must be evident that a single governor could not get on for very long in the government of a large trading city without some sort of a Council. But then, this brings us closely to the model of an old Roman municipality. It may be remembered, too, that William the Conqueror's Charter is addressed not only to William the bishop and Gosfrith the portreeve, but also to the burghers. An interesting article not long since appeared in Walford's *Antiquarian*,\* from the pen of Dr. Pring, in which a clever line of argument is elaborated, suggesting that the office of portreeve itself descended from Roman times, and that the actual name, "porta," a city gate, itself shows the survival of a Roman official, having charge of the space at the city gates where the markets were held.

This subject is likely to receive much illustration from the series of volumes to be issued. Perhaps their appearance will be decisive upon it, for their production will require the searching through of many of the provincial municipal archives, and much important information may be the expected result.

The chapter devoted to a record of the portreeves is an interesting one, as is also that of the creation of the office of mayor. We hear of the mayors giving charters to the craft guilds; of many of the shopkeepers at an early period living at Stepney, Stratford, or Hackney; of many curious changes of name, showing that what is so familiar to us in the varying orthography of names in the seventeenth century had much earlier beginnings. The record of the appointment of the wardens is ably written, and is full of information, although assertion is now and then adopted when a little implied doubt would have been more suitable. We have reference to the guarding of some of the City gates by certain of the wards, in which we can readily recognise a resemblance to the defence of various parts of a castle by the feudal system of castle guard. There is hardly space in these crowded pages for reference to the old London legends, and none is made either to Gog or Magog, or to King Brutus. This is an advantage. Still, we were not prepared to hear that Ludgate meant only a "postern." The presence of the Jews in London is briefly referred to, and we learn that "the Jews were already remarkable for their skill in building, and theirs are among the oldest stone houses we hear of." The large amount of property held by the various monastic churches around the City is mentioned, and the causes why the suburbs of London were not included in the scheme of government of the City, are alluded to, as also the curious essays at the government of Bridge Without Ward. Of Westminster Abbey doubt is expressed with respect to genuine evidence of its being a very ancient foundation. "So far, I have not found any unquestionable evidence that Westminster Abbey was in existence before the Danish Conquest." The references to the earliest mention of the City wards are briefly but well rendered, having regard to the importance and extent of the subject.

The chapter devoted to the Church in London is all too short for fair justice to be done to the extended subject, and due allowance has therefore fairly to be made. There is a great deal contained in it which will

\* See the *Builder*, vol. II, p. 795.

\* The Ancient Name and Office of Portreeve. By J. H. Pring, M.D. *The Antiquarian*, magazine, iv., p. 264.

amply repay for the perusal; as, for instance, when the work of the Canons of St. Paul's is discussed, their non-residence, their finding a parochial congregation irksome, and the growth of a number of parish churches around the Cathedral and the Minster of St. Martin-le-Grand. "The Bishop and his Canons could assign a parish to a church as a modern rector assigns a district to a chapel-of-ease." Reference is made to the dedications of many of the churches, and it is ingeniously suggested that since several of the churches dedicated to All Hallows, St. Mary, and the like, stand close to one another, they, in fact, show the subdivision of some primitive parish having such a dedication, the later churches having the same dedication as the parent one, with a suffix for distinction. There is, perhaps, too much said to suggest that many of these parishes are of late rather than of early formation,—say, as we understand it, of post-Norman rather than of ante-Norman date. We think the balance of evidence is the other way, and that this chapter would have been the better had some of the statements been a little less positive. Thus, we are told that "St. Magnus only died in 1110, and his church, therefore, must belong to the great church-building epoch of the twelfth century, at the earliest." Other writers have, however, shown that there was more than one saint of this name, and that more probably the church is named after an earlier one. Then, too, there is no documentary evidence of the separation of this or of several others of the parishes, which might reasonably be expected to exist were their formation of the later Norman times. St. Bridget is hardly likely to have been the Swedish saint, as is suggested; and surely the existence of the steeple of All Hallows-the-Less, over the gateway of Cold Harbour, can hardly be accepted as evidence that the church was built by the owner of the mansion. Does it not rather point to an extension of the building, when the gate being in the way, the steeple was placed over it,—such as, in fact, we see in several existing buildings? We cannot support the statement, p. 167, that, with some exceptions, "no City church was conspicuous for any fine feature." While there were doubtless a good many small churches, Hollar's views are alone sufficient to show that they must have possessed many very interesting characteristics. A tribute is rendered to the genius of the "greatest English architect, called in to give the world a series of models of unapproachable beauty and convenience, designed, not like the old churches for the celebration of mass at many altars, but with the object of accommodating the largest number of hearers within sight of the pulpit." We concur in every feeling of admiration for Wren as a true man and a born architect; but to speak of his churches as of "unapproachable beauty" is merely a piece of the exaggerated cant fashionable at present among a certain clique of aesthetes.

The two concluding chapters, on London Trade and London and the Kingdom, are the best in the book. The former refers to the growth and extension of the mercantile influences of the City, not only in England but abroad, reference being made to the extended privileges of the citizens and of their dealings with foreign nations on reciprocity principles. "The men of other nations coming to London were to be treated as their countrymen treated the London traveller abroad." The closing chapter refers to many an event of which the Imperial City may be proud, for it speaks of her prowess and her influence for good in many a momentous event of English history. A parallel is drawn between Paris and London, and it is stated that while the influence of Paris on France has usually been bad, that of London on England has been good. Its voice has been potent in the setting-up of kings, in sustaining the liberties of our country, in many a noble and good act. Its influence has been the turning-point of many an event, and in the long run its support has caused success, the want of it failure.

While it is no ordinary task to write a book on London that is capable of satisfying the many and varying demands upon it, it is,

in like manner, no easy task to review any such book. When a volume is not sufficient to render justice to the theme, the ordinary compass of a review is hardly capable of reference to all the subject-matter of the book. We have only touched upon many points which deserve reference; we have passed over many more altogether. Still, while several things have been pointed out which we consider to be defects, we have, we hope, said sufficient to show that this moderate-priced volume is deserving of a place in the library of every man who desires to know more than he does at present of the rise and progress of the City of London.

A NOTE ON SIENA CATHEDRAL.\*

BY T. MANLY DEANE.

**T**O give a description of Siena Cathedral in a short space and short time is no easy matter, considering the number of works of art it contains, both in sculpture and painting, quite apart from the architecture of the whole, which, as a piece of Italian Gothic, may be considered the best that nation ever produced, being only rivalled by Orvieto and Milan; but, as most people know, the Italians never cared for Gothic work, and all their attempts at it are tinged with Classic, both in composition and detail. Siena is an instance, and no student of Gothic would ever come here to learn his art, beautiful as this building is. In composition, the façade certainly surpasses Orvieto; it is plainer and broader, and more logical; it is crowded with ornament; but this, in a climate like Italy, does not seem out of place, and certainly does not interfere with the whole effect, but rather gives scale and dignity. The west front, being so striking and more elaborate than any other part, naturally attracts all one's attention, and when one has described it he may be said to have described the exterior of Siena Cathedral; though the lofty campanile,—a work of much earlier date than the west front,—is a beautiful feature, and resembling in detail most of the campanili in Tuscany, beginning low down with one window on each face, in each story the number increasing towards the top. The church is built of black and white with some red and other coloured marbles in stripes. The campanile is all black and white.

Like the country itself, its people and their habits, one needs to be accustomed to this sort of thing before it becomes pleasing; but so it is this tower is beautiful when you know it. The dome is very little visible from outside, and is not a pleasing feature, with the exception of the lantern on the top, which is pretty. It will be well just to explain that the church, as it now stands, is an enlargement of an older church (of which, however, it would be difficult to find any traces), which was built in the twelfth century, and this enlargement is in its turn only part of a great scheme to build a huge cathedral, which would have been the largest in Italy, the present church being only the transept to this; but after working for years they were stopped by the plague and by the foundations giving way. This work was going on from about 1225 to 1259, and again till 1321; the nave of the present cathedral was lengthened in 1339. The principal dimensions are now,—300 ft. long; width of nave, 80 ft.; length end to end of transepts, 170 ft. John of Siena was the architect to the alterations of the west end; Maestro Lando also is mentioned as an architect, whose work also appears.

The inside of the cathedral is a picture. It would be impossible to say anything was good from an architectural point of view, but it has a lovely tone of colour, and from every point of view it groups well. There is no triforium, but simply very high side arches resting on clustered columns of black and white marble in stripes, and over these the vaulting arches spring close down to the string, with three-light tracery windows between. The aisles have large single-light pointed windows. There are five bays to the nave. The transepts have

aisles, with a chapel in each towards the east. The choir also has aisles. The dome and lantern is not over the centre of transept and nave, but towards the west end of the crossing; it is hexagonal on plan. There is a small apse to the choir. Over the side arches, as a sort of cornice between consoles, is a row of linceus heads, all done at one period, but supposed to represent the popes, among whom originally were some which had to be removed.

The pavement is a most remarkable work, and illustrates in stone Bible history, old and new, together with some classical mythological characters. This work is done by different hands, and is principally fifteenth-century. Beccafumi and others worked at it. The drawing is very good. It is now always covered up with wood so as to protect it, but it can always be seen without difficulty.

The pulpit is by Nicolo Pisano, thirteenth century. Either a copy of this or one very like it is in South Kensington Museum. The carving is too crowded, and though well executed, not satisfactory, nor to be compared with thirteenth-century work at Amiens or other Northern work. The steps up to the pulpit have a beautiful balustrade and other work in the best Italian Renaissance style. There are tombs, and fonts, and holy-water stoups also in this latter beautiful style, throughout the church. The west window, which is circular, is filled with good stained glass, representing the Last Supper, date about 1549. The choir-stalls are beautifully carved by one Bartolo. Negroni, 1567; they are very elaborate, but a little past the best period of wood-carving, and want the crispness of treatment so essential to good wood-carving. There is a room off the north aisle of the nave, entered through a doorway round which is some fine Renaissance work, called the Library. This room is enriched with beautiful frescoes by Pinturicchio and by Raffaele while a student; these were finished 1503, and are perfectly preserved; they represent scenes in the life of Pius II., Æneas Silvius Piccolomini. The room was erected and this work procured for it by Pius III., his nephew. The choir-books, which are splendidly illuminated, are kept in this room; these illuminations are late in style, and, though wonderful, are not, in the writer's opinion, very beautiful or worthy of study; but the frescoes certainly are, and, to those interested in the costume of the Middle Ages, this is a rich find. The pavement also of the Library is an interesting piece of majolica tiling, and the ceiling is beautifully painted in the best manner of the Renaissance, and is quite fresh and brilliant. It is a scheme of colouring which is suitable to good Gothic work and Classic alike, and from it one may judge of the effect of clear pure colouring harmoniously blended, showing that there is no difficulty in using red and blue and gold,—pleasant brilliant colours,—instead of melancholy greens and greys. It is said this room was built specially for the reception of these choir books.

Below the choir is the baptistery, but to reach it one must leave the church. It has a painted vault and walls, fifteenth-century work, but it is very dark; the font, date 1423, in the centre, is a beautiful bit of work, and exhibits sculpture by Gio della Quercia, Ghiberti, Donatello, and Michelozzo.

NOTES.

**I**T appears that any project for founding the proposed Imperial Institute in a central position will probably have to be abandoned for want of funds to purchase a site anywhere in the Westminster district, and it is proposed that the promoters of the Institute should appeal for a portion of the site in the bands of the Commissioners of the Exhibition of 1851. No doubt the cost of such a site as is required would be enormous in the neighbourhood of the Houses of Parliament, and no doubt the Imperial Institute would have a very good claim on such property as that held in trust by the Commissioners of the 1851 Exhibition; but for all that, the neigh-

\* See Illustration in this number.

hourhood of our Government buildings is where the Imperial Institute ought to be, and we greatly doubt if it would be worth while to erect it out at Kensington.

AS usual after a heavy fall of snow, the daily papers resound with paragraphs, easily written and neatly turned, making great show of indignation against "vestries" and all other bodies who might be supposed to be responsible for clearing away the snow, for not doing it quickly enough. We say advisedly "a show of indignation," for we suspect that this kind of indignation paragraph is simply thrown out as seasonable and popular, and likely to hit the public feeling at the moment when snow is making every one uncomfortable. As we have pointed out on a former occasion, this indignation is to a great extent senseless and misplaced. If heavy falls of snow occurred over London a dozen or a score times in the year even, there would be something to be said for keeping an army of men in readiness to clear it all away each morning it occurred. But the expense of doing this would be enormous, and as it is, a heavy fall occurs, perhaps twice, often only once, in a winter, and to keep a sufficient number of men and carts at call to clear it all away at once would mean an expense completely out of keeping with any ratepayer's notion of economy. The makers of paragraphs probably never stop to calculate what is the area and what the cubical mass of a fall of snow of a few inches thick over London; if they did, they would perhaps see the absurdity of their expectations from the authorities. There are certain discomforts which, though considerable at the time, are too exceptional to be worth providing against as if they were regularly recurring evils. Thus, in regard to drainage, it has been long recognised by the best authorities that it is more reasonable to risk an occasional overflowing of sewers by storm water than to go to immense extra expense to construct sewers of capacity for the heaviest possible storm. So in the matter of snow; it would be mere waste of money to keep in readiness for a whole winter the men and *matériel* necessary to make a rapid clearance of such an immense mass of matter, which will clear itself in two or three days. If people would make a few simple calculations, they would find that out; but then the oburgatory paragraphs would be all spoiled!

IT would seem that the Government have at last awoke to the necessity of preventing open spaces in the neighbourhood of London from being absorbed by railway companies, although it must be confessed that they have taken rather a singular method of showing their interest in the subject. The Home Secretary has forwarded to the Metropolitan Board of Works the plans, book of reference, and *Gazette* notice deposited in connexion with the proposed introduction into Parliament of the Latimer-road and Acton Railway Bill, and has requested the Board to favour him with their remarks with regard to an anticipated interference with commonable lands. The action of the Home Secretary is satisfactory so far as it goes, but why should he select the Metropolitan Board of Works to do the work? The Board is, in all probability, as ignorant on the subject as he appears to be himself. It has charge of some few open spaces which are handed over to it by Act of Parliament, but it is not likely to be acquainted with the local circumstances of open spaces which are not under its control.

A REPORT has been addressed by Mr. James Lemon, M. Inst. C.E., to the Local Board of Cowes, on the main sewerage of that district, which comprises about 570 acres. The population of the district in 1881 was 7,072, the rate of increase being 18.7 per cent. in ten years. The present sewers drain upon the foreshore by fourteen outfalls at all states of the tide, the result being the deposit of sewage mud on the shore, and the issue of sewer gas from the tide-locked sewers into the town, at certain states of the tide. Mr. Lemon proposes to divide the town into two districts. The high-level portion is to be drained by an

18-in. iron drain pipe, with a gradient of 6 ft. per mile, and there is to be a reservoir sewer, to act as a flushing tank, to hold 5,000 gallons, into which the low level sewage will be pumped. The discharge is to take place at half ebb, at a distance of 630 ft. from high-water mark. No means are proposed for defecating the sewage; and Mr. Lemon speaks with hesitation as to how far it can be got rid of in its crude state without nuisance. That is a point as to which attention should be given to the facts collected by Messrs. Robinson and Melliss, in their work entitled the "Purification of Water-carried Sewage." In the present case, as may be expected from the levels, the sewers of the upper district, Mr. Lemon remarks, become ventilators to the sewers of the lower. It is proposed to provide manholes or lampholes at every hundred yards, which will act as ventilators; that is to say, will diffuse the sewer gas formed through the town, instead of allowing its escape at the outfall or through the higher portion of the sewers. How far sanitation is promoted by such a diffusion of sewer gas is a moot point; and we are thus brought face to face with the two main evils that attend on the treatment of water-borne sewage, when no steps are taken for its disinfection. The estimate of the cost is 5,600*l.* for intercepting sewers; 4,538*l.* for reservoir and outfall; and 5,620*l.* for new sewers, manholes, flushing chambers, gas engines, ejectors, and ventilators. Adding 15 per cent. for contingencies and engineering, the sum arrived at is 18,121*l.*, or 2*56* per head on the population of 1881. The cost of a very similar arrangement at Brighton was 100,000*l.* for a population of about 109,000 persons, as stated by Messrs. Robinson and Melliss.

AN instructive measure of the activity of the builder in London is furnished by the annual report on the monthly returns of district surveyors, published by the Metropolitan Board of Works, of which the thirtieth has just appeared. The fees received in 1885 were more than double those received in 1856, but there have been waves of advance and decline. The first maximum was attained in 1863, from which year there was a decline to 1873. A rise then took place, and was tolerably steady until 1881, amounting to rather more than eighty per cent. in these eight years. A decline succeeded, and has been nearly continuous since 1881, the fees received for which year amounted to 51,383*l.*, while for 1885 they only came to 41,395*l.* In 37 out of the 71 districts specified in the return, the fees received were under 500*l.* each. In seven they were over 1,000*l.* each, the highest being in the district of St. Giles, Camberwell, where the total fees received amounted to 1,733*l.* The expenses of the various districts amounted to 9,292*l.*, or nearly 22½ per cent. on the receipts. The sums added or lost came to 2,561*l.*, or a little over six per cent. of the receipts. The number of new buildings erected in 1885 was 7,669, the additions, alterations, and other works being 10,530. Arrears were received in respect of 3,435 new buildings and 2,348 additions, &c. The total number of works dealt with in the report for 1885 was thus 23,982, the highest number, 29,275, having been attained in 1881. The number returned in 1856 was 14,654.

IN the last issue of the *Bullettino della Commissione Archeologica di Roma* (xiv. 9) appear fac-similes of sculptors' signatures from the plinths of statues recently discovered at Rome, near the Via delle Sette Sale. Fragments only of a few of the statues remain, and these are being diligently pieced together. The signatures, however, are in themselves of great interest for the history of Græco-Roman art, as they throw light on a flourishing school of sculpture down to about the fourth century A.D., at Aphrodisias, the chief city of Caria. The representatives of this school so far best known are Aristæus and Papias, the sculptors of the two famous black marble Centaurs in the Capitoline Museum. Another sculptor, Xenos, of the same city has left us a seated male statue, now in the Ludovisi Palace, on the drapery of which he has inscribed his

name and birth-place; also he has left us a Heron, with a long metrical inscription, in which he boasts of Aphrodisias as "happiest of towns," and says that, "trusting in his art he wandered through many cities." It appears from the number of new Aphrodisias signatures that have turned up in Rome that Xenos or some of his successors must have settled in Italy. The plinths are of Carrara marble, so the statues must have been made on the spot. Three of the names bear the cognomen Flavius,—Flavius Xenon, Flavius Chryseros, Flavius Andronicus. These two last appear for the first time, and are, judging from the style of the letters, of somewhat later date than that of Flavius Xenon. He boasts himself a high priest and a man of fame (διδάσκαλος).

THE *Berliner Philologische Wochenschrift* (December 25) reports the discovery of a well-preserved bronze statue in the excavations still going on between the Erechtheion and the Propylæa. The statue is 27 centimètres high, and represents a female figure wearing a shirt of mail. Her right hand is stretched out; in her left she holds hack a piece of the long robe that falls to her feet; this robe is presumably beneath the coat of mail. The style of the statue is reported to be similar to that of the numerous archaic marble statues recently found. With the figure were discovered twelve bronze vessels,—wine-cups, kraters, and the like. One of these, an amphora, is 29 centimètres high. From the presence of so large a number of bronze vessels it is conjectured that the excavators may be close upon the site of the Chalkotheke, built by the orator Lycurgus. If so the Chalkotheke stood at exactly the opposite corner of the Acropolis to its usually supposed site, *i.e.*, near the modern Museum. But at present this is mere conjecture.

WE are glad to see that the votive Corinthian tablets (in the possession for the most part of the museum at Berlin and the Louvre) are beginning to attract the attention they deserve. In a paper on the "Monuments Grecs Publiés par l'Association pour l'Encouragement des Etudes Grecques en France (11--13)," M. Collignon publishes eight of the most important specimens in the Louvre: his paper can be had as a "tirage à part." The tablets were found at Pendé Skouphia, a little village close to the Acrocorinthos, by a peasant. There can be no doubt as to their intention, they are exvotos, such as frequently appear on vase painting, and in these particular instances they are manifestly intended to be hung up in a shrine sacred to Poseidon. Probably the shrine got too full, a clearance had to be made, and the old exvotos, having served their end, were thrown outside the temenos to make room for new dedications. Two of the tablets represent Poseidon upright, with the name of the dedicator written pillar fashion (σπονδίων) behind him. A third has Amphitrite with her trident, and the words "I am Aphirite [*sic*], the wife of Poseidon." Another has two horsemen starting for the battle, no doubt under the protection of the sea-god. A fourth has two beautiful swan-heads decorating the end of a ship,—the Greek name, *χρυσόκερα*, compels us, if we desire to be accurate, to call them goose-heads, but the beautiful waving necks must have been inspired by a swan's notion. Further, the tablets give us a new potter's signature,—M(ι)lonidas painted (me) and dedicated. The signature of a second Corinthian potter, Timonidas, also appears. He is known to us already by a very curious vase of the shape known as lagynos, found at Cleonæ. The tablet is additional evidence, if any were needed, that Timonidas had his workshop at Corinth. The style of the tablet is more finished than the vase. Besides these mythological designs many scenes from daily life occur, well worthy of study, but which space compels us to omit.

THE Art-Union of London have produced for their annual engraving one of Mr. Leader's landscapes, "Strealey-on-Thames," engraved by Mr. Willmore. It is a good specimen of an old school of line engraving, and the distance is treated with much breadth



and softness of effect. The landscape, like many others by the same artist, is of that superficially sentimental type which appeals best, we suppose, to the popular taste, for which the Art Union, we believe, professes to cater. We are glad that the very large and coarse type of engravings that used to be issued seem to be given up.

MR. EMERSON'S assistant, Mr. Ellis, has thought it incumbent on him, in the absence of his principal, to write to the *Liverpool Courier* and deny our statement that Mr. Emerson made a selection of the drawings of his design for the Liverpool Cathedral for publication in our columns. It is a pity Mr. Ellis did not take the trouble to ascertain the facts before rushing into print. We have Mr. Emerson's letter, dated 6th January, 1886, before us, in which he says:—

"You have full permission to get what drawings from Messrs. Sprague you may require for illustration in the *Builder*, but I do not wish any beyond the following published, from which you may take your choice, viz., a in. scale plan, showing steps at the west end; west perspective ditto; south elevation; east elevation; longitudinal section, with enriched channel; transverse section through west elevation, showing steps, &c.; and interior perspective, and perspective from the east."

The plan and elevation "showing steps,"—an expression twice used,—is the "Design B," which overruns the limits of the site, and which was, as will be seen, the only plan that Mr. Emerson authorised us to publish. After this, perhaps Mr. Ellis will write to the *Liverpool Courier* and withdraw his statements.

#### LETTER FROM PARIS.

THE Ministerial dislocation of the last few weeks has also put a temporary check on the work of the Commission for the 1889 Exhibition; but M. Lockroy, the Commissaire-Général, though turned out with the other Ministers, has been reinstated, and all goes on as before. Besides the architects already mentioned, MM. Contamin, Chabron, and Pierron are engaged as engineers for metallic construction. For the architectural work M. Formigé has the collaboration of MM. Gaston Hénaud and Devienne; M. Bonvard is in relations with MM. Bergon and Gravigny, and M. Dutert with MM. Blavette and Degloze; lastly, M. Laforcade, the able chief gardener of the city of Paris, is charged with all the plantations and gardens on the Champs de Mars and the Trocadéro. The work has fairly begun. The excavation and foundation contracts have been let, and are about to be commenced, as well as the work for the iron supports of the galleries, which will be commenced in April. This last work is estimated at 2,000,000 francs.

As to the Eiffel Tower, there is talk of certain artistic clothing to be given to it, to show people that we are not quite in an age of iron and electricity; but whether the application of a quantity of coloured faience will do much to ameliorate the scheme may be questioned.

The machinery committee, on its part, has been studying the question of motive power, which will play an important part in the Exhibition, and will have to be provided to the extent of 2,500 horse power.

The opening of the Hôtel des Postes, which was announced for the beginning of July last, seems to be adjourned to the Greek Kalends, and it is even said that the building will not be utilised by the State, but is to be sold to the Magasins de Nouveautés. This is an exaggeration; the hôtel will not be sold, but improvements will have to be made, the number of pipes and heating centres increased, the artesian wells deepened, and many other expenses gone into at the cost of the shareholders. Whether all this is the fault of the former Minister of "Postes et Télégraphes," M. Cocheru, or of the present minister, M. Granet, or of the architect, M. Guadet, may be matter of dispute.

The building of the Guimet Museum in the Avenue de Trocadéro, intended to contain the Oriental collection bequeathed to the city by M. Guimet, is actively proceeding; it will probably be opened in 1887; more fortunate than the long-talked-of Musée of Decorative Art, which is still a matter of talk only. According to the official scheme, this building,—which

is to be erected on the site of the ancient Palace of the Cour des Comptes,—is to cost 8,876,000 francs. It is a great outlay for what is after all only the embryo stage of a museum; and thinking persons (there are some still) say it would be much better, instead of all this ostentatious expense, at once to purchase or rent a more modest building in the region of the bronze or furniture establishments, where the Parisian artisan may come and study the work of the finest epochs of French art.

At its meeting again the Chamber will probably proceed to consider the interrupted Metropolitan Railway project, with the Minister of Public Works and the Parliamentary Committee. The latter has suppressed the line from the Halles to the Place Denfert-Rochereau, by which move a saving of thirty millions of francs, making the whole cost 190 millions, instead of 220 millions. But how long it will be from this arrangement to the commencement of the work, and what portion will be ready for 1889, who shall say?

While waiting for the Metropolitan Railway, Paris is to be amused by an International Exhibition, outside the walls, in honour of the fiftieth year of the establishment of railways in the country; for which exhibition the Municipal Council has devoted a very large space in the Bois de Vincennes. The first line opened in France was, in fact, that of St. Etienne, not that of Paris and St. Germain; but the matter is really a private speculation of considerable interest to railway people, and not quite deserving the title of "International."

Though we have already in Paris Houdou's statue of an aged and decrepit Voltaire, and Caillé's presentation of him in middle age (a work heavy and devoid of character), the Municipal Council have accepted a statue of a young Voltaire, by M. Lambert, a sculptor of talent, who is owner of the Château de Ferney, where Voltaire lived, and who, therefore, possesses all the documents and data for making a complete likeness. The statue is not a bad one, but the fashion of Voltaire statues of all ages rather recalls the story of the showman who exhibited the skull of "Voltaire when a child."

In regard to this subject, we may correct a mistake in our last letter, as to the statue of Voltaire which M. Monnier has been commissioned to superintend at St. Claude; the sculptural portion of this is to be by Mdlle. Gagneur, who exhibits annually in the Salon, under the pseudonym of "Syamour."

The Municipal Council has voted 45,000 francs for a pedestal for the Étienne Dolet statue by M. Guilbert for the Place Maubert. The work itself is very mediocre, but, as the pedestal will be ornamented with bas-reliefs of which the most important will be "the City of Paris reviving Free-thought," one may presume that the object of the expenditure is anti-clerical rather than artistic. In regard both to this statue and that to Étienne Marcel there are no materials for a historical likeness, the portraits being merely imaginative. In regard to this latter statue, there is a curious piece of litigation going on, the founder having been under contract to cast it in one piece, while the sculptor, M. Marquette, affirms that it has been cast in fractions. The question is submitted to a special committee.

The Académie des Beaux Arts has been enriched with two fine busts in marble; one, that of Victor Massé, is the work of Aimé Millet; the other, that of Ambroise Firmin Didot, has been presented by the family of the celebrated printer, who had commissioned it long ago from the sculptor Perrand. We have also to note with admiration the recent fine bust of the Abbé Lagarde, founder of the Stanislas College, from the chisel of M. Chapu.

The *Journal Officiel*, on the favourable report of the Conseil d'État, has at last definitely put on record the acceptance of the magnificent gift of the Duc d'Anmale; and the Institut has been authorised, on certain conditions imposed, to accept the ownership of the domain of Chantilly, and of the books and furniture and works of art in the château. The *Journal* adds that "at the expiration of the title of the Institut, and after the reservation of the annual sums necessary for the endowments created by the donor, the revenues of the domain will be consecrated to the keeping up of the buildings, parks, and collections, the development of the library and galleries, the creation of pensions to men of science, artists, and literary men; the foundation of prizes to encourage those entering on

the careers of science, art, or literature; and, lastly, to all expenses incidental to visits of the public to the Musée Condé." We may add here that the fine equestrian statue of M. Paul Dubois, an illustration of which appeared in our pages on June 19 last, has been placed on its pedestal in the courtyard of the château.

The recent losses in the personnel of the Ecole des Beaux Arts have been filled up by new appointments. M. Delaplanche, the sculptor, has been entrusted with the modelling classes in the place of the lamented M. Houlle; MM. Mauduit & Julien, the architects, have been also named professors, the first of construction, the second of perspective, in place of MM. Brune and Chevillard.

The competition for a new school for girls in the Rue des Martyrs, before referred to, has been decided by a jury, presided over by M. Alphand; the design of M. Cassien-Bernard being placed first, those of M. Gennys and M. Breton second and third respectively.

We learn that on the recommendation of the Conseil d'État, the administration intends to "désaffecter" the Church of the Assumption, Rue St. Honoré, against which the anger of the Municipal Council has been long directed. Why should this building have escaped the zeal of the first Revolution? The church, which served as parish church before the erection of the Madeleine, was built about 1670, from the designs of Charles Errard, one of the twelve founders of the Academy of Painting. Eight Corinthian columns support a portico in front of the church, which is in the form of a rotunda with a large cupola, painted in fresco by Delafosse. This maladroit laicisation will not alter the character of the building, and, speaking on artistic grounds merely, it is to be regretted that this system should be pursued of endeavouring to bring under the domain of the State all the great monuments of architecture erected for religious purposes.

Politics mixed up with art generally produce unfortunate results. Without going back to David, who expiated in exile the part he had played in the violent deeds of the Convention, we have seen, nearer to our own day, Gustave Courbet play, in the evil days of the Commune, the part which we all know. The sculptor Baffier, inflamed possibly by such illustrious examples, endeavoured the other day to stab a deputy whom he regarded as too lukewarm. M. Baffier, whose recent works have shown more of artistic violence than artistic feeling, was the author of a "Marat" purchased two years ago by the Municipal Council. Was his attack on M. Germain Casse the result of political fervour or mere derangement of brain? Judging by some of his recent works, especially the "Jacques Bonhomme," in the Salon of 1885, we should lean to the latter conclusion.

The artistic world has learned with great regret that poor François Bonvin has been struck with blindness and paralysis. This conscientious artist, to whom we owe so many pages instinct with observation and talent, is in danger of want, and a committee has been formed to organise a sale of his work, as was done fifteen years ago in the case of the painter Anastasi, who also became blind, and lived to be forgotten by those who had formerly admired his works.

Several artists of merit have died during the past month. The painter Joseph Mélin, who has died at the age of 72, had been a pupil of Paul Delarocbe and of David d'Angers. He was especially occupied with animal painting, and received medals in the Salons of 1843, '49, '55, and '58. We may mention also M. Victor Deroche, a landscape painter of talent; M. Paul Arvise, one of the best designers for Sèvres ware; M. Abel Orty, another landscape painter, who has died at the age of 47; and M. Edouard Lièvre, a former pupil of Couture, who had recently turned his attention to decorative art, and is the author of some very interesting works on furniture.

A curious exhibition of ancient pictures will be open, by the time these lines appear, at the Ecole des Beaux Arts, for the benefit of the sufferers from the inundations in the South of France. One cannot too much praise the zeal and generosity of collectors,—usually very jealous of their treasures,—who at the call of charity are ready to lend their most precious and valued works. It is superfluous to add that the Rothschild family play the most important part among the lenders of pictures. The Baroness de Rothschild contributes a fine Teniers, an admirable landscape by Hobbema,

and a "Jeune Fille à la Rose" by Goya. Baron Alphonse de Rothschild sends a "Portrait of a Young Man" by Raffaello, the "Singer" of Ostade, and a fine example of Cuyt. The Wouvermans and Cuyts of Baron Gustave are there in great force, and among the loans of the Baron Edmond is the famous "Oak" of Ruysdael. The Spitzer collection has also been despoiled of some of its finest works, including the portrait of Edward VI. (of England) and of the Duc d'Albe, by Antonio More, a curious Cranach, and a sketch of the "Mars" which Rubens painted at the Pitti Palace. M. Hector Crémieux has lent three fine Géraults. Among works of the English school will be Lawrence's portrait of the Duc de Richelieu, a "Mother and Child" by Reynolds; and among less known works are some landscapes by Hubert Robert, pictures by Van der Helst, and a hull-fight by Goya, the latter lent by M. Henri Rochefort, who also sends a curious painting of Æneas at Carthage, by Tiepolo. The exhibition will be a very interesting one, and, probably, profitable for those in whose interests it is being held.

#### TWO OLD PARISIAN JEWELLERS: BOURGUET AND BOURDON.

I.—JEAN BOURGUET.

"Mon dessin en faisant ce livre a esté d'instruire le Jeunesse, et de soulager leurs mères, c'est pourquoi c'est aux jeunes gens à qui j'adresse ces instructions, les exhortans de faire attention à ce qui suit et à ce qui est écrit au bas de quelques-unes des planches de ce livre. Premièrement, il faut que l'élève ait un bon couteau et un bon ciseau, et bien desiné, en moins d'ornement. Pour cela je leur ay fait plusieurs tiges de feuilles d'une grandeur suffisante pour pouvoir les desiner au crayon ou à l'encre de la Chine, de plus je leur produit deux belles grandes frises qui sont desja au jour il y a du tems pour les accoutumer à bien rendre une feuille avant que de commencer à graver, je trouve cela si nécessaire que je ne pense pas qu'on puisse réussir aisément sans cette étude; ceux qui me croiroient en demeurant convaincus par l'expérience, et ils verront que quand ils commenceront à graver, cela leur donnera de la facilité et du goût et même pour le pinceau; ce livre les conduira pas à pas par la quantité des morceaux de taille d'espargne et de bas reliefs en émail de toutes sortes de formes et grandeur, — oval, rond, carré, et d'autres figures, puis de les accoutumer à remplir toutes sortes d'ouvrages. On remarque que quand ils n'ont jamais fait que des ovales, des ronds, et des carrés ils se trouvent embarrassés quand ce qu'ils ont à faire a une autre forme; le grand nombre d'élèves que j'ay fait me confirme dans ce que je dis icy: je leur donne dans le bas de cette feuille plusieurs têtes de bagues, où ils remarqueront comme il faut premièrement tailler en taille basse et nette, en sorte que quand on a cossillé, et usé, les contours soient bien formés afin qu'il n'y ait plus que les coups de force à donner au pinceau, car pour les tendresses ce doit être l'or qui les forme, ce que je n'ay pu exprimer que par un trait fin, qu'il ne faut pas absolument faire au pinceau. C'est pourquoi tout consiste à tailler nettement, et de bon goût; avec un peu de soin et d'application ils connoîtront la vérité de ce que je dis; mais si quelques-uns sont assés négligens pour ne pas faire attention à ce que je leur enseigne qu'ils s'emprennent à leur peu de bonne volonté; si quelques-uns en profitent qu'ils m'en sachent gré. Pour moy, j'ay fait ceci de bon cœur pour leur rendre service; Dieu leur fasse la grace d'en profiter."—Preface to Bourguet's "Second Livre de Taille d'Espargne."

AMONG some absolutely or comparatively unknown masters of decorative art whose work we propose making our readers acquainted, we have selected for our first article two French jewellers who lived in Paris in the early part of last century, Jean Bourguet and Pierre Bourdon. Each of them published a little oblong octavo book full of the choicest designs from his own hands. The curious piece of old French at the head of this article forms the preface to Bourguet's volume; it is packed full of lessons for all who are learning and all who, having learned, have also learned to love, the art of decoration. So far as we have been able to ascertain, the books are not only not to be procured, but scarcely to be seen in this country. The only copies we have traced are an almost complete set of the plates of both books, very clean and well preserved, in the Print-room of the British Museum, and one copy of Bourdon's work, in a fair state of preservation, in the Art Library of the South Kensington Museum. Possibly the book-boxes on the quays by the Seine may contain many scattered fragments of the masterpieces of these two old and, we trust, in their days, respected citizens of La Belle France; but, alas! beyond such few copies of their books as may still exist, all their memorials have perished with them. An industrious and peaceable citizen's life naturally contains but few incidents worth recording; so, perhaps, after all, it is not to be wondered at that the art books are almost silent about these two jewellers. But it is a matter of wonder that not their lives merely, but their works, are passed by in solemn silence by the compilers of our books of refer-

ence. We have been unable to trace a single recorded opinion upon the artistic excellence of those works in all the host of books which have been written on the art of decoration. Even Reynard, in his valuable album of reproductions of the best specimens of the decorative work of the fifteenth to the eighteenth centuries, has

he certainly must have been at the zenith of his powers at that time. Its title runs thus:—"Second Livre de Taille d'Espargne, et de Bas Reliefs en Esmail, ou noir d'Escaille, Bas Reliefs pour Tabatières et Ouvrages d'Orlogerie, par J. Bourguet, Marchand Orfèvre à Paris." The first page contains the preface already



Fig. 1.

only condescended to give us one page from each book, and Reynard, with all his appreciation of the beauties of the art, refrains from giving critical opinions on any of the plates he reproduces. Designs good, bad, and indifferent are given one after another, the reader, or

given, very neatly engraved. We cannot do better than at once to make some notes upon the lessons he teaches in it.

There is a charming old-world sincerity and cordiality about the exhortation to the young pupils, for whose benefit he undertook his labour



Fig. 2.

rather the beholder, being left to draw his own conclusions from, and make his own reflections upon, them. It is our pleasant task, therefore, to commence this series of articles with two artists so completely unknown as Bourguet and Bourdon, and we may proceed at once to judge

of love; and about the kindly remembrance of the pangs endured by their masters,—pangs which, doubtless, had given him the acutest suffering during the lessons he gave to his own apprentices. Then there follows a short application to his own peculiar industry of a



Fig. 3.

them by their works, so that by them in the future they may be known.

Jean Bourguet, then, lived in Paris quite early in the eighteenth century. (The date given in Bryau's Dictionary is "flourished about 1702.") His "Second Livre" (which from certain *scintille* of internal evidence we take to mean second edition) bears date, however, 1723, and

principle which in truth lies at the root of the whole matter, which is the keystone of all industrial art. "First, it is certain that to become a good gold and silver smith, you must begin by knowing at least how to draw and design (the use of the word *desiner* seems to be clearly elliptical) ornament." The true function of ornamentation is surely a very high one: it is

one of those mysterious influences which charm away the tedious monotony of life. What would existence be like under a sky of never-changing grey or endless sunshine? Those who have been forced to bear it tell us it is unendurable, and that a ray of light, or a patch of cloud or shadow, is welcome as flowers in May. Could we live in a world where bricklayers and masons only built dead walls? Watch how the light, even in this dull, smoke-bespattered London of ours, glances off the changing curves of the massive cornice on that large commercial edifice over the way, which day by day brings premature night upon our office. Mark how the eye wanders over the monotonous surfaces, seeking rest and finds it in that line of light, and there will be no uncertainty in the answer. Ornamentation makes our world of variety instead of a dead-level world of monotony, and variety is always very charming. In all forms of work, from the highest to the lowest, ornament has its proper place; in some that place is a more prominent one than in others; but a place it must have always. And yet it is by no means certain, indeed, in a great number of cases it is assuredly uncertain,—that the workers, master and men, do devote the proper attention and study to it. "Oh! anything will do." "Shove in something, somehow and anywhere." The matter and the manner, the form and the execution, are too often utterly neglected. The ghastly devices that meet us on all sides as we take our walks abroad tell their own gruesome tale of neglect of the commonest ideas of beauty and of grace. This principle, then, which

given in fig. 1, we think that this conjecture amounts to an absolute certainty; the two finals given in fig. 2 reveal more of the draughtsman's own spirit, working in new lines, and imbuing outlines more formal than Van Meekenen ever attempted with the master's grace. In addition to the plates on which he drew a considerable number of these *tiges de feuilles*,



Fig. 5.

he produced two very fine scrolls, which, with pardonable vanity, he calls "*deux belles grandes frises*"; they are, indeed, masterpieces of constructive skill and of the very greatest beauty. In fig. 6 we have given a sketch of the best of the two, and in fig. 5 one



Fig. 6.

of a smaller and more compact composition of the same class. The lesson which he expressly meant to force upon the attention of his pupils in these acanthus studies was, as he expresses it, "*pour les accoutumer à bien refendre une feuille avant que de commencer à graver.*" A *feuille refendue*, that is, to cut or split up the outline of the leaf properly. The ultimate

success of the design must obviously depend on the care and accuracy with which this is done. The deeply-serrated leaf of the "bear's breech" has always exercised the greatest fascination over the designer, perhaps on account of the great difficulties which it puts in the way of accurate conventionalising; but when they are overcome, the result more than repays the labour which the achievement has cost. It is, of course, perfectly easy to let a pupil copy a model of an acanthus leaf and "lay it on" where it may be wanted; but this feeble method of instruction would not suit an artist such as Bourguet was; his scholars must realise the why and the wherefore which make the model worthy to be copied; they must understand the principles on which it is constructed, so that afterwards they may be able to work independently of the work of others; that they may be able to adapt their foliage to the necessities of every case, and that each leaf should, as in nature, have its own peculiarity and its own charm.

It will not perhaps be out of place here to dwell shortly on what we understand by accurate conventionalism. We have on previous occasions insisted on the importance in ornamentation of keeping the line between representative art and decorative art rigidly fixed. We have also pointed out how decorative art can derive its inspiration from nature without passing from the right to the wrong side of this line. When it does go to nature for inspiration it conventionalises natural form, adapting it to the capacity of the materials in which the work is to be executed. But if, while drawing from this fount of inspiration, it adopts nature's work in part only and in part rejects it, the result can only be commonplace and often vulgar and offensive. As in the broad structure of conventional work generally nature's tangential law cannot be neglected with impunity, so in the smaller detail of the conventional foliage a most rigid observance of the laws of leaf-growth is an absolute necessity. To illustrate our meaning, let us consider one of the simplest of the well-known decorative leaf forms, the ivy, so much used by the Mediaeval illuminators, either with its three or five points. As we all know it, it is difficult to realise a figure more full of simple grace; but imagine one of the parts unduly distorted or one of them omitted, or the angles at which the side lobes spring from the stem altered beyond the limits which Nature allows herself; the result would be at once most hideous and uncouth. Or imagine one of the petals of the Tudor rose displaced and made to spring from nowhere in particular; or the whole of the petals, instead of clustering round the centre, decentralised. Could anything more grotesque, uncomfortable, or impossible be devised? And so it is with the serrations of the acanthus leaf. Nature has her own laws, which she implicitly abides by in furnishing the leaf with these indentations. They are closely allied to those which govern the spring of the fern fronds, although in that plant they are more easily to be discerned. Each serration is, in fact, a separate leaf with its own separate structure; but instead of standing out distinctly, as in the fern, the greater part of its form is merged in the main body of the leaf, leaving nothing but the points distinct, the size of these distinct points varying in every leaf and in every lobe. The main stems of all the dependent lobes in nature are connected in a clearly-defined manner with the main stem of the parent leaf, and their connexion must be preserved in the conventional foliage. In much of the acanthus foliage with which our houses are beautified in the present day, it is a perfect puzzle to find the stem of the lobes, and, when found, to discover what on earth it has to do with the main body of the leaf. The same principle, it need hardly be said, must be observed in the "bellying" of the leaves. If the decorator who uses the acanthus for his model ignores this structural principle he can only produce something which cannot fail to be repulsive to the eye.

But this principle, as we have said, is only an illustration of the broad general one; in both the large designs Bourguet has shown himself a master of the broad principles of construction. In fig. 5 he has adopted with the greatest fidelity the general idea of the plant growth of the acanthus, tapering gradually with less and less foliage up the flower stem. In fig. 6 the design is based on an imaginary and fanciful plant growth, but the flow of the curves is based with the most rigid fidelity on Nature's



Fig. 4.

Bourguet first insists upon, with regard to his own profession, we take to be a true, a lasting, and a universal one. Are you architect? Are you builder or stonemason? Are you worker in woods or metals or precious stones? Do you weave the soft threads of silk or wool, or homelier cotton? Do you mould the clay into vessels whose uses may be noble or ignoble? Do you put the commonest of the products which Nature has laid at your feet to the services which necessity has taught? Before you can do any of these things well, before the world can take pleasure in looking upon your work, above all things it is of the first importance that you should be able to devise some pleasant breaks to the uniformity of the broad surfaces which first come from your hand. This is the first rule Jean Bourguet instilled into the minds of those who sat at his feet:—If you would become a good goldsmith, learn the nature and the power of design. To this end he devotes some of his plates exclusively to studies of conventional or decorative foliage. The leaf he makes use of without exception is the deeply-serrated acanthus, which has so often, and with so much charming variety, stood in such good stead to the art-workers of many centuries. His methods of treating the leaf, of twisting out floral excrescences, and of manipulating the stems, is based, as it seems to us, entirely on that of Israel van Meekenen, some of whose charming productions we considered in our issues of Dec. 5 and 12, 1885. Van Meekenen's work certainly found its way into France at some time or other; the writer of these articles remembers in his early years to have seen in a cheap French book of alphabets some reproductions of Israel's celebrated alphabet, stated to have been copied from the collections of the Luxembourg. But Bourguet was not a mere servile imitator of the great German master; he studied him at his best, he caught the grace and charm and all the niceties of his spirit, and thenceforward made it his own. If we look carefully at the three floral studies

tangential law; and the whole of it is wrought with the most subtle charm, the grace of the drooping flower being especially noticeable. We think that these *deux belles grandes frises* will well repay the most careful study.

There is a dash of worldly wisdom in the worthy jeweller's next remark, and we cordially echo his words, for there is nothing so difficult as getting people with ideas of their own, and who, having a certain amount of taste, consider that they know all about the matter, to realise that there are such things as canons of decorative art; or, if they like it better, a right and a wrong in decoration. "Those who believe what I say, experience will confirm . . . but if there should be some negligent enough not to pay attention to what I am teaching them, they must lay the blame on their own lack of good will."

Another of Bourguet's remarks we cannot pass over.—"It is to be observed," he says, "that when people have only ornamented ovals, circles, and squares, they find some difficulty when they have to ornament some other form. The great number of pupils I have had confirms me in what I am saying." The necessary correspondence between the structure of the ornament and that of the space ornamented is another of the great canons of the art.

In figs. 3 and 4 we have given some specimens of Bourguet's work where the play of his fancy was confined within set spaces: fig. 4 is probably for the lid of an enamelled snuff-box; the others are medallions in the same style designed for the embellishment of the pages of the book. There is a wonderful charm in the way in which in all the cases the design adapts itself to the outline without the slightest appearance of constraint, and also in the remarkable manner in which the surface is covered. The use of straight lines occasionally breaking up the flow of the curves is also noticeable, in every case without in the slightest degree marring the continuity of the design, but rather giving it a force of its own. The other specimen given is a curious arabesque pattern of great originality and beauty.

Here we must leave the excellent Jean Bourguet, master of his craft, and worthy instructor of many apprentices, who, doubtless, in their day also gave good work to the world. The instruction that he conveyed to them he preserved in his carefully-engraved pages; it is not too much to hope that 160 years after their first appearance the remnant of them which survives may still be pregnant with life and vitality to influence and instruct the youth of this later generation, "*et de soulager leurs maîtres.*" "If some shall profit therefrom let them admit their indebtedness to me; for myself I have done this with good heart to do them service. May God give them grace to avail themselves of it."<sup>\*</sup>

#### LONDON AND THE SESSION OF 1887.

With the last day of November expired the time for the official deposit of plans and notices relative to the various public works which will be submitted to Parliament in the Session next ensuing. The numbers of railway Bills and provisional orders are both less than on the same occasion in 1885, when the totals were respectively 53 and 62. This year they amount to 48 and 40. Of plans 132 are lodged, as compared with 176 twelve months ago. So similarly with the miscellaneous and tramway groups, the respective figures being severally 48 (1885) and 33 (1886); and 13 (1885) and 11 (1886). Various "notices" are also given by the Metropolitan Board of Works for projected operations, as well as by the School Board for London in respect of a further batch of provisional orders for supplying additional school accommodation. Confining our observations for the present to within the home district we proceed to briefly indicate what are the more important schemes under contemplation.

The School Board schedule a total of twenty sites, representing a gross area of about 15½ acres. A deduction, however, will in effect be made of four sites, equivalent to, say, either 2½ or 3½ acres, from the grand total as a set-off on the score of alternative sites. The twenty sites fixed upon are situated in the parishes of St. Peter and St. Paul, Hammersmith (2, being alternative); St. Mary, Stoke Newington (3, two of them being alternative); St. John, Hackney (1); Stretcham (1); St. James,

Clerkenwell (3, one being alternative with that in Islington); St. Ann, Limehouse (1); St. George-in-the-East (1); St. Giles, Camberwell (3); Islington (1, being alternative with one in Clerkenwell); Wandsworth (1); St. Paul, Deptford (1); and in the Hamlet of Peuge (2, being alternative). The plans for the parcels of land may be seen at the offices of the Board, on the Victoria Embankment; and the provisional orders will be submitted, we believe, for confirmation to the Educational Office, Whitehall, for ultimate ratification by the Queen in Privy Council.

We will now turn to the Metropolitan Board of Works. In virtue of a Metropolitan Management Act Amendment Bill the Board seek to get conferred on them and on certain vestries and district boards further powers over the laying of mains and pipes for water, gas, or hydraulic power purposes; and this Bill will provide for giving the vestries and boards additional powers as to the formation of streets and roads, besides extending, it may be, the powers of gas and waterworks companies. Their Theatres and Music Halls Bill is designed, as last year, to extend their "powers as to the inspection of houses or other places of public resort . . . kept open for the public performance of stage plays; and of houses, rooms, or other places of public resort . . . kept open for dancing, music, or other public entertainments of the like kind." This Bill may require that before such a place is licensed it shall obtain a Board's certificate, to run for a year, as to the efficiency of its structural and other arrangements and appliances for public safety; and that such places shall be deemed to be unlicensed unless such certificate have been granted, and also as to the efficiency of arrangements, &c., for protection from fire; and that the Board make by-laws or regulations for carrying out, under penalty, their requirements. Under another Bill, also as last year, the Board seek to alter so much of the Metropolitan Fire Brigade Act, 1865, as relates to the contributions towards expenses of carrying out the Act which are to be paid by companies insuring property from fire, and to fix the companies' contributions on a new basis. The Board's intentions are very vaguely expressed, but in the result they mean that the limit of one 3d. rate on the gross value of the property, as defined in their Loans Act, 1863, shall cease to be the maximum estimate. They propose to make a bridge across the Surrey Canal in Canterbury Bridge, Deptford, in lieu of the existing swing-bridge, and to secure that the cost shall be partly borne by the Camberwell Vestry and the Greenwich District Board of Works; and to make a means of communication beneath the Thames at Blackwall in the shape of a tunnel (single or double) for vehicular,—but not tramway,—and pedestrian traffic,—the tunnel with its approaches to lie between the Artichoke Tavern, Poplar, and Ordnance Wharf, Greenwich. They will ask for an extension of the time which is now limited by the Metropolitan Bridges Act, 1881, and their own Bridges Act, 1884, for the compulsory purchase of lands for the new Battersea Bridge and its approaches, together with the alteration of Vauxhall Bridge. As touching open spaces, they propose that the Commissioners of H.M. Works and Public Buildings shall transfer to them all functions in relation to Victoria Park,\* Battersea Park (250 acres, *olim* Battersea-fields), Kennington Park (25 acres, *olim* Kennington-common), the public garden adjoining to the Museum at Bethnal-green, the Thames (Chelsea) Embankment, including the river wall and works in connexion therewith; and Westminster Bridge, with its approaches. The costs of maintenance would thus be shifted from the Consolidated Fund on to the metropolitan ratepayers, so far, indeed, as they are not met by the incomes derived from the properties in question. It is further contemplated to enable the Lewisham District Board to acquire and maintain as an open space or recreation-ground a parcel of land between Dulwich-road and Laurel-grove at Peuge, the Metropolitan Board defraying one-half of the expense; to purchase and throw into Bostall Heath, Plumstead, a piece of land on its northern side; to make an addition to Brook-green, Hammersmith; and to agree with the owners for purchase of certain houses, buildings, and lands,

—about 32 acres in all,—known as Ravenscourt Park, Hammersmith, for future maintenance as a public recreation-ground. Under this head, too, falls their decision to insert powers into their Various Powers Bill for the transfer to them of all the duties and privileges at present discharged by the Wandsworth-Common Conservators. Here arise certain vexed questions, and we are told that the Board's proposals do not receive the unanimous approval of the inhabitants mostly interested. The Common, or rather the 160 acres which alone remain open, yet retains some *beau-vestes* of its once suburban attractions. There is a strong local feeling against its being subjected to the ultra-Puritanical régime that prevails at, for instance, Hampstead Heath and Clapham-common. Within our own memory that charming bit, the old "Black Sea," has been appropriated for the villas of Spencer Park; whilst the dealings of the Commissioners of the Patriotic Fund with the sixty acres which they secured about thirty years since scarcely encourage the Conservators to hope that the Common might not eventually disappear. They assert that from 1794 to 1866, as many as fifty-three enclosures were made, varying in area from a quarter to ninety-six acres, that the total area of common land enclosed during the past century in Battersea and Wandsworth parishes alone exceeds not less than 500 acres, and that nearly 3,000 acres locally subscribed, has been spent in preserving the 160 acres which are left. We may here add that, as we mentioned two or three weeks ago, an adverse poll of the Hornsey ratepayers has decisively shelved, for the present, the Local Board's scheme for the sale to them by the Ecclesiastical Commissioners, for 25,000*l.*, of the fifty-three acres known as Churchyard Bottom Wood, Highbury. It is contended that the Commissioners do not own the freehold to sell, but that they, as vested with manorial rights, could be compelled to keep that area open for public use and enjoyment. Mr. H. R. Williams's exertions largely contributed to the successful negotiations whereby the neighbouring Gravel Pit Wood was acquired, without purchase, for the care of the Corporation of London, and it is to be hoped that no legitimate efforts will be spared to complete his good work.

The Corporation of London are minded to construct a new approach to Leadenhall Market by altering and straightening the existing thoroughfare leading (westwards) from Lime-street, by the Peterwells' Hall, to the market. The changes will be made in the parishes of St. Dionis Backchurch and All Hallows, Lombard-street. They will also apply to Parliament for an Act whereby at all municipal elections within the City limits the voting, in case a poll be demanded, shall be taken by ballot.

Of railway schemes the first in point of magnitude is that promoted under style of the West London Extension and Commercial Docks Railway. It is proposed to construct a line from the West London line, at a point just north-east of Clapham Junction, to a point in Onegar-yard by the Norway Dock of the Surrey Commercial Dock Company. Its several junctions with the East London, South London, Thames Junction, and North Kent lines will add considerably to the hewling-ganglion of lines that already exists in the market gardens between Hatching New Town and Deptford. This Bill empowers the new Company to purchase, of the Dock Company, the Grand Surrey Canal and its branch, known as the Peckham Branch, and the Croydon arm or Railway Lay-Bye. And since it provides for the discontinuance of such canal with its branches, and for relieving the two companies from any obligation to maintain the same, we gather that part of the proposed railway will lie in the bed of the canal, between Camberwell-road (eastern side) and the Russia and Norway docks of the Dock Company. With this may be compared a recent project for laying a railway in the bed of the Regent's Canal. The direction planned out for the new railway brings back to mind King Cnut's cutting a trench from Redriff (Rotherhithe), over against Wapping Old Stairs, to Lambeth, across the morasses of Bermondsey, Southwark, and St. George's Fields. There

\* Nearly 300 acres. Its prime cost was covered by the sale (1841) to the second Duke of Sutherland, for 75,000*l.*, of the Crown lease of York (now St. Stafford) House, St. James's Park. *Tithe statutes* 4 and 5 Vict., cap. 27, and 5 and 6 Vict., cap. 20.

\* The Patriotic Schools were erected in 1857 (girls\*) and 1870 (boys\*). The latter, with about 11 acres, has been sold (1882) for 30,000*l.*, to the Governors of Emmanuel Hospital. A fence has been set up to separate the 20 acres not needed for the former, and this land the Commissioners have leased for farm buildings and a house.

\* To be continued.

can be no doubt that such a canal was really made in the course of the siege of London by the Danes, though it failed to answer the purpose designed for transporting shallow-draught vessels, or, rather, galleys, to westwards of London. There is some evidence that the same sovereign also made or devised a similar canal around the northern side of the City. The former trench is reputed to have been used as a tideway during the building of Peter of Colechurch's stone bridge across the Thames. The Great Eastern Railway Company have in view a branch from their Colchester line in St. Mary's, Stratford-le-how, to Victoria Park, with a junction to the thickly-populated and just-incorporated borough of West Ham. They mean to enlarge their Liverpool-street terminus, and to widen the railway leading thereto, along the eastern side thereof (the North London Railway being to the west), for the length between Norton Folgate and Two Swan-yard. The enlargement of Liverpool-street station and the line northwards will involve the removal of St. Botolph, Bishopsgate Without, ward and parish schools, with the chapel and cradle's residence appertaining to them in Primrose and Skinner streets. We can merely mention the new City of London and Southwark Sub-way (Kennington Extension), and the Latimer road—at Notting Hill—and Acton Railway. On the other hand the London, Hendon, and Harrow Railway is abandoned. The North London, South Eastern, Metropolitan, Lewisham and Greenwich and District Tramways are generally to be extended in various directions. Of a scheme affecting Clissold Park, Stoke Newington, and of the Government New Bankruptcy Offices Bill we must reserve our notice, for the two sites concerned demand a few words in regard to their historical and topographical features.

THE RATEABILITY OF MACHINERY.

"The decided cases upon the question of the rateability of machinery exhibit considerable difference of opinion among the judges as to what is and what is not rateable, differences which it is impossible to reconcile." This is the statement to be found in the latest edition of Mr. Castle's well-known work on the law of rating. A few pages further on he thus alludes to the case of Laing v. The Overseers of Bishopwearmouth, "The most recent case seems to have unsettled the law more than ever." Under such circumstances as these, the case of Regina v. The Tyne Boiler Works Company (Limited), which was recently decided by the Court of Appeal, seems to deserve the most speedy notice; for it can scarcely be questioned that it puts an end to the doubt which has recently been felt on the subject, and, as a decision of the Court of Appeal, must be regarded as settling the law upon this point. In effect, though not in name, it was an appeal against the decision in the Bishopwearmouth case, because the Justices at Quarter Sessions, and also a divisional court of the Queen's Bench Division, acted on that decision, so that the propriety of the decision in the Bishopwearmouth case came directly under review by the Court of Appeal.

In the Tyne Boiler Works case, the machinery as to which the question arose consisted of a hydraulic riveting machine, resting by its own weight alone on a cement foundation, and of two travelling cranes, running on rails fixed on halks of timber. There was no intention that these articles should be permanently annexed to the works, and it is clear they were not permanently attached to the ground. In the Bishopwearmouth case some of the machinery was bolted to the ground, but in a manner that enabled it to be removed at will, and some, as in the last case, was retained in its place by its weight only. In delivering judgment in the former case the late Chief Justice Cockburn observed that all the machinery was rateable,— "The whole of it, though some of it may be capable of being removed without injury to itself or to the freehold, is essentially necessary to the shipbuilding business, to which the premises are devoted, and must be taken to be intended to remain permanently attached to them so long as these premises are applied to their present purpose." Now, let us follow up this dictum with the rule as enunciated last week by the Master of the Rolls:—"Things on the premises are to be rated which are there for the purpose of making and which make premises fit, as premises, for the particular purpose for which

they are used; these ought to be taken into consideration, as enhancing the rateable value of the premises." Therefore it is now quite clear that the doctrine that machinery must be physically attached to the soil in order to be rateable, or, it would be more correct to say, to be included in the rateable value of the premises, is now absolutely at an end. Again, the test proposed by Mr. Castle, viz., whether such machinery would be landlord's or tenant's property from year to year, seems now equally to have no legal authority. It is, no doubt, true that this decision may cause some difficulties, because it may be that things not hitherto included as adding to the rateable value of premises will, in future, have to be taken into account. Furniture is not rateable, but would a billiard-table in public billiard-rooms be regarded as adding to the rateable value? We mention this as an instance of an article which may be regarded as belonging to two classes. Difficulties or no difficulties, however, there can be no question that this decision of the Court of Appeal has finally settled a point upon which there has long existed doubt, though the balance of judicial decisions seems to lean towards the solution now reached by the Court of Appeal.

MAP OF LONDON, SHOWING THE BOUNDARIES OF SURVEYORS' DISTRICTS.

We publish this week the first section of a map of London, showing the boundaries of the Surveyors' districts under the Metropolitan Board of Works, accompanied by a list giving the addresses of the district offices and their hours of business. The remainder of this map will follow in three other sections with the three succeeding numbers of the Builder, so arranged that the four can be mounted as one map if desired.

The boundaries have been put on with great care by a draughtsman who had access to the best documentary information, and we hope that the map may be of use to architects and builders, especially when on work near one of the district boundaries, when a mistake as to the actual district may easily be made, and has often been made, resulting in loss of time and other inconvenience which, we hope, may be obviated henceforward.

Illustrations.

THE HOTEL DE VILLE, PANTIN.

WE have previously given illustrations of two of the suburban Town-halls or Mairies rising up around Paris, those of Neuilly\* and St. Denis†, and we give this week an illustration of another more recent erection of the same kind at Pantin, one of the most important communes of the Department of the Seine, the population of which has been augmented since the war by a great number of emigrants, or immigrants, from Alsace. The previous town-hall was a mere villa, "une folie," as it was called, originally erected by the Marechal de Sombise for a certain lady once famous in the dancing world and otherwise. The new building, erected from the designs of M. Léon Guélorget, erected for the inhabitants of Pantin with an official building more adequate in its requirements as well as more dignified in its origin.

The new Hôtel de Ville occupies a central site between the houses of "Vieux Pantin" and those of the new Alsatian colony, known as the "Quatre Chemins." The building is a large one, the principal front, shown in the view, being about 150 ft. long. The style adopted is that of the Renaissance under Henri II. Remarkable care has been bestowed by the architect on the treatment and execution of the ornamental detail.

The three entrances of the principal front lead to a vestibule decorated with an order of columns and pilasters, leading to the main staircase lighted by a large stained-glass window, executed in the style of the close of the six-

teenth century, after a cartoon by M. Guélorget; a composition symbolising the industry and commerce of Pantin.

The Salle de Justice opens from the entrance vestibule; the other public rooms are arranged on various stories as convenient. The Salle des Fêtes is on the first floor, with the Salle des Mariages on the one hand of the same floor, and the Council-room on the other. This arrangement, unavoidable, has a little cramped the Salle des Fêtes. This latter contains a fine chimney-piece in white marble, unfortunately disfigured by a very bad bust representing "La République." The principal doorway to the Salle has a pediment decorated with the arms of the ancient Dukes of Pantin, which date from 1204.

The illustration is engraved from a photograph, by Mr. J. D. Cooper.

"THE ENCHANTED CHAIR": SCULPTURE.

ALL who visited the last Academy exhibition will remember, or ought to remember, this fine life-size group in terra cotta, by Mr. A. Gilbert, which occupied a prominent position in the octagon hall, and is one of the most imaginative and original works by an English sculptor which we have seen there of late years. It is not merely a finely-modelled study; there is a poetic suggestiveness about it; the dragon wings coiled up under the seat, the Cupid among them, the eagle with outstretched wings above, suggest we know not what of glamour. There is a whole "Arabian Night's" tale in the group; one can fancy all kinds of legends for it. The feeling of deep sleep is finely conveyed in the figure. We have much pleasure in giving an illustration of a work which, both in technique and in imaginative power, gives us reason to look with much interest for its author's future productions.

It may be right to add that Mr. Gilbert speaks of the work as "unfinished," and we presume the minor details are not worked out entirely according to the ultimately intended form.

THE CHANTRY OF HENRY V., WESTMINSTER ABBEY.

HENRY V. is said to have cherished a peculiar veneration for Westminster Abbey as the scene of the great reformation of his character. He not only ordered the great architect of his age to continue the building of the nave of the church, but also, in his will (made just before the expedition to France which led to the battle of Agincourt) declared that he would be buried in the Abbey, and gave minute directions as to the position and form of his tomb.

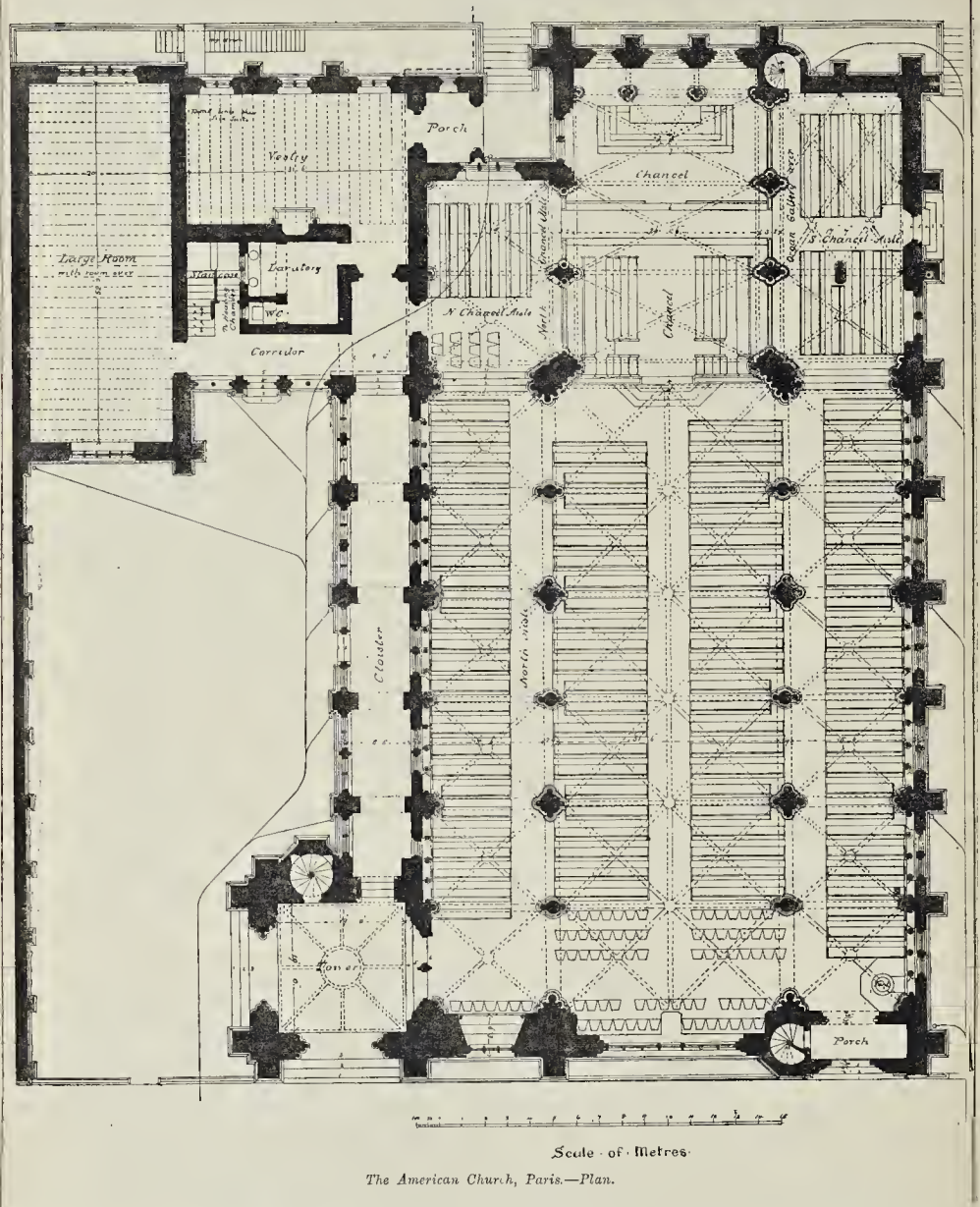
On Henry's death, at Vincennes, the body was brought, with great magnificence, to Westminster, notwithstanding large offers of money by Paris and Rouen to be allowed the honour of retaining it. The extreme east end of the Confessor's Chapel, hitherto devoted to the sacred relic, was cleared out, and the present magnificent Chantry erected at a level where it could be seen from the body of the building. The form of the structure is said to be based upon that of the letter H, the first of Henry's name. He was the first king to order the erection of a separate chantry over his tomb. The larger statues represent the patron saints of France and England,—St. Denis and St. George,—as well as King Arthur and Edward the Confessor. The smaller sculpture represents the personal peculiarities of Henry V., and scenes from his life.

CHURCH OF THE HOLY INNOCENTS, HAMMERSMITH.

THIS church, designed by Mr. Jas. Brooks, is a fine example of simple and solid work, producing its effect by massive construction and picturesque outline and grouping, without any adventitious aid from decorative detail. The plan is designed on the system, which has been tried from time to time by modern church architects, of making the side aisles narrow alleys for passage merely. This treatment is unfortunately rather difficult to carry out architecturally without going to the opposite extreme and making the aisles too narrow, as is certainly the case with Street's Church of All Saints at Clifton, where this plan was tried

\* Builder, January 2nd, 1886.

† Builder, October 30th, 1885.



and where the passage past the piers is too narrow for two people to walk abreast conveniently. We hope this has been avoided in the design shown here. The exterior architectural treatment is very solid and effective.

#### THE AMERICAN CHURCH, PARIS.

We give some of the geometrical drawings for this building, which is, we understand, much admired in Paris. It is situated in the Avenue de l'Alma, Champs Élysées.

Some of the small scale drawings were prepared during the lifetime of the late G. E. Street, R.A., the other drawings and details have all been made by his son, Arthur Edmund Street, M.A., under whose supervision the work has been carried out. Mr. Arthur Street also

designed the vestry buildings and all the furniture and fittings of the church, the bishop's throne, stalls, sitters, &c.

The walls are built in dressed ashlar, and inside, and outside of Conflans stone; the arcade, columns, and other portions of the building are executed in Ancy-le-Franc stone.

The woodwork is all of oak; the roofs are covered with green Eureka slates. The floors are all of marble, in patterns executed by Messrs. Farmer & Brindley, who also carried out the stone carving.

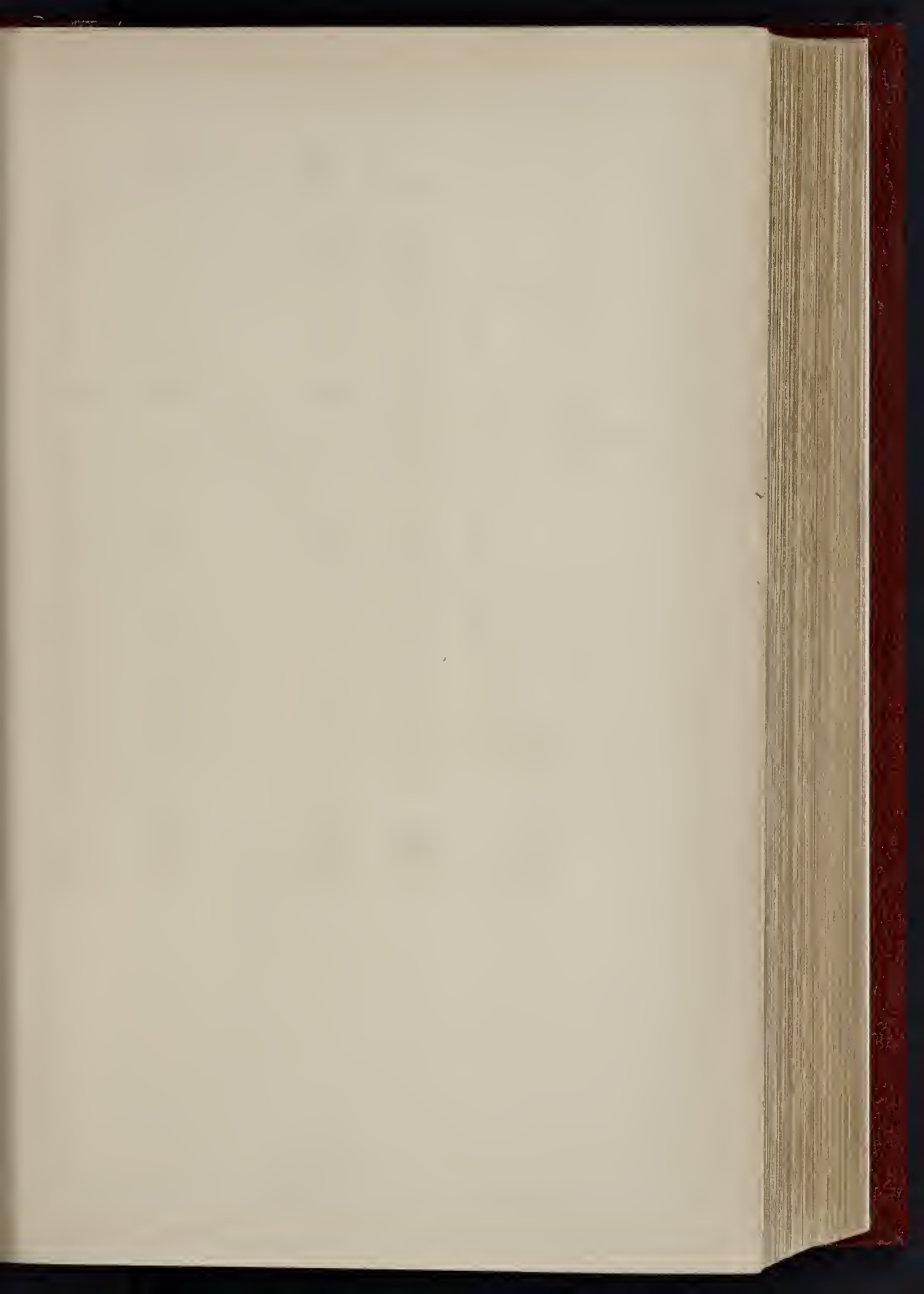
The heating was carried out by Messrs. Jeakes & Co., and the wrought-iron screens and hinges and tower gates by Mr. Barford. Messrs. Potter executed the altar-rails and candle standards in the church as well as in the mortuary chapel below the vestry buildings, and likewise the railings outside. Mr.

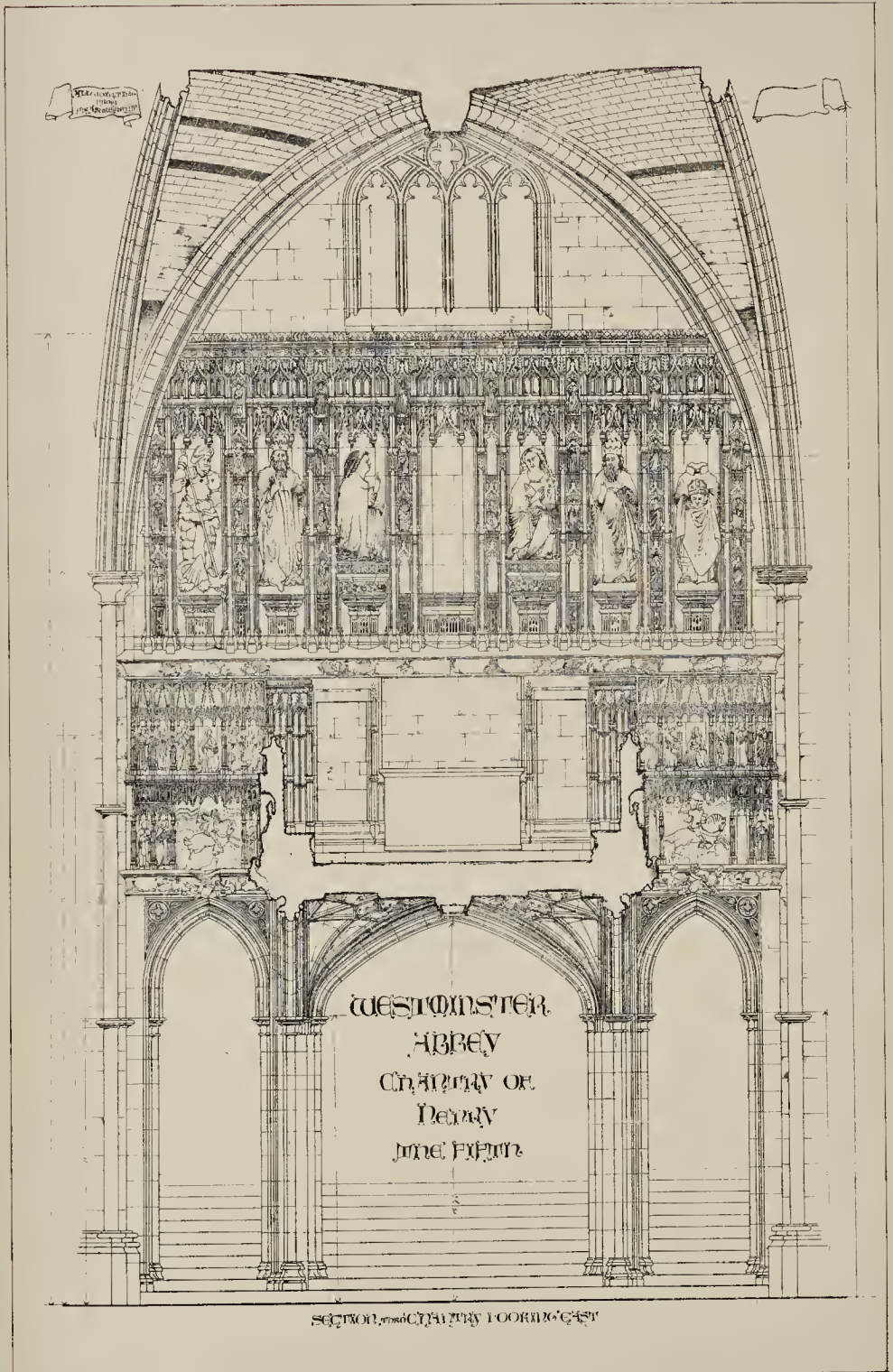
Robinson, Bloomsbury, made the oak sedilia; and Mr. Gibbons the liany-desk. Mr. Earp executed the Bishop's throne, the altar, retable, and font.

Some of the stained glass which has been fixed has been carried out by Messrs. Bell & Beckham, and the scheme and a great part of the design was the conception of the late Mr. Jas. Bell, under Mr. A. E. Street's direction.

Mr. Lovatt, of Wolverhampton, was the contractor, and the cost of the buildings may be taken at about 50,000*l.* for the church, and 14,000*l.* for the vestry buildings, in addition to which there have been many special gifts. Mr. Wallis has been the clerk of works.

**Obituary.**—Mr. John Warrington Wood, the sculptor, died on Sunday last in Warrington, his native town, after a short illness.



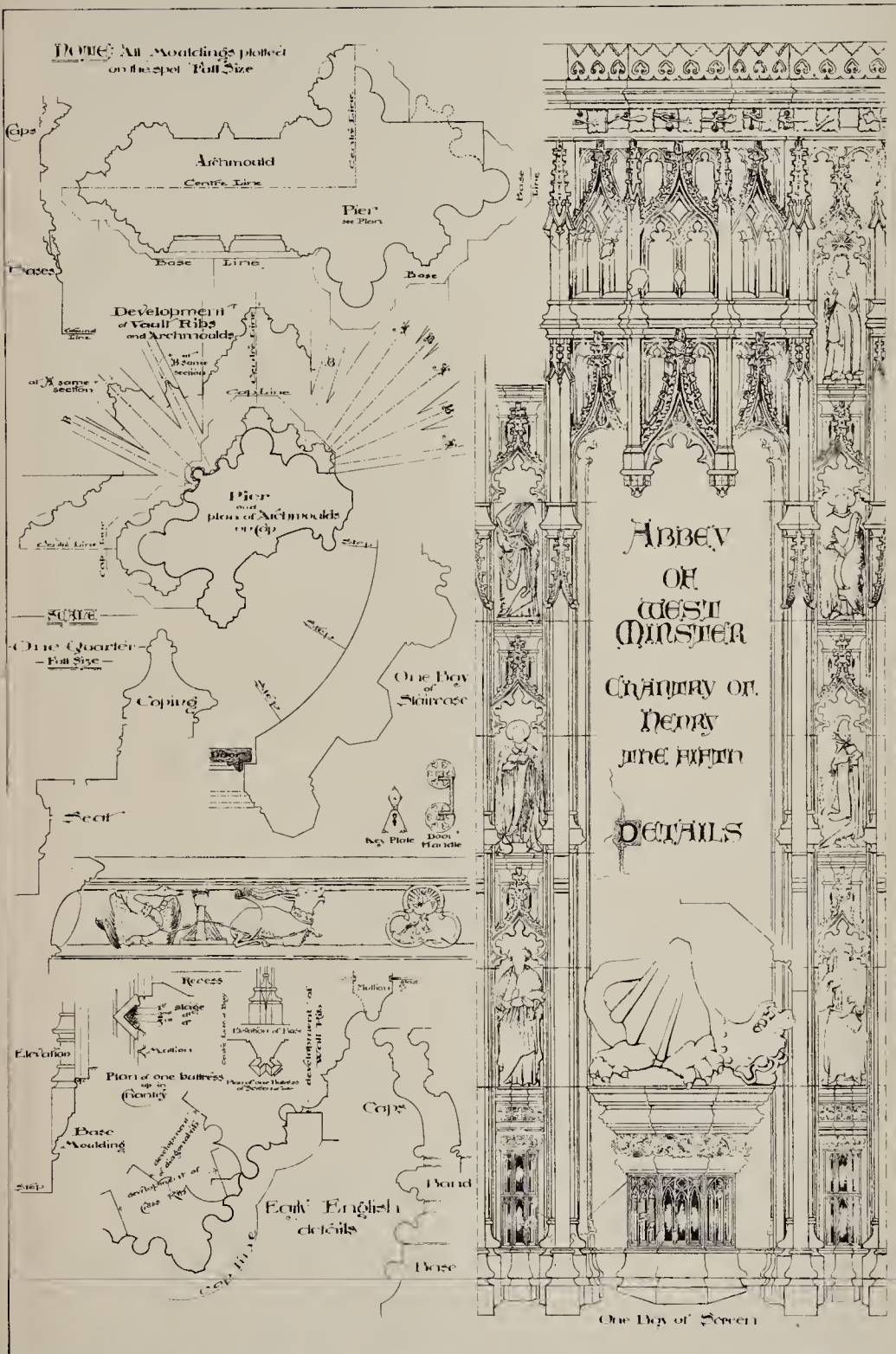


1. Rail Plan. 1/4 in. scale.

— Engraved by W. Dunn. 1/4 in. scale.

DRAWN BY MR. G. T. M'COMBIE.





F. Hill, Phil. Lib. & Co. del.

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DRAWN BY MR. G. T. MCCOMBIE.





DUCKS, LOTUS, AND WATER.



CHRYSANTHEMUM, JAY, AND WATER.



IRIS, LILIES, AND WATER.

Carved Pierced and Coloured Wooden Balustrades (Japanese Work).

JAPANESE CARVINGS.

The illustrations of Japanese carvings are reproductions in black and white of coloured drawings by Mr. Josiah Conder, of Tokio, who recently contributed a paper on "Japanese Architecture" to the Royal Institute of British Architects. They are examples of the ornamentation of partitions and screens, and are treated in the same way as the ram-ma, or ventilating openings common to all Japanese buildings. They are usually carved in camphor wood, the wood being pierced, and frequently displaying a different design on each side. After being coated with a mixture of whiting and size to preserve them from the attacks of insects and decay, they are coloured with as near an approach to a reproduction of the beautiful hues of nature as is compatible with their decorative nature. The same fidelity to nature is found in all Japanese work, so beautifully conventionalised in the many different materials in which their art is displayed, that, as will be seen in these illustrations, it is almost impossible to detect, excepting upon close scrutiny, where nature ends and art begins. These drawings represent carvings of (1) ducks swimming amongst lotus plants; (2) jays flying amongst chrysanthemums, water being again represented; and (3) the Iris, lilies and water. They are so delicately coloured that these reproductions fail to convey more than a slight idea of the beauty of the originals.

A Billiard Room for the Constitutional Club, Poplar, is in course of erection from the designs of Mr. Brett A. Elphicke, architect, Tunbridge Wells. The room will be 42 ft. in length, by 20 ft. wide, and will be lighted by a leaded lantern over each table. Mr. Riddle, of Poplar, has been entrusted with the execution of the work.

THE "APPARTAMENTO BORGIA,"  
VATICAN, ROME.\*

In the spring of 1885 the Department of Science and Art obtained permission from the Pope to have copies of the frescoes and other decoration taken, and a model made of one of the Stanzas of the Appartamento Borgia in the Vatican Palace. This concession was obtained with difficulty, owing chiefly to the fact that the suite of rooms in question is now the "Library of Printed Books," and thus contains an important and considerable portion of the famous Vatican Library. It is greatly to be wished that the Vatican authorities may ere long give consent for photographs of the whole of the decoration of these rooms being taken.

The model, which is destined for the South Kensington Museum, has been carried out in plaster with great care and fidelity to a scale of one-tenth of the original by Signor Consolani, of Rome, who had a principal share in the construction of the model of the great monument to Victor Emmanuel, which will some day clothe the north side of the Capitol. The coloured decoration of the ceiling and the wall-frescoes are being copied by Count Lemmo Rossi Scotti.

The "Appartamento Borgia" was so named after its founder, the Borgia Pope, Alexander VI., and its decoration is for the most part the work of Bernardino di Betto (or di Biagio), better known as "Pinturicchio," or the little painter.

The position of the rooms will be seen on the sketch-plan, and will be best recalled by those who know something of the Vatican, as being immediately below the stanze of Raffaele, the rooms of the former suite coinciding in shape and size with those of the latter and having their look-out over the great cortile de Belvedere.

A door opens directly from the loggia on the

first floor of the cortile di San Damaso directly beneath the door of the Sala di Constantino which leads into the loggia of Raffaele, but access can only be gained through the great hall of the library from the Gallery of Inscriptions.

Unfortunately it is only with difficulty and by special permission that the visitor to the Vatican can obtain access to these rooms, which, apart from what they contain, are only second in interest and hardly second in general beauty of effect to the stanze of Raffaele.

In the following description of the rooms they have been taken in order as approached from the library. It may also be mentioned here that when the right or left hand is specified it is that of the spectator and not of the personages of the pictures.

Although the decoration of Stanza I. is by some attributed to Benvenuto Bonfigli, the friend and possibly assistant of Pinturicchio, it may well be that all this work is from the designs of Bernardino himself, who was a man, as hinted above, much affected by outside influences at different times, now showing signs of the study of Signorelli, now of Raffaele. The main part of the ceiling is flat, and rests on a deep, vaulted cove springing from a shallow cornice. Except in the case of the Borgia arms occupying the centre octagon, the whole of the mouldings and other ornamentation of this ceiling (and that of Stanza II.) is painted only, therein differing from the other and more characteristic work of Pinturicchio, which is largely in relief stucco. Part of the centre of this ceiling is given in the illustrations, with notes of the colours used.

The vaulted cove forms three lunettes on each wall, in each being painted three-quarter length figures of a prophet and sybil in converse. The soffits above the lunettes are occupied by armorial bearings and other devices, and on the

\* See Illustrations in this number of the Builder.

cove itself are two octagons on each side of the room filled with representations of the planets in the upper part, and allusive incidents beneath them. Thus we have a hunt with falcons beneath Jupiter, below Mars a drol in presence of a lady, below Apollo a throned king, a wedding presided over by Venus, people reading and conversing under Mercury, fishing under Luna, a massacre taking place beneath Saturn, and, lastly, a figure of Astrology as embracing the study of the whole.

The effect of the flat part of this ceiling is good; but the cove is somewhat ineffective, on account of the small scale of the figures, though the merit of the composition is considerable.

The form of the next stanza is rather irregular, the width increasing from 20 ft. 3 in. to 24 ft. 7 in., while an arch, springing from responds of considerable projection, spans it at about two-thirds of its length. From a cartouche on the ceiling we learn that the work was done in 1494. It is often attributed to Bonfigli, though this is very doubtful, and, perhaps, it would be fair to suppose that the main scheme is due to the master, though certainly the assistant, whoever he may have been, to whom the execution was entrusted, seems to have allowed himself much freedom in carrying out the master's ideas. In this second chamber, in particular, there are especial differences in the manner of the work from that of the three succeeding chambers, such as an absence of gilding and of relief stucco work in mouldings and ornaments, and the use of secondary colours in the decoration. Though the work of decorating these six chambers extended only from the end of 1492 till some time in 1495, or about three years, yet even this period,—short, when we consider the extent of the operations (for the rooms extend nearly 200 ft. and average 35 ft. wide),—was not entirely spent by Pinturicchio in Rome. It is therefore obvious that he must have left much to be done by assistants, and in the smaller and less important rooms we may conclude that we have a correspondingly larger proportion of their work.

A brief of Alexander VI., dated March 29th, 1493, requires the people of Orvieto, for whom Pinturicchio was then painting certain figures in the cathedral, to wait till his palace was done; nevertheless, they seem to have got the painter there again, for, in March, 1494, the Pope sends for him, and in this year and the following his suite of apartments is completed.

The general arrangement of cove and flat space, in Stanza II., is similar to the room already described; but the treatment of it is unsatisfactory and ill-adapted to the space. The lunettes have half-length figures of prophets, apostles, and sybils, holding long rihand-like scrolls, with inscriptions upon them. These are much too intricately arranged over the blue ground, and produce a disturbed effect. Probably these figures, as well as much other of the work, have suffered from unskilful re-painting.

The succeeding three rooms are, undoubtedly, the work of Pinturicchio. Each averages 28 ft. wide by 34 ft. deep by nearly 30 ft. high, is divided transversely by an arch with a soffit some 4 ft. wide, and has one window rising but little above the spring of the semicircular vault, which is intersected by nearly pointed transverse vaults on either side of the great arch. The rich colouring and brilliant effect of gilded stucco-work in these rooms is admirably calculated for the amount of light admitted by the one window, placed low, and near the outside of walls nearly 5 ft. thick.

The cross walls of these rooms are set obliquely, but hardly enough to be perceptible, except on plan. Sketches of a pendentive of the ceiling, and part of the decoration of the wall, &c., facing the window, are given among the illustrations. The ribs are of gilt stucco, with fruit and foliage in low relief, with outer mouldings, &c., partly painted, partly in relief. The greater part of the ground of the ceiling is a rich dark blue colour, varying considerably in depth in different parts. The spaces above the side lunettes are filled with some rather clumsy ornament in relief, introducing hills, amorium, and crowns, the smaller spaces having crowns or rosettes. The arms of the Pope, wherever they occur, are generally in full relief, carved in wood, and attached to the wall or ceiling, and are on a party red and blue ground.

In the Siena library above the two end windows, there are somewhat similar shields of arms supported by angels (Fig. 1).

The soffit of the large arch had probably

relief stucco panelling similar to that of the next two stanzas, but this is now replaced by painted ornament of lake design but poor execution. Five octagonal panels are included, that at the crown of the arch having a figure of Justice, the others subjects illustrative of its administration drawn from Biblical and classical history.

Allegorical impersonations of the seven Sciences fill the lunettes beneath the ceiling. Beginning with those opposite to the window, that on the left hand shows "Rhetoric" sitting in a canopied niche-like seat in the centre. She, as well as all the others, is represented as quite youthful. She hears a sword in her right hand, and a suspended golden ball in her left, while winged genii on either hand bear respectively the same symbols. On each side stand three men reading, or in contemplation. The background is a landscape on an embossed gold ground. This fresco is in fair preservation. It, as well as the "Musæ," shows the influence of Perugino, with whom Pinturicchio had worked as assistant in the "Moses and Zipporah" of the Sistine Chapel in 1484. Next, on the right, is "Geometry," holding a golden quadrant in her right hand. At her feet sits a man describing a problem on a tablet, while other male figures hold instruments or scrolls. The background of this and the next three is similar to that of the "Rhetoric." Still proceeding to the right is "Arithmetica" holding compasses and an abacus in her hands, and seated on a throne, with a canopy like a sounding-board over, from the angles of which hang festoons.

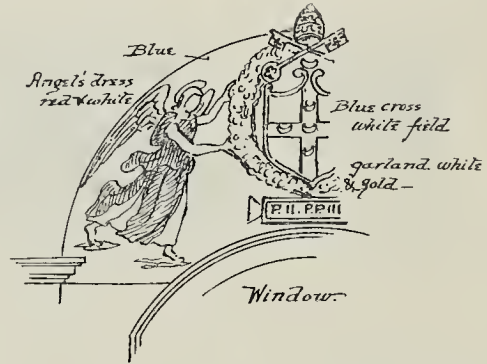


Fig. 1.

"Music" comes next, seated on a throne, with green hangings around, held up by flying genii. At the back is a terrace wall, beyond a landscape. Music herself plays on a violin; a genius on each hand, standing on the step of the throne, plays on a flute. A youth, in rich red garments, upon the left, has a guitar in shape like a violin; another, robed in blue, sitting on the step or dais, plays a harp; a third stands behind. Three girls, upon the right, are singing, while one beats time with a small golden baton, and with them is an old man.

Very little relief is used in this fresco, though some of the decorations of the throne and personal ornaments of the figures are of stucco. In some of the other subjects it is more freely used, especially in the constructive features. This is, perhaps, the finest in composition and colour of the series, and is, fortunately, in good preservation. Its refined identity and graceful treatment suggest the thought that in this work the painter was inspired by a more thorough sympathy with his subject than was the case with some others. Over the window the lunette is undivided and is occupied by "Astrology." The representative figure holds an astrolabe; two genii on either side have mystical emblems and instruments, while nine other figures fill up the sides. This is much faded and injured by smoke or damp, a result not to be wondered at when we know that for some time these chambers were actually used as guard-rooms for the Swiss guard.

"Grammatica" sits in a large arched niche with wings, which extend across the picture; she holds a book in her hand but looks upward. This and the last of the series, representing "Dialectica," who sits with hands crossed one

over the other, are much damaged. "Dialectica" occupies the centre arch of a screen of three, of very good design, festoons in relief stucco depending from the crown of each. The effect of the whole scheme of this room is admirable, owing to the decorative value of the similar treatment of the lunettes throughout, and the harmonising effect of the gold backgrounds.

The division of the large semicircle opposite the window into two spaces, with the arms in the spandrel, is also an improvement in some respects on the plan of treating it as a single subject. There is a good stone cornice to this room, though not so deep and important as that of Stanza IV., the frieze being carved with ox skulls and festoons.

The next room, numbered IV. on the plan, is that of which the model has been executed. As before remarked, the general arrangement is similar to that of No. III., the difference consisting chiefly of the want of a like coherence in the subjects of the frescoes, the use of figure decoration in the ceiling, and the greater use of stucco in the pictures themselves. It is indeed a striking characteristic of the painter's work, and is used by him to an extent which suggests the influence of Crivelli and his sympathy with earlier methods. His faces are evidently portraits, and are expressive and lifelike, while the treatment of his subjects is often unconventional, and the attitudes natural when not biased by the influence of Perugino, whom he occasionally outdoes in affectation of pose. In this series, besides personal ornaments,

all parts, with green hangings around, and, generally speaking, all parts which require gilding, we have large architectural features in four of the lunettes modelled with a projection of several inches. The soffit of the large arch is panolled in octagons and oblongs, the former, five in number, containing figure subjects illustrating the myth of Argos Panoptes. The ornament and mouldings are gilt, the ground being blue. The gilding having become much worn and perished, the red mordant employed shows through with decidedly pleasant effect. The mouldings have been fixed up in short lengths, and the ornament on the ground is poorly modelled, the idea having been apparently to break up the ground rather than to give effect in detail. The general scheme of the interior is shown in the perspective illustration, details being given of the principal parts.

It will be observed how much of the decoration is illustrative of myths in which a bull or cow figures. This is in allusion to the bull charged on the Borgia shield. The appropriateness is but superficial, though as the stories of the "Golden Calf" and of Jupiter and Europa have not been made use of, it suggests the possibility that those were avoided of which the application was more obvious or more appropriate.

The figure decoration of the vault gives in eight scenes the myth of Isis and Osiris. These are painted with a limited scale of colours, in a more conventional style than the wall subjects, the affectedness of attitude being very noticeable in some. Each has some central feature, such as a shrine or altar, in high relief. All the subjects of the wall-paintings are drawn from the Lives of the Saints, except the Visitation of the Virgin, which is apparently chosen to balance

the Visitation of St. Paul adjoining it. That opposite the window represents St. Catharine before the Emperor Maximian at Alexandria. A large triumphal arch, resembling that of Constantine, occupies the centre middle distance. The emperor under a canopy in front of a group of courtiers listens to the saint before him, while a doctor in a yellow robe combats her arguments from a book held up by a kneeling boy. A large group of people behind him is good in colour, and presents interesting types of the painter's fellow-citizens. Several horsemen fill up the right of the fresco; the cloak of gold brocade of one of them is modelled in stucco. In Nos. 2 and 3 are shown events in the career of SS. Barbara and Juliana. The former has the tower from which the saint has been miraculously delivered for its central feature, a rent in its side showing the manner of her escape. She departs towards our left, her father hurries away, sword in hand, in the opposite direction, two men accompanying him. The figure of the saint, in a pale crimson dress, is a good deal damaged; the father, whose principal garment is of the splendid deep crimson, inclining to scarlet, found in several other of these works, is better preserved. In the distance are small figures showing further episodes in the story. A large fountain with deep polygonal basin raised on steps occupies the middle of No. 3. The principal action concerns St. Juliana, who is here being bestowed by her father in marriage to an idolater. These three figures are to the right; a stag, some rabbits, and other small animals fill up the foreground. These are well drawn, contrasting favourably with the animals found in most contemporary works. A highway runs across

him are two disciples, poorly dressed, in striking contrast to the three figures on the opposite side behind St. Anthony. These are shown in the sketch, and of course refer to the famous Temptation of the saint. The centre figure has a crimson dress, shaded in darker self-colour; her attendant on the left, who bears a box of perfume, a yellow robe over blue; the other has one of rich blue with brown sleeves. The Satanic origin of this group is obvious from the horns, claws, and wings. The distance has pleasant bits of lake and mountain scenery. Some of these glimpses of landscape show observation and study of nature. Atmosphere and distance are very fairly given, though there is often too much small detail introduced. It is to be noted that Pinturicchio executed for Innocent VIII. (the predecessor of Alexander), in the Belvedere of the Vatican, a series of landscapes of Italian cities, which have now nearly disappeared. In this, as in other of the frescoes, especially the St. Catherine, we have numerous plants painted in the foreground, the flowers being composed of little beads of stucco, clustered or singly. They become more frequent in proportion to the distance of the field represented, so that the ground in the rear of the arch is quite thickly strewn with them. The same means are then taken to represent the glow of the descending sun, where the heads become less closely studded together as the distance increases.

Over the door, below No. 3, in a circular stucco frame, is a three-quarter length of the Virgin teaching the infant Christ to read from a book. It is much damaged and faded in colour. The cornice of this room is of stone. The upper ovolo is cut with a deep gullitoe,

No. IV., and the similar painted ribs and panel borders,—themselves interlaced, too,—of Stanza II.

The face of the main arch is now quite plain, having apparently been deprived of its decoration. Part of the soffit is shown among the sketches. Taking the frescoes in the order of events, we begin with that on the left, on the wall facing the window. This is the "Annunciation." Gabriel on the left, in red, the Virgin in blue, kneel on either side of a vase of white lilies. There is a composition of two smaller arches flanking a much larger one in the background, the Deity, surrounded by cherubs, filling the centre compartment. No relief is employed, and some parts have become smoky and hurred, but the decorative effect of the whole is very good, owing to its simplicity and symmetrical arrangement. Malachi, with the text, "Ecce, ego mittam angelum meum, nomen timentibus orietur vobis," has reference to this subject.

Proceeding to the right we have the Nativity. The Holy Child lies on the ground in the centre, his mother and Joseph in adoration kneel on either side, and two angels behind. Others are shown in the sky and standing on the thatched roof of the stable to the right. To this subject pertains the figure of Isaiah in the ceiling with the text "Cognovit vos possessorem."

The "Adoration of the Magi" follows. The colour throughout this has been very good, though now rather damaged in parts, especially the Holy Family to the left. It is very noticeable that even where the draperies, &c., may be much affected by damp, the flesh tints still come out well and appear to have suffered little.

The medallion above represents David with the prophecy "Adorabunt enim omnes reges." The next subject is the Resurrection. Above the tomb is Christ in a large vesica surrounded by cherubs. He is in a white robe lined with blue, has a white flag with a red cross in his left hand, and his right raised in benediction. One soldier sleeps in front of the empty sarcophagus, two others kneel in adoration on the right. On the left is a portrait of Alexander VI., kneeling with hands raised in prayer. The background is an open landscape. Zephaniah (Sophonias) with the text "Resurrectionis mee expecta in die," occupies the circle above. The Ascension is shown in the large space over the window. Christ, in a white garment, is surrounded by a golden vesica with a rainbow-tinted border. High up an angel kneels on either side, and many cherubs and birds are in the air around. The Virgin and five Apostles are standing or kneeling on the left, and seven on the right. The horizon is placed rather high and the landscape behind has a lake and trees with hills on either hand. A dark purplish red or plum colour is used in one of the dresses, which the painter has not used elsewhere in these stanze. The figure of Micah, with the inscription "Ascendit pendens iter ante eos," refers to this event.

The "Descent of the Holy Spirit" is here shown as taking place in the open air, the virgin kneeling in the centre of the picture, the apostles ranged equally on either side. The dove descends upon them surrounded by a nimbus of rays and an effulgent company of cherubs.

The prophet Joel in the circle above has the inscription "Et in die de Spiritu meo spernem carnem."

The "Assumption of the Virgin," the only subject drawn from traditional sources, is the last of the series. The sarcophagus occupies the centre foreground, the mouldings being in stucco. The Virgin, clothed in white in a dark blue vesica with a gold centre, is in a sitting attitude, the border of the aureole being composed of cherubs and small purplish clouds. Two angels hold a crown above her head, while two on each side have musical instruments, like those in Pinturicchio's picture in the Vatican gallery. St. John kneels on the left in a blue dress, with rich red robe or cloak over it, while on the right is a kneeling figure, apparently a cardinal, in a plain rich scarlet dress. There is a dark landscape background. The colour and state of this work are alike excellent. In the ceiling we have Solomon bearing the inscription "Exaltata sum in Libano quasi cedrus"; an eighth prophet, Jeremiah, having apparently no special reference to any design.

We now come to the largest chamber of the series, corresponding to the Sala di Costantino of the Stanze of Raffaele. As originally deco-

Ceiling of Stanza VI.

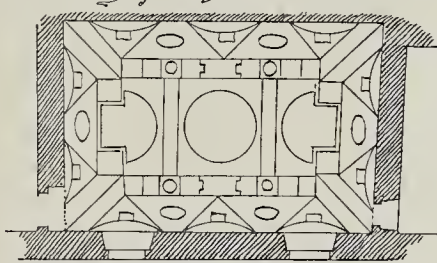


Fig. 2.

the landscape, along which a procession of people leads the saint to execution.

Above the window is the "Martyrdom of St. Sebastian." It is in good preservation, but has been much restored. In many respects it is a fine work: the nude figure of the saint is well drawn and free from affectation; the action of some of the archers is vigorous and not overstrained, and, owing presumably to its position, where relief work would have had no effect, no stucco decoration has been used. There are three or four figures on either side, chiefly the archers, and an old man sitting on the ground on the right, who appears to be superintending the execution. St. Sebastian is bound to a column against a ruined mass of brickwork, such as the painter might have sketched then, even more readily than now, in Rome itself. The left background is a landscape of a lake and hills,—on the right we see the Colosseum and other buildings in ruins. An angel above bears a crown of martyrdom.

No. 5 shows the "Visit of St. Elizabeth to the Virgin." Two-thirds of the background is filled with an architectural composition of arches, supporting a balcony and loggia. There are some good female figures spinning wool on the right, but the work is smoky in appearance and faded in parts.

The subject of No. 6 is the "Visit of St. Antony to St. Paul the Hermit in the desert of the Lower Thebaid." They are shown seated on the rocks, which rise in the middle of the picture, in the act of dividing a small loaf which a raven has brought. A rill of water issues from the rock between them, and a bell is hung on the crag above St. Paul. St. Antony, a fine venerable figure, in a rich purple robe and white tippet or cowl, faces St. Paul, whose only garment is of a plaited texture, very coarsely woven, as if of straw or grass. Behind

and the bed-mould with the "egg and tongue." The corona has crowns in high relief, alternating with foliated and other ornament in great diversity. The variety of ornament in the frieze is also noticeable. All this work is reproduced in relief in the model executed for the Department, which terminates in front of the main arch, and thus includes frescoes 1, 2, and 6.

Although hooks remain from which hangings have been suspended, it has been suggested by some, not without foundation, that the walls beneath the cornice were decorated with painted and gilt representations of drapery, like those below the older paintings in the Sistine Chapel. The cornice was also probably partly gilt.

In Stanza V. the main arch has no responds. The scheme of ceiling decoration is shown in the drawings. Half-lengths of prophets take the place of the Osiris series in the last room, each having reference, through a prophecy inscribed on a scroll, to the subjects on the walls, which, with the exception of the last described, are taken from the Bible. The arabesque of bills and foliated ornament on a blue ground is very rich and beautiful, the effect of the whole ceiling being even finer than that of No. 4. The preponderance of the primary colours,—red, blue, and gold, and the use of the low reliefs in stucco,—inevitably bring to mind the colour-design of the Moors, and suggests comparison with it. In the Italian work, blue decidedly preponderates over the red, and gold is not quite so freely used. In both, however, the ground is hardly ever gilt, and is always broken up by small unobtrusive ornament, so as to prevent flatness and poorness of effect. Here and there are certain direct resemblances to Moorish ornamentation: as, for instance, in the interlacing ornament of the ribs of ceiling

rated by Pinturicchio it was known as the hall of the Martyr-Pontiffs, from the circumstance of a series of portraits of these Popes having filled the lunettes. Most unfortunately all this work was destroyed within a few years by Leo X. (1513-22) and replaced by the work of Giovanni da Udine and Perino del Vaga in their well-known style. There is a deep cove pierced transversely and forming three lunettes on each long wall and two on each end wall. The general arrangement of the ceiling is shown on the plan (fig. 2). The circle has four female figures hand in hand, some of the other larger divisions having the heads of the week represented by various deities. Thus we have Jupiter in a chariot drawn by eagles, Mars drawn by horses, Venus by doves, Mercury by cocks, Luna by female figures, Saturn by dragons, and Apollo by horses. There are also the signs of the Zodiac and other emblems. The evidence which these chambers afford of the progressive secularisation of art is interesting. We note a marked advance in this direction in the art of Pinturicchio himself, though, as already noted, his sympathies in many respects were with earlier ideas as to treatment and technique, and the choice of subjects was probably not entirely his own. As an instance we have classic and mythological subjects put on the same footing as Biblical ones in the illustrations of Justice, and such a subject as the history of Osiris freely chosen. In this room his work is soon swept away to give place to a merely mythologic scheme. The martyred Popes are ousted to make room for the pagan deities whom they regarded as devils and whose cult some of them had given their lives to destroy, and "thus the whirligig of time brings in his revenges."

The spirit which informs the work of Pinturicchio is no longer that of the intense personal belief seen so plainly in the earlier masters. Biblical or theological subjects, or even the Lives of the Saints, hardly move him to his best efforts. It is in allegory that he puts forth his full strength and most loving care, and his thought is not so wholly given to edification but that he can bestow much pains on individual portraiture, especially in the subordinate personages, where convention has not decided on certain types, can indulge his predilection for gorgeous colour, for wealth of decorative detail, and for the added charm of landscape, architectural or natural. In short, for the earlier singleness of aim concentrated or telling the story, and inculcating the moral, is substituted a multiplex charm and attraction, whose aim, if single in any sense, is to produce beauty and harmony of decorative effect. His work marks the transition from the Umbrian to the Roman style, from the spiritual grace and religious sentiment of Perugino to the dramatic vigour and individuality of Raffaello's Roman period. The change is only a part, of course, of the great change going on in the outside world, from the moral earnestness and serious spirituality, the richness and fulness of invention (within certain prescribed limits) which marks the temper of the Medieval mind, to the cheerful secularity and eclecticism of the Renaissance.

But, although the signs of change in this painter's work are strong and unmistakable, we feel that he is hardly so far removed from the earlier spirit as from that which animates the style of the Cinque-cento. The inequality of value to be observed in his work is to be attributed to the dependence he must have placed on the work of assistants and pupils. He was apparently a man of great facility, and an indefatigable worker, and this was what, as Vasari remarks, made him in such request with impatient patrons in a period of feverish haste, not, as in the nineteenth century to grow rich, but to have beautiful surroundings. The extent of his work in Rome alone, extending over eighteen years or thereabout, is very great, and he was not employed during the whole of this period (1484-1502) at Rome for in 1491-2 he executed some decorations in Orvieto Cathedral, in 1496 several altar-pieces for Perugia, and in 1500 a series of frescoes in the collegiate church at Spello. Perhaps the accusation of his contemporaries that he let the love of gain weigh with him in the too rash acceptances of commissions was justified; still, with all its inequality of merit, it is not going too far to say that we owe to the genius of Pinturicchio some decoration which may be ranked among the fittest and most beautiful ever produced.

F. W. WOODHOUSE.

### "MEASURE AND VALUE."

"Scalpi salubris ictibus  
Et tunicae plurima.  
Fabri polita malleo.  
Hanc Sæva molens construat.  
Aptique junctis nervibus  
Lecturam in festigio."

"With many a cunning stroke by mallet wrought,  
The ringing chisel o'er the surface sped,  
To shape this mass, of stone with labour brought  
And laid with level joint on even bed,  
What patient skill did vaults and arches close  
From base to gable, as the building rose."

THE above Latin quotation is taken from a well-known Medieval hymn used at the dedication or anniversary of the consecration of a church. It is not possible to translate it exactly, because there are some idiomatic words and expressions used, the meanings of which probably refer to methods of workmanship which are no longer practised, so we have endeavoured in the translation to give rather an impression of the meaning than a paraphrase. This singular passage, however, serves to show how, in Medieval times, the mere material act of building was, to a great extent, regarded as a religious work. At the present day we should scarcely think of celebrating the operations of the mallet or the chisel, or the careful jointing of stonework, in a hymn, yet it may be a very pertinent question to ask whether the writers of the Middle Ages are remarkable in giving this religious aspect to building, or whether we are remarkable in not doing so. At first sight, it is a ridiculous one to say that there cannot be the slightest doubt that the Medieval usage was, at any rate, tinged by a kind of superstition, and that the superior intelligence of the present day must undoubtedly take the correct view of the case. If, however, we come to this conclusion, it is very difficult indeed to account for the minute and circumstantial descriptions given in the Sacred Scriptures of the erection of the Tabernacle in the desert, and of Solomon's Temple. It may be said that these were special cases, and, therefore, it was necessary for the cause of religion itself to give an account of them; but, surely if this alone were the object sought, a few words speaking of the magnificence of the structure, describing it in a poetical manner, and giving a sort of general notion, would be quite sufficient for the purpose. But instead of this, what we read is a detailed architectural description, entering into constructive particulars and peculiarities, giving dimensions of various parts, names of architects, builders, &c., and that, singularly enough, in cases where they were not Jews, but strangers. Then, again, in the Sacred Scriptures we find denunciations against slovenly buildings and slovenly builders. The most remarkable example of these is in the book of the Prophet Ezekiel, where proceedings strongly resembling those of the nineteenth-century "jerry-builders" are described and denounced:—

"... And one built up a wall, and, lo, others daubed it with untempered mortar. Say unto them which daub it with untempered mortar that it shall fall; there shall be an overflowing shower, and ye, O great hailstones, shall fall, and a stormy wind shall rend it. Lo, when the wall is fallen, shall it not be said unto you, Where is the daubing wherewith ye have daubed it? Therefore, thus saith the Lord God: I will even rend it with a stormy wind in my fury; and there shall be an overflowing shower in mine anger, and great hailstones in my fury to consume it. So will I break down the wall that ye have daubed with untempered mortar, and bring it down to the ground, so that the foundation thereof shall be discovered, and it shall fall, and ye shall be consumed in the midst thereof; and ye shall know that I am the Lord. Thus will I accomplish my wrath upon the wall, and upon them that have daubed it with untempered mortar, and will say unto you, The wall is no more, neither they that daubed it."

Now, although this is to be understood in a figurative sense to apply to the false prophets of Israel, yet there cannot be a doubt that it is also intended, to a certain extent, to be understood literally as a very strong denunciation against bad and slovenly building, and we could scarcely imagine the operation referred to being so carefully described unless special attention was intended to be directed to a dishonest and dangerous practice connected with the art of building, and a species of fraud probably somewhat extensively in use in the time of the Prophet Ezekiel. The "untempered mortar" referred to undoubtedly means mortar without lime in it, i.e., mud,—we have more than one reference to the practice of using mud for mortar in Scripture. As we have previously pointed out, this description might be taken as applying to our present "jerry-building," and

\* Ezekiel xlii. 10-14.

it shows the antiquity of that abominable institution. Very much has been written of late years against modern builders and their practices, but at any rate they cannot be blamed for having introduced the system, though it was probably never so extensively practised as at the present time, and undoubtedly a good deal of the abuse levelled at the jerry-builder is well deserved. There are, however, two sides to every question, and when we denounce men for dishonest practices, it is well to see to what extent these men may be victims instead of culprits. If, for instance, the defective state of the laws, general usage, or the avarice and cupidity of others, make it difficult for a man to be honest in his business, or hold out such a premium to dishonesty that a man can only remain honest greatly to his own personal loss and risk, it is clearly our duty, while denouncing the evil practices, to attempt in some way to remove or mitigate those circumstances which have led to the prevalence of the evil. And now the question arises,—can we point to any particular cause for the present great prevalence of false and slovenly building? We think we can. There is an impression among a large portion of the public, that all builders are rascals, but there is really no reason why this should be the case, and there are some reasons for supposing that the builders are more sinned against than sinning. Amongst the circumstances which are so detrimental to architecture, building by contract is one of the worst. And our chances of getting really good work and honest workmen would be greatly enhanced by giving up contracts altogether, and adopting the system of "measure and value." The writer was informed by an architect of very high standing in his profession, that in building a very costly and elaborate church, he had found the cost only one-fifth more by "measure and value" than by contract; whereas the superiority of the workmanship far more than made up the difference. Pugin also was strongly opposed to the present system of contract, and his beautiful little church at Ramsgate,—the most poetical-looking building of modern times,—was erected without a contract. It is quite evident that when a builder is bound down by contract, it is his interest to do the work as badly as it can possibly be done, and to avoid anything like variety or originality of ornament or construction, and to use the cheapest material that he can possibly come across. We do not say for a moment that builders always do this; on the contrary, the builders of many of our largest and most important public buildings have had to seek relief in the Bankruptcy Court from attempting to carry out their work in an honest manner. This, too, in cases where the client was well able to afford the extra outlay which had resulted in the cost of material; but no, there was the contract, and the client stuck to it as Shylock did to his bond: he would have the pound of flesh. Those who know how our public buildings are erected cannot but feel a kind of shame when they realise the fact that instead of being a source of credit and gain to the contractors they have in too many instances been the cause of ruin and intolerable vexation; and what makes the matter worse is the fact that the honourably scrupulously just man it is who suffers, whereas the man who scamps the work, or the jerry-builder who runs up a series of abominable "semi-detached villas" often makes a fortune.

It does certainly seem contrary to all sense of justice that a builder should be bound to carry out a work which, owing to causes over which he has no control whatever, may ruin him. Yet how often is this the result of building by contract? All agreements between men must be to a certain extent conditional, even when that agreement is ratified by an oath. Thus, for instance, the Queen in her coronation oath promised to maintain the Established Church of Great Britain and Ireland. Circumstances arose which rendered it necessary or advisable that the Established Church of Ireland should be no longer maintained, and Her Majesty had to give her consent to an Act of Parliament which put an end to the establishment and endowment of that religious body. Yet we think no man would dare to draw from this fact the deduction that the coronation oath had been violated.

Now if in such matters as this circumstances alter cases, why should it not be the same in simple matters of contract? Of course we do not for a moment suggest that the man him-

self should be a judge of his own case, but we think there should be some kind of court of appeal or of arbitration which should have the power of releasing builders from being forced to carry out contracts which, owing to some alteration in the circumstances of the case, render it certain ruin to him and a most unfair advantage to his employer. But probably the best way would be to do away with contracts altogether, for as long as they exist we shall never again see the kind of work which was done in the Middle Ages; and as to any religious element in building, where every one connected with it mistrusts and tries to take a rise out of his neighbour the very idea is an absurdity. Where client, architect, builder, foreman, and workmen are all playing a "game of grab," so as to put the most money into their pockets without the slightest regard for the work, how can we expect to find poetry or art in our buildings? If we read two great accounts of building given in the Sacred Scriptures,—that of the Temple of Solomon and of the Tower of Babel,—the former reads like work being done according to measure and value, and the latter was evidently "a contract job." "The people is one and they have all one language . . . Let us go down and there confound their language that they may not understand one another's speech."<sup>\*</sup>

Before this tower was built, the people had all one language, and understood one another; but afterwards they were all scattered abroad, and they left off to build the city." The one language in building has gone from us. We have no one language, but a Babel of styles, and we have no combined interest in the work, but every one is simply working for himself. Our language has been confounded. We no longer understand one another, and our views and interests are scattered. Now may it not have been the fear of this happening, and the warnings contained in the sacred writings, which led men to regard building as a religious act? And by depriving building of that religious aspect, may we not have destroyed the ancient safeguards, and opened the doors to selfishness, corruption, and dissension?

Our drawing is intended to show the varied treatment which results from building without contract. It will be noticed that the great church has its towers placed obliquely to the axis of the building,—an uncommon treatment, examples of which, however, exist at the church of Ingolstadt, in Bavaria, and foundations of towers so placed were formerly to be seen at St. Onen, at Rouen. They were, however, destroyed during the "restorations," and the new towers placed square with the front, in the ordinary way. With the exception of this, we believe the whole treatment of the front to be original, both in composition and detail.

H. W. B.

BUILDING IN ABERDEEN.

DURING the year just ended trade has been fairly active both in the building and granite-polishing departments. Neither employers nor employed have had any reason to complain as to the volume of business, although the former grumble very much as to the effect of over-competition in forcing prices down to unremunerative rates. A number of private persons have laid out detached parts of streets, while a more systematic attempt in this direction has been carried on by the City of Aberdeen Land Association in the Fountainhall and West End districts. The Municipal Corporation has also engaged, either alone or in conjunction with other parties, in extensive public improvements. The first section of the Rosemount Viaduct, viz., the part from South Mount-street to Union-terrace, was completed in the spring, involving a present expenditure of about 50,000*l.*, and the demolition of a number of buildings, displacing about 600 individuals. The extension of the Viaduct to the Schoolhill by a mound and three arches, has also now been contracted for and commenced. In addition, the Corporation has dealt with an unhealthy area at the Shorelands, near the Harbour, where both cholera and fever used to be prevalent, and in virtue of the powers obtained by a provisional order under the Artisans' Dwellings Improvement (Scotland) Act, has razed a number of buildings in certain former lanes in that quarter. The level has now been raised about 4 ft., and a new street,

40 ft. wide, called "Mearns-street," leading from Regent Quay to Virginia-street, opened up. This new thoroughfare will be very convenient for the erection of warehouses in connexion with the harbour and docks. The population displaced here amounted to about 800 persons, generally of the poorer classes, and unable to pay a large rent. These consequently migrated temporarily to the Gallowgate and Justice-street districts, thereby aggravating the pre-existent overcrowding in these quarters. Some relief has now been afforded by the opening up of Summerfield-terrace,—a street in the east end leading between King-street and Park-street,—which has already been wholly fenced and built on with working-class houses. Urquhart-road, farther to the east, has also been extended to the Links by the Town Council in conjunction with the Trades Hospital, and fencing has commenced there, as well as an extension of Colville-place. Fonthill-road has been widened to about 50 ft. throughout, and opened up to Holburn-street, while Bon Accord-street has been extended at an improved level by a bridge over Rosebank-terrace. The much-talked-of Riverside-road, including a new elliptical arch at Wellington Bridge, has been constructed, partly by the Aberdeen Harbour Commissioners, and partly by the Town Council. The total extent of this carriage-drive is about one mile and a quarter, from Victoria Bridge to Allanvale. The increase of the population has compelled the construction of a new water-house and pumping machinery at Cults, while the new supply reservoir at Mannofield has been partly finished and partly contracted for, at a total cost of 15,310*l.* The small estate at Westfield has been purchased by the Town Council, and new streets are being laid out there, while the level of Correction-wynd has been lowered, and various paving and minor improvements have been executed.

COMPETITIONS.

*New Market, Carlisle.*—At the meeting of the Carlisle Town Council on the 21st ult., Mr. Creighton moved "That the plan marked 'Arm'd at All Points' be selected as the design for the new market, subject to the author satisfying the Market Committee as to cost, construction, and other details." Mr. R. S. Ferguson seconded the motion, which was agreed to. Messrs. Cawston & Graham are the authors of the design in question, which will cost about 20,000*l.* to carry out.

*Townhall, Bethnal-green.*—The plans sent in for the proposed new Townhall at Bethnal-green were exhibited in the Board-room of the Vestry last week. The first premium (one hundred guineas) was awarded to the set of plans marked "Orient." The second premium (fifty guineas) was awarded to the plans bearing the motto "Use and Profit." According to a local journal, the third and fourth premiums were not awarded, and the names of the successful competitors were not appended to the premiated drawings.

THE RIGHT OF DISTRICT SURVEYORS TO ENTER DWELLINGS.

MR. F. M. B. CALCOTT, of 52, Lincoln's Inn-fields, was summoned by the Metropolitan Board of Works, at the Marylebone Police-court, last week, before Mr. Cooke, for the payment of 4*l.* 6*s.* 9*d.*, being fees incurred in the inspection of Nos. 8, 10, and 12, Eresby-road, West Ham, impudged, by Mr. Thos. Blashill, the District Surveyor.

Mr. Norman Bavan represented the Metropolitan Board of Works, and Mr. Holloway, solicitor, was for the defence.

At the outset of the case, Mr. Bavan drew the magistrate's attention to the fact that while the 72nd section of the Building Act gave the Metropolitan Board power to shore up dangerous buildings in order to secure the safety and protection of the public passing by, the 80th section stated that if the interior of the building was dangerous, it was within the power of the magistrate to order the removal of the inmates. He therefore contended that the Act gave the District Surveyor the right to enter a building for the purpose of inspection where there was a doubt as to the safety of the inmates, owing to the condition of the house. He called

Mr. Leach, the tenant of No. 12, Eresby-road, deposed that about 4 ft. square of the ceiling in the middle of the top bedroom of his house fell down, leaving other portions in a faulty condition. The ceiling on the top landing also fell.

Mr. Thomas Blashill, District Surveyor, said he received directions from the Metropolitan Board of

Works to inspect several houses in Eresby-road. He did so, and sent a certificate to the effect that the structures were dangerous, and that the owner should be called upon to take down the plaster ceilings of the houses. Parts of two of the ceilings had fallen, work was in progress at the time, pieces of zinc being placed over cracks in the ceilings of some of the other houses, and screwed to the joisting above. By the Magistrate.—In his opinion the ceilings were dangerous. He produced some of the material which fell. Instead of being of hair, lime, and sand, it consisted of dirt, a little lime, and instead of hair he found here and there a little string or such like stuff. The houses were put up, he believed, in the spring of last year. There was nothing to form a good key. The weight of the material should be about 24 oz. the square foot, but this weighed about 7 lb., and the thickness was nearly 2 in., or about double what it should be. In his opinion the Act fully entitled him to inspect the interior of the houses, because the internal portion of the structure might be dangerous, and not the external portion.

Mr. Holloway, for the defence, said his contention was that the Act was not intended to apply to the interior of a house simply for the protection of the inmates, except in the matter of fire, drainage, or the size of rooms where they were of so small a size as to be injurious to health. He denied the right of the District Surveyor to go in and inspect the premises under the circumstances.

Mr. Cooke.—You admit the right to go in to inspect a flue or a drain. And if that is so, if they have the right to go in for that, surely they may go in for other matters? It is a very important power, which ought to be exercised, because, as houses are now being built, the inmates are often in great peril. The houses are built like straw, and I fear there are a very great many of them about.

Mr. Holloway then called Mr. W. Matthews, who said he had been a surveyor for sixteen years. He received a letter from Mr. Calcott on the 9th of July, and went to inspect the houses. He found Mr. Tebboth, a builder, had taken down the loose portions of the ceilings and had repaired them. The other parts of the ceilings were quite safe. He (witness) gave directions that entirely new ceilings should be made, as that would be the best way of doing the work, both in the rooms and on the landings. The part which fell was exceptionally thick, owing to the joisting being out of the level.

Mr. Tebboth, a builder, having given evidence of doing the work,

Mr. Cooke said: I have no doubt this house was dangerous, to a certain extent, and that inspection was necessary, and must be paid for. The only question is as to whether they had a right to inspect the inside. I shall hold that in regard to No. 12 the inspection was rightly done.

Mr. Bavan asked for costs.

Mr. Cooke made an order for the whole amount claimed, with 2*l.* 2*s.* costs.

PROVINCIAL NEWS.

*Birmingham.*—With the end of the year the members of the Birmingham Conservative Club will vacate their present quarters in Union-street, and early in the year just entered upon will take possession of the new building which has been erected for them in Temple-row. The building, which is from the designs of Messrs. Osborn & Reading, architects, Birmingham, has cost about 13,000*l.*, exclusive of site, &c. The site contains 800 square yards, and the whole of this area is covered by the new buildings, which are three stories in height, with a ground floor and basement. The frontage to Temple-row is only 45 ft. in length, so that the building is of rather narrow elongated form, but the architects have contrived to provide conveniently-arranged and well-lighted and ventilated suites of rooms. The style of architecture adopted is a Roman type of the early Italian Renaissance, and the chief features of the front are the boldly-outlined entrance portico and lofty bay windows which are carried up on either side to the level of the third story, with balconies and parapets on the two principal floors. The main entrance from the street is by a broad flight of steps beneath the portico, and leading to the ground floor, which is raised sufficiently above the street level to secure the privacy of members from curious passers-by. The whole of the facade is in white stone, from the Portland and Hollington quarries. Messrs. Barnsley & Sons, of Ryland-street, have carried out the whole of the building work.

*Cockermouth.*—Messrs. Jennings Brothers, of Cockermouth, are now doubling their brewery, and also increasing their maltings. The architect entrusted with the work are Messrs. H. Stopes & Co., London.

*Silloth.*—The Carlisle Journal publishes a description of Messrs. Carr & Co.'s new mill at

\* Genesis xi, 6-7.

Silo, which is now nearly completed. The mill is situate on the west side of the new dock, and parallel to the extensive grain warehouse belonging to the North British Railway Company. It is claimed that the new mill will be absolutely fireproof, every portion, down to the smallest detail, being of incombustible materials. The walls are of a specially hard brick, manufactured by the Birkby Brick Company, near Maryport, tested before use and found to stand a crushing strain of over 70 tons to the superficial foot. The fireproof floor and roofs, which have been carried out by Messrs. Homan & Rodgers, engineers, Dawson-street, Manchester, are formed with their patent section rolled iron girders and joists, and filled in on the flat-arch system with concrete of a special kind. The surfaces are faced in quartz finish, and the roofs are laid with Scryssal rock asphalt. The ceilings have been done by the same contractors with Robinson's patent cement. The contract for all the ironwork has been carried out by Messrs. Cairns & Co., and Messrs. Tweedy & Co., of Carlisle. All the windows are fitted with Lindsay's patent wrought-iron sashes, and are of malleable iron with stamped boss intersections. A strong iron roof, nearly 40 ft. span, designed by the architect to suit the numerous iron worms over the silo bins, has been erected at a height of 56 ft. above the ground by the same firm, and covered with Vieille Montagne zinc Italian rolls, supplied by Messrs. Braby, of Liverpool. The engine and electric light-houses are decorated with glazed bricks and Burman-tofts faience ware, manufactured by Messrs. Wilcock & Co., of Leeds. The engines are compound and of 300-horse power, being manufactured by Messrs. Douglas & Grant, Kirkcaldy. Lines of rails have been laid on both sides of the building and through the warehouse to facilitate the transit of goods to all parts. The chimney-shaft rises to a height of 120 ft. above the ground. It has about 300 ft. of the capacity from the boiler furnaces, and possesses one of Green's patent fuel economisers in the centre of the feed-passages. The shaft is circular from the foundation, and has a massive square base and terra-cotta cap. This material has been adopted instead of stone for the window sills, cornices, parapet walls, pediment, and ornamental work, and has been supplied from the well-known works of Messrs. Edwards, Rnabou, North Wales. To admit of the rapid erection of the buildings, hydraulic mortar grout in mills has been used throughout, one-half being supplied by the Jarrow Cement Company and the other half by Mr. Armstrong, from his recently-opened quarries at Kershopfoot, near Penton. The general builders' work has been carried out by Messrs. Beatty Bros., contractors, Carlisle, in about nine months. Mr. T. Taylor Scott, of Carlisle, is the architect.

**Walsall.**—On Sunday last the new "church house" for the parish of St. Matthew, Walsall, was opened by the Bishop of the diocese. The building, which is situate at the corner of Temple-street, and opposite to the principal entrance to the parish church, has been designed by Mr. James Davis, architect, Walsall, and erected by Mr. T. Taylor, of Walsall. It is in the Perpendicular style.

#### CHURCH-BUILDING NEWS.

**Aylesbury.**—The Bishop of Oxford on the 21st ult. opened Walton Church, Aylesbury, which has been considerably altered, under the superintendence of Mr. Brett A. Elphicks. The interior has been thoroughly cleaned, refloored, and re-seated. A baptistery, bell-tower, and two porches have been added, and a new three-light lancet window inserted in old wall. The work is in Monk's Park Bath stone and flint; the baptistery in red brick. Mr. Landon was the clerk of works.

**Tharston.**—Tharston Church, Norfolk, has just been reopened, after complete restoration of the tower (the stair turret of which fell a few years since) and also of the north porch. The bells have been entirely rehung. The work has been done by Mr. E. L. Semmence, builder, of Wymondham, under the superintendence of Mr. E. Preston Willins, Diocesan Surveyor, Norwich.

**Warrington.**—All Saints' Church, Warrington, about three miles and a half from Croydon, has recently been restored, under the superintendence of Mr. P. M. Johnson. It was partially restored in 1857 by Sir Gilbert Scott, but at that time no repairs worth mentioning,

either to the roof or the walls, although they must have been required, were undertaken. The church consists of a nave without aisles, and chancel, with vestry on the north side and a porch on the south side. The total length is about 56 ft. and the width is about 19 ft. There is no mention of the church in Domesday, but there are traces of Norman masonry in the low-side window of the chancel. The plan and general arrangements show clearly that the church must have been enriched in the thirteenth century, and it is, in fact, a very perfect specimen of Early English, the original plan remaining unaltered, the only additions being the porch and the vestry, the former built about 1678 and the latter about sixty years ago. The walls are of flint and rubble, rough-cast externally with a sort of pebble concrete; the ashlar is a soft calcareous sandstone, probably from Reigate or Gostone, which was much perished in places, the weatherings of the buttresses having been tiled. The roof, which is covered with red tiles, has a tiled bell-turret at the west end, erected in 1820. In the interior of the church, close beside the north door, is a painting in distemper of the legend of St. Christopher. This painting is about 9 ft. high, and, from its style of execution, appears to be of the same period as the church. It is in very good preservation, and has not been interfered with during the recent restoration. The tracery of the east window, which is modern, was inserted in 1857, and probably follows the lines of the original Decorated late window. The drop-arch and jambs are original. Prior to the year 1857 the church had a seventeenth-century pulpit, with carvings of Adam and Eve, &c. (described in a paper by Mr. Ralph Nevill, F.S.A., in the Transactions of the Surrey Archaeological Society, vol. vi.), which has disappeared.

**Wishaw.**—The parish church of Wishaw, near Birmingham, has just been renovated and re-seated in pitch-pine from the designs of Mr. A. B. Phipson, of Colmore-row, Birmingham. The work has been executed by Messrs. Jones & Willis, who have also supplied the new choir stalls, pulpit, Communion fittings, lectern, &c.

#### Northern Architectural Association.

An ordinary sessional meeting of the Northern Architectural Association was held on the 22nd ult. in the Old Castle, Newcastle. Mr. E. Shewbrooks presided. The Hon. Secretary (Mr. F. W. Rich) intimated that a communication had been received from the Royal Institute of British Architects stating that a general conference of British architects would be held in London during the week commencing 2nd May, 1887, and asking that the Northern Association should nominate a member to sit as representative on the special committee. Mr. Hoskins was appointed to represent the Association. The Hon. Secretary also read a communication from the Manchester Society of Architects, pointing out that preparations were being made for a Jubilee Exhibition at Manchester, and stating that the primary object of the Exhibition was to illustrate the art progress of the nation during the Queen's reign. The Committee of the Exhibition were willing to allot a space as an Architectural Court in proximity to the Fine Art Section, in which might be exhibited designs for, or drawings and photographs of, buildings erected since her Majesty's accession to the throne. The Secretary was instructed to say in reply that the communication had been laid before the members, and also that the Exhibition about to be held at Newcastle would perhaps claim the attention of the members first. The Hon. Secretary then read a paper on "Architectural Pupillage, and its Bearings on Federation."

**Sewerage Works, Maryport.**—The main sewerage works here having been completed, the engineer, Mr. H. U. McKie, of Carlisle, has presented his report to the Trustees for the Town and Harbour. He states that the contractors, Messrs. H. Fisher & Co., of Cockermouth, broke ground in July, 1885. Eighteen months were allowed for the completion of the works, but they were completed (with the exception of a few details) in October last. The total cost of the works was 13,150*l.* Mr. J. McKie was resident engineer, and Mr. R. Fisher was clerk of the works. The trustees, the sewerage committee, and the officials, to celebrate the completion of the works.

## The Student's Column.

### FIELD WORK AND INSTRUMENTS.—I.

#### INTRODUCTION.

THE object of the following articles will be, first, to give the student a good practical knowledge of the construction and handling of surveying instruments, and then to deal with their practical application in setting out work. In so doing, we intend to make the various diagrams which will illustrate the subject as self-explanatory as possible, to avoid the tediousness of continuously turning backwards and forwards from the diagram to the letter-press. Some general description will, however, be added, in which we shall state the object of each diagram and the best way to study it. The value of understanding not only the use but also the practical construction of an instrument is shown by the importance set upon this information in the professional examinations annually conducted by the Surveyors' Institution and other bodies, in which examinations a knowledge of land surveying and levelling is required. An acquaintance with the subject also forms an indispensable part of the study of both architects and engineers. A man could not be expected to know thoroughly how to deal with a plan unless he knew how to make it, and those who are most conversant with the instruments employed for the purpose will know best how either to set about the work themselves expeditiously or to direct their assistants to do so in the most approved manner. Special attention will be directed to the methods usually adopted for testing the accuracy of the instruments described. Unless an instrument is in proper adjustment the most careful use of that instrument must of necessity fail to secure accuracy.

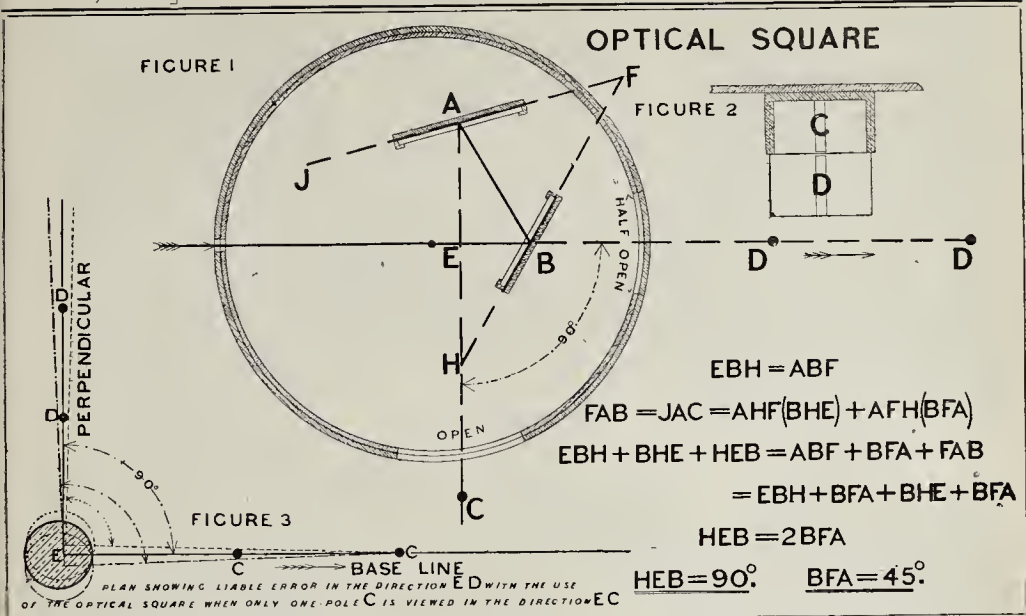
#### Surveying Instruments.

##### I.—THE OPTICAL SQUARE.

This instrument is used for setting out perpendicular lines and long offsets. It commends itself on account of its portability, being about the size of a large watch, and consists of an outer circular tube attached to one side of the box, and an inner circular tube attached to the other side of the box, the one sliding inside the other, and maintained in position by a small fixed screw connexion, which will be seen in the outer rim or side of the instrument. The inner circular portion can thus be twisted round by the hand to allow of three apertures through both tubes at the side, one open for nearly the whole depth of the side, one open for about half the depth of the side, in addition to a small circular hole to serve as an eye-piece. When not in use the inner tube can be twisted round to close the apertures, and thus prevent dust working its way to the inside.

Fig. 1 illustrates an enlarged section of the top-plate of the inner tube removed, so as to show the two glasses marked A and B, which are permanently fixed by the maker in vertical planes intersecting one another at an angle of 45 degrees. The glass marked A is formed entirely of silvered glass, while the glass marked B is silvered for only half its depth, as indicated in fig. 2, which shows the attachment to the upper plate in the diagram. In using the instrument, the surveyor holds it horizontally in one hand; placing his eye opposite the glass B, at the arrow in fig. 1, and looking towards D, he observes the pole D, through the plain or unsilvered portion of the glass B, while a pole at C, if the angle CED forms a right angle, will be reflected from the looking-glass at A, and seen in the silvered portion of the glass at B, one pole coming in line over the other, as indicated in fig. 2. The mathematical proof given in the diagram depends upon the angle of incidence JAE being equal to the angle of reflection JAF so far as the glass A is concerned, and the angle of incidence ABF being equal to the angle of reflection EBH so far as the glass B is concerned. The exterior angle of the triangle AHF is equal to its two interior and opposite angles, and these angles can be named for purposes of further application as the angles BHE and BFA, as shown in brackets on line 2. Then the three angles of the triangle EBH being equal to the three angles of the triangle ABF, and one of the angles in the triangle ABF being proved equal to the sum of the two angles BHE and BFA, we obtain, by substituting these values, an equation in which the angles EBH and BHE appear common to both sides: hence the remaining angles are





equal, and the angle HEB formed by the intersection of the lines ED and EC at the point over which the instrument is held, is seen to be double the angle BFA formed at the intersection of the planes contained by the mirrors.

Fig. 3 shows a precaution to be observed when great accuracy is required by viewing two poles instead of one in the required direction. It is evident that if the dotted lines be continued for any length, the direction of the required perpendicular would deviate considerably from that indicated by the full line, while the position of the surveyor at E might depart but very slightly from the direction of the given line EC. With the use of a second pole in the line EC this error of deviation would be at once detected, and by setting two poles with the instrument in the line ED, the direction could be more accurately continued than when only one pole is employed. Fig. 1 may be taken to illustrate setting out a perpendicular to the right-hand side of the surveyor, in which case the optical square is held in the left-hand, and the surveyor directs his assistant with his right-hand. Fig. 3 illustrates setting out a perpendicular to the left-hand of a given line, in which case the instrument is simply turned over, held in the surveyor's right-hand, his assistant being directed by his left-hand. Thus the open portion of the side, which allows the pole to be reflected in the mirror at A, is left unimpeded by the surveyor's hand holding the instrument. In each case the assistant has to keep his pole upright, and to follow the direction of the surveyor as to moving the pole to be set out, either right or left, until one pole is reflected over the other in the glass B. When this coincidence takes place the pole is fixed in the ground, and the right angle is said to be set out.

**Cremation in Denmark.**—The first cremation in Denmark was recently performed at Copenhagen. The whole process lasted an hour and a half, but it is anticipated that it will be greatly shortened when the furnace has been used a few times more. There was not the slightest trace of either smoke or smell. The body cremated was that of a Swedish convict. The crematory is built according to the design of a Danish architect, but has been constructed by a Milanese firm of engineers. The length of the building is 32 ft., and the breadth 21 ft., there being two stories. In the lower one the gas furnace is placed, whilst in the upper one stands the real cremating furnace. There is also a small room for relatives, &c., who desire to be present during the operation. A bridge of stone leads from the ground to the upper story, along which the body is carried to the cremating furnace.

**Books.**

*Ornamental Interiors, Ancient and Modern.* By J. MOYR SMITH. London: Crosby Lockwood & Co. 1887.

THIS is far too ambitious a title for what is really only a series of pleasantly-written, but rather rambling, notes on the subject of interior decoration. The book, which is mainly a reprint of a series of articles, is, however, well illustrated and handsomely got up, and contains some true criticism and a good many good examples of decorative treatment. There are a great many descriptions of various "treatments" of interiors given, which may be read with interest as descriptions and with advantage as suggestions. There is a rather amusing off-hand style about the book, and in the manner in which various decorative designers are referred to in a kind of clapping-on-the-hack fashion, as "Fred" this and "Alf" the other; indeed, Mr. Smith seems mostly to consider the usual prefix of "Mr." as an unnecessary formality in speaking of his contemporaries, though he is every now and then seized with a recollection of it. About the author's decorative recommendations there need be no crossing of swords; they are in general marked by good taste if not by any very remarkable originality. Some special point is given to the book, however, by the audacious manner in which the author assails some prevalent ideas and existing reputations. Among other things, he does not scruple to knock Mr. Ruskin about in a way that would deeply shock that prophet's fair idolaters. He observes that Mr. Ruskin did not discover the Doge's Palace, any more than Turner's genius, but they were not "blindly worshipped" before him. The author shows a want of the sense of proportion in coupling together Turner's genius and the Doge's Palace, as if they were two things in the same category, whereas Turner is worth all the Doge's Palaces that ever might, could, or should have been. But when he goes on to say that "the difference between the work of an incompetent and a competent critic may easily be perceived by comparing Ruskin's 'Stones of Venice' with Fergusson's 'Handbook of Architecture'"; and that beside Fergusson, the mature man who has studied all styles, Ruskin appears like "an un instructed amateur," we may say that he shows himself a competent critic as well as an outspoken one. Mr. Smith is not unhappy either in some of his criticisms on the architectural profession. There is only too much illustration of the truth of his remarks on page 81 as to the way in which the second or third-rate architect struggles to follow the fashions of the leading

men and frames principles for doing so. "When fashion decrees that a woman shall wear a dress that violates the usual canons of good form she does not defend the principle or want of principle; she simply says that she wears it because it is the fashion. Architects, however, while showing all a woman's eagerness to adopt a new fashion, always manage to convince themselves that the mode they adopt is the best possible, and of irreproachable principles." For "always" read "often"; but the remark is true enough with that limitation. We are also very glad to see the author's hearty appreciation of the architectural qualities of that much under-rated building, the Houses of Parliament.

Mr. Moyr Smith gives, in a chapter on "Amateur and Architectural Amateur Decoration," an amusing sketch of the days when ladies and decorators were quite agreed that there was nothing so tasteful in a drawing-room at least as "white and gold," with doors grained to represent satin wood, &c. But we do not see the sense of Mr. Smith's sarcasms at the "high-souled men" who have since come boldly forward and denounced "the awful iniquity" of graining and of realistic flowers, &c. We quite agree that a tone of absurd solemnity has often been taken by the denouncers of "shams" of this kind; but there is really no common ground between imitation of graining and imitation of the human figure in sculpture and painting, which is a comparison the author draws. The grain markings of wood are not matters worth the trouble of an imitative art of reproducing, for one thing; and further, there is no doubt that the main object of graining, whatever may be pretended, is to convey the impression of a better and more costly wood than has really been employed. As such it is a vulgarity; and we may add that "we" considered it so before the fashion of criticism turned against it; and shall continue to think so after it is revived, if it is revived. It is a foolish employment of human ingenuity. The author is probably right in his estimate of the part played by good fortune, and the support of literary friends, in the reputation of "the Morris papers." The first patterns introduced by the poet, however, embodied a new idea in wall-paper designs, which is something.

"Now, most can raise the flowers,  
For all have got the seed."

We cannot help thinking that Mr. Moyr Smith could have produced a much better book on the subject he has treated if he had taken the trouble to go into it systematically, instead of merely putting together a collection of rather rambling essays. As it is, the book is a pretty and a readable one, and that is about all.

**Freehold Disfranchisement: A Defence of the Leasehold System.** Second edition. By GEORGE BEKEN. London: Liberty and Property Defence League, Westminster-chambers.

This is a second edition of a carefully-compiled pamphlet to serve as a counterblast to the speeches and publication of those who advocate the enfranchisement of leaseholds. There is much sound argument in it, and much which will not hold water. Thus, Mr. Beken says that the more building land rises in value, the more likely are good houses to be built, and costlier ones to be erected in place of existing buildings. This, he says, gives a great deal of employment, and every kind of occupation is benefited directly or indirectly. But this is altogether an irrelevant argument against leasehold enfranchisement, neither is it by any means clear that a workman who is obliged to be in some particular locality benefits by the increased size of the houses where he is obliged to live. The fact is that Mr. Beken, like many unskilled advocates, scarcely distinguishes his strong and weak points, and marshals them all with equal confidence before us.

### RECENT PATENTS.

#### ABSTRACTS OF SPECIFICATIONS.

905, Door Lock Spindle. T. Young.

Instead of being made as usual in square section, the spindle which is the subject of this patent is made of any convenient section. Upon it is fixed a roller capable of rolling or of sliding against a corresponding inclined plane. The return of the spindle is effected by a feather spring assisted by a spiral spring (compressed when the spindle is pulled or pushed), which also prevents the handles or spindle shaking loosely in the lock.

923, Water-closets. H. W. Buchan.

The improvements which constitute this invention have reference to closets of the Bramah pattern, and consist in an alteration of the basin. The trap is combined with the basin, dispensing with the separate trap or S-bend in the discharge-pipe or outlet. The overflow also is taken from the lower end of the basin at a point which is always sealed, and prevents the admission of sewer gas into the basin from the soil-pipe into which the overflow discharges.

979, Fanlights, Ventilators, Casements, &c. W. Leggett.

The patentee's improved apparatus is arranged in such a manner that the inventor is enabled to dispense with the ordinary hinges, and the fanlights are also locked or secured in any position to which they are moved within the range of the apparatus. A toothed quadrant gearing is preferably employed; the quadrant gearing into a toothed rack that is secured to an internal worm worked upon an external worm, which, when actuated, operates a nut and quadrant, causing the casement or ventilator to be moved on the transoms.

981, Skylights. W. Leggett.

This invention consists in an adaptation of somewhat similar mechanism to the opening of skylights, and is principally designed with a view of operating the skylights from the floor, so as to avoid the use of a step-ladder or other apparatus. The skylight is locked also in any position to which it may be raised.

1,086, Paint. F. Wendling.

The paint which forms the subject of this patent is designed for specially resisting atmospheric influences and variations of temperature, and is intended to be washable. Silicates, lime, potash are mixed, and caustic potash afterwards added. It is said to mix well with colours, and to be cheap.

1,130, Bricks, &c. W. Johnson.

According to this invention the clay, as it passes from the hopper, is covered on the top and the sides with sand, and to ensure the attachment of the sand it is passed between rollers which press the sand firmly into the surface of the clay. The bricks are made in an expanding mould, which is not closed until the brick has been placed in position, ready for pressing, the mould being opened or expanded before the brick is forced out.

1,149, Door-checks. H. Hartung.

This invention consists principally in the combination of two sliding-rods, arranged at right-angles to each other; one of these rods is formed telescopically, and the other with a piston and cylinder, and the rods are connected together and compounded by means of links.

#### NEW APPLICATIONS FOR PATENTS.

Dec. 17.—16,545, H. Sulley, Pavement Lights.—16,570, E. Abercrombie and C. Hall, Push and Pull Bar-handle and Door-knob.—16,612, C. Harris, Gasoliers and Gas-brackets.

Dec. 18.—16,637, E. Mileson, Mantel-board.—16,665, J. Johnson, Locks.

Dec. 20.—16,676, W. Pressland, Burglar-alarm.—

16,694, J. Seymour, Window-fastenings.—16,705, A. Clarke, Chimney-caps and Ventilators.—16,708, M. Syer, Syphon Cisterns for Flushing Closets, &c. Dec. 21.—16,730, A. Dawson, Door Locks.—16,752, J. Honeyman, Ventilators.

Dec. 22.—16,809, E. Hughes, Circular Saw-benches.—16,811, H. & H. House, Door Checks or Buffers.

Dec. 23.—J. Rowland, Flange Joint for Connecting Lead Pipes, &c.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

5,206, W. Thompson, Bridges.—14,011, J. Buckland, Spindle for Locks, Latches, and Handles.—14,124, H. Freese, Wood Pavements.—14,423, H. Tucker, Corrugated Iron Roofing.—14,527, T. Cox, Fixing Tiles, Panels, and other Ornamental Wall and Building Linings.—14,848, C. Barker, Ventilating Buildings.—14,888, J. Brown, Window-sash Fastenings, &c.—15,389, A. Hildipe, Indicator Bolts or Fastenings for Doors.—15,456, C. Appleby, Heating Chambers, &c.—15,759, R. Da Ridder and W. Bennett, Heating Public Buildings, Dwelling-houses, &c.—15,542, J. Fisher, Latch for Doors, Windows, &c.—15,603, F. Baker, Buttions or Fasteners for Doors or Windows.—15,949, J. Beryl, Metallic Trellis Work.

#### COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

2,374, C. Groombridge and J. Rickman, Door-chain, &c.—2,457, W. Sanderson, Door Lock and Latch Furniture.—10,207, J. Garvie, Jun., Excavators.—13,273, C. Straub, Compositing or Building Material for Architectural Purposes.—14,374, E. Theadam, Chimney Tops.—2,861, T. Panario, Water Waste-preventer.—11,460, T. Robson, Window Frames, and Mode of Balancing the Sashes.—15,212, D. Grove, Water-closets.

#### RECENT SALES OF PROPERTY.

##### ESTATE EXCHANGE REPORT.

DECEMBER 18.

By BAXTER, PAYNE, & LEPPER.  
St. Mary Cross—A plot of freehold land ..... £200  
Berkley 4, Vine-st. place, freehold ..... 210  
Cucham—Two freehold cottages in South-street ... 210  
Widmore—33 to 39 (odd), Lycey-road, 78 years, ground-rent 74, 12s. .... 470

DECEMBER 17.

By NORTON, TRENT, WATNEY, & CO.  
Hackney—Leasehold ground-rent of 10s. .... 190

DECEMBER 21.

By HAMNETT & CO.  
West Kensington—8, AYOUBPORA-road, 94 years, ground-rent 12l. .... 910  
32, Glazbury-road, 90 years, ground-rent 16l. .... 830  
31, Fulham Park-gardens, 91 years, ground-rent 12l. .... 405

Mile End—46, Harford street, 31 years, no ground-rent ..... 330  
20, Jubilee street, 23 years, ground-rent 4s. .... 200

By A. CANCELLOR.  
Taichenham—Three plots of freehold land ..... 663

By REYNOLDS & EASON.  
Islington—12, Canonbury-place, 68 years, ground-rent 10s. .... 650  
50 and 62, Dowland-road, 31 years, ground-rent 12s. .... 610

Bethnal Green—1 to 4, Turville-court, freehold ..... 650  
Hackney—91 and 93, Wick-road, freehold ..... 630

#### MEETINGS.

SATURDAY, JANUARY 1.

Association of Public Sanitary Inspectors.—Mr. James Eastman on "Sewage Irrigation Applicable to Small Areas." 6 p.m.

MONDAY, JANUARY 3.

Royal Academy.—Mr. J. E. Hodgson, R.A., on "Art a Universal Language." I. 8 p.m.

TUESDAY, JANUARY 4.

Birmingham Architectural Association.—Mr. T. Camm on "Art in Glass in relation to Architecture." 7.30 p.m.

WEDNESDAY, JANUARY 5.

Civil and Mechanical Engineers' Society.—(1) General Meeting. (2) Mr. C. H. Cooper on "The Treatment of Sewage at Wimbledon." 7 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting. 8.30 p.m.

THURSDAY, JANUARY 6.

Royal Academy.—Mr. J. E. Hodgson, R.A., on "Art a Universal Language." II. 8 p.m.

Edinburgh Architectural Association.—Mr. Harry Chebb on "Ancient, Medieval, and Modern Locks and Keys." 8 p.m.

FRIDAY, JANUARY 7.

Architectural Association.—Mr. T. M. Rickman, F.S.A., on "The Complement of Architectural Instruction." 7.30 p.m.

#### Miscellaneous.

**The Slate Trade.**—Meetings of the Welsh Quarry Proprietors were held last week and prices fixed for the coming year. The quarries in the Carnarvon district continue the lists now in force, but with smaller discounts, and there are some slight alterations in the Bangor and Portmadoc lists. At the last-named place trade is expected to be very brisk owing to the increased facilities given by the London and North-Western Railway Company for the Continental trade.

#### Sales of Building Land in Surrey and Hants.

—A few days since Mr. H. J. Brake submitted for sale, at his auction rooms, New Bridge-street, several plots of building land in the counties of Surrey and Hampshire. The Surrey property is situated in the parish of Fresham, near the Haslemere station of the London and South-Western direct Portsmouth line, and about forty miles from London. All the plots offered were sold; those having a frontage of 135 ft. and a depth of about 400 ft., realising 80l. each, whilst the plots having a frontage of 132 ft. were sold for 42l. each. The Hampshire property comprised twenty building plots, some of which are situated at Fleet and Headley, and others at Farnborough, near the North Camp and Farnborough stations on the London and South-Western Railway. The plots comprising the Fleet property, having frontages of 140 ft. and depth of 100 ft., and containing an area of about one-third of an acre each, were sold for 40l. The Headley plots, containing an area of about an acre each, were sold at prices varying from 14l. to 17l. 10s.; and the Farnborough plots, having frontages of 20 ft. and depths of 173 ft., realised 30l.

#### Faithful to his Duty.

—We cut the following from the interesting survey of the state of the country after the snowstorm which the *Times* furnished its readers on this as on other similar occasions:—"The driver of the mail cart between Staplehurst and Rochester had a narrow escape while on his way to Rochester on Monday morning. When he arrived at the bottom of Blue Bell-hill, a mile from Maidstone, he drove into a deep drift, and the horse becoming frightened plunged further into the accumulation. After failing in his efforts to extricate the cart, the driver, a young man named Hayes, took out the mail bags, tied them round his body, mounted the horse, and cutting away the traces, left the cart buried. Several times during the journey the horse fell, haring itself and its rider in deep snow. After a terrible experience of five hours in a blinding storm, Hayes rode up to Rochester Post-office and handed in the mails in safety." Well done, Hayes!

#### A New Baptist Chapel at East Moulsey.

A Baptist chapel has just been erected at East Moulsey, and was opened last week. The building, which is situated in Bridge-road, is in the Gothic style of architecture, and is faced with red brick and stone dressings. The edifice is entered by a prominent stone porch. Internally it is 55 ft. in length, and 30 ft. wide. The interior walls are faced with cement and stucco work, the building being covered in by an open-timbered roof. The seats are of stained pitch-pine, and a dado of the same material is carried round the lower part of the walls. There is a raised platform for the use of the minister, and in front of it a baptistry 4 ft. 6 in. in depth. Attached to the chapel are the minister's and general vestries. Messrs. Potterton & Gould are the architects.

#### The Attorney-General (Sir Richard

Webster, Q.C., M.P.) entertained the employes of Messrs. Kirk & Randall and others connected with the building of his mansion "Winterfold," at dinner at the Onslow Arms, Cranleigh, on the 23rd ult. The vice-chair was occupied by the architect, Mr. E. Talbot, supported by Mr. Unwin, the clerk of works, and Mr. May, the foreman of works. After the cloth was removed, and the usual loyal toasts had been given, Sir Richard proposed in complimentary terms the health of the contractors, after which the host's health was proposed by Mr. May, and received with great enthusiasm.

#### A Granite Sarcophagus.

—We are informed that the Empress Eugénie has commissioned Messrs. Alex. Macdonald & Co., Limited, of Aberdeen and London, to prepare a polished red granite sarcophagus to contain the remains of the Prince Imperial. It will be an exact reproduction of the massive sarcophagus which was presented by the Queen to the Empress on the death of Napoleon III., and, along with it, will be placed in the Mausoleum now in course of erection at Farnborough-hill.

#### The Catholic and Apostolic Church.

Bridgenorth, has been enriched by the addition of a reredos of Caen stone and alabaster. It is in the style of the Decorated period, and has three crocketed gables. In the centre one is a carved and gabled canopy, under which the tabernacle is fixed. The work has been executed by Messrs. Jones & Willis.

The vacant District Surveyorship.—We are informed that Mr. Alfred Conder, F.R.I.B.A., of Palace Chambers, Westminster, and District Surveyor for Woolwich, has been appointed by the Metropolitan Board of Works to act as Temporary Substitute in the District of Charlton, Lee, and Kidbrooke, rendered vacant by the decease of Mr. J. Collis, the late District Surveyor.

The New Medical Examination Buildings.—The New Examination Hall on the Thames Embankment is rapidly nearing completion, and the question as to the uses to which the vacant plot of land not required for the building should be applied must soon be determined by the authorities of the combined colleges. If pecuniary reasons are not urgent (and, considering the large incomes now derived by the two colleges from their examinations, we should not suppose they could be), we would recommend that it should be left as it is, and should not be built on until the requirements of the examining board have been fully tested by one or two years' experience. It will then be time enough to decide whether class-rooms and laboratories for elementary or advanced scientific teaching and work could be added with the greater advantage. If, as is rumoured, there is a great divergence of opinion on this point, there is the more reason for delay, and for not taking any definite step which cannot be subsequently retraced if such a course should then seem expedient.—Lancet.

The Channel Tunnel Scheme.—Notice has been given that application will be made to Parliament next session for an Act authorising the South-Eastern and other railway companies to continue their experimental borings, and making provision (in the event of these trial works being so successful as to demonstrate the practicability of constructing the Channel Tunnel) for vesting in the Lords of the Treasury the sole right of determining the expediency of continuing or prosecuting the permanent works of the Tunnel, and for the ultimate transfer of the undertaking to the Government.

Steel Rails in Construction.—We understand that the framework of the building for the American Exhibition at Earl's-court is being constructed of steel rails, such as are used for railways. Two of these, bolted back to back, with the T-side out, make a column, and the only casting required is an angle iron and eyebar, into which the ends of the rails are slipped. This frame will then be covered with plates of glass and sheets of corrugated iron.

A New Kind of Paving Stone.—Trials with a new kind of paving stones are now being made on the Charlottenberg Bridge in Berlin. They are made from a composition of iron slag, coke, and cement, and weigh from 18 lb. to 20 lb. each. It is claimed that the new stone is cheaper than ordinary natural paving stones, and lasts longer. The stones are manufactured at ironworks in Upper Silesia.

Robert Boyle & Son, Limited.—The first annual general meeting of this company is fixed to be held on the 11th of January, at the Cannon-street Hotel, when it is proposed to declare a dividend at the rate of 12 per cent. per annum on the ordinary shares of the company, a substantial proportion of the profits earned being carried forward to the credit of a general reserve account. We are informed that the company have completed arrangements for the manufacture and sale of their various ventilating and sanitary appliances in Germany, France, Belgium, Holland, Spain, and Denmark.

Table with columns: Commodity, £. s. d., £. a. d. Includes sections for TIMBER (continued) and METALS.

Table with columns: Commodity, £. s. d., £. a. d. Includes sections for METALS (continued) and GILLS.

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS. Epitome of Advertisements in this Number.

Table with columns: Nature of Work, By whom required, Premium, Designs to be delivered, Page. Includes Asylum Buildings.

Table with columns: Nature of Work, or Materials, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes Making-up and Paving Roads, Caiking Repairs to Hospital Ship, etc.

Table with columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes Sanitary Inspector, County Surveyor, Assistant Engineer.

Table with columns: Name, Amount. Includes BARNES—For alterations to school at Barnes; EALING—For new warehouse in Western-road, Ealing.

Table with columns: Name, Amount. Includes BURNEMOUTH—For the erection of refuse-destroyer; CHELSEA—For new stables; GUILDFORD—For paving works for the Guildford Gas Company.

PRICES CURRENT OF MATERIALS.

Table with columns: Commodity, £. s. d., £. s. d. Includes sections for TIMBER and GASK.

HAMMERSMITH.—For additional stabling, King-street, Hammersmith, for the London General Omnibus Company. Under the superintendence of Mr. Lamban. Quantities by Mr. A. J. Bolton:—

Table with 2 columns: Item and Amount. Includes Parzan £2,350, Hack £2,284, Roberts 2,160, Kuljbt 2,163, Webb & Roser 2,474, Higgs 2,603, Masley 2,443, Garrud 1,683, Rh-hens & Monni 1,982, Evans 1,969, Haynes 1,800, Parker (accepted) 1,920.

HAMMERSMITH.—For buildings, stables, and premises, Hammer-smith-road, for the London Road Car Co. (Limited). Mr. P. Dollar, architect, Great Marlborough-street:—

Table with 2 columns: Item and Amount. Includes A. R. Flew & Co. (accepted) £5,100 0 0.

HAMPSTEAD.—For works in connexion with the Hampstead Improvement, for the Metropolitan Board of Works:—

Table with 2 columns: Item and Amount. Includes G. Elkington £10,300 0 0, Hindle & Morrish 9,800 0 0, Church & Co. 1,826 0 0, Killingback 7,893 0 0, Rutty 7,889 0 0, Trehearne & Co. 7,555 0 0, Mowlem & Co. 6,823 0 0, Nowell & Robson (accepted) 6,773 0 0, Bentley 6,730 0 0, Felton 6,575 0 0.

HEREFORD.—For the erection of granary, stables, &c., at back of steam-corn-mills, Bath-street, Hereford, for the Industrial Aid Society. Mr. T. Clarkson Wakeling, architect. Quantities supplied by the architect:—

Table with 2 columns: Item and Amount. Includes Webb, Hereford £1,290 0 0, Williams, Mersey 1,150 0 0, Meredith, Birmingham 1,119 0 0, Pritchard, Hereford 1,114 0 0, Jones & Son, Wolverhampton 1,059 0 0, Bowers & Co., Hereford (accepted) 992 0 0.

[Architect's estimate, 1,232.]

HOLLOWAY.—For new school buildings, &c., Black-stock-road:—

Table with 2 columns: Item and Amount. Includes Tozer £14,334 10 0, Dawes 13,296 0 0, Godfrey & Son 12,240 0 0, T. L. Green 12,068 0 0, G. Stephenson 11,980 0 0, C. Wall 11,623 0 0, W. Johnson 11,496 0 0, Atherton & Latta 11,385 0 0, Stimpson & Co. 11,374 0 0, Downs 11,362 0 0, Wall Bros. 11,255 0 0, Cox 11,254 0 0, Goodwin 11,155 13 9.

LONDON.—For paving and other works for the Metropolitan Board of Works, in the following streets:—

Table with 2 columns: Item and Amount. Includes Green-street, Bethnal Green, Nowell & Robson £4,212 0 0, Mowlem & Co. 4,145 0 0, Griffiths (accepted) 4,699 0 0, Hindle & Morrish 3,984 0 0. Touch-street, Wapping, Trehearne 3,350 0 0, Hindle & Morrish 2,999 0 0, Turner & Sons 2,947 0 0, Woodham 2,900 0 0, Bentley 2,744 0 0, Mowlem & Co. (accepted) 2,685 0 0. Brook-street, Limehouse, Hindle & Morrish 1,890 0 0, Turner & Sons 1,778 0 0, Mowlem & Co. (accepted) 1,519 0 0.

LONDON.—For paving works, river wall, and weighing-stages, for Messrs. Randall & Co.'s new coal wharf, Vauxhall:—

Table with 2 columns: Item and Amount. Includes W. H. Wheeler, Queen Victoria-street £310 0 0. Accepted.

NEW BARNET.—For the erection of three villa-residences, for Mr. J. Monington (who supplies fittings and fixtures). Mr. P. Dollar, architect, Great Marlborough-street:—

Table with 2 columns: Item and Amount. Includes A. R. Flew & Co. (accepted) £1,915 0 0. [No completion.]

NEWPORT (Mon.).—For two shops and houses, Chepstow-road, Maiden, Newport, for Mr. John Young. Quantities by the architect, Mr. E. A. Lansdowne, Newport:—

Table with 2 columns: Item and Amount. Includes C. Reed £598 18 0, G. Martin 799 0 0, G. Wilkins 792 0 0, Firbank 769 0 0, G. Morgan 719 0 0, T. Goleworthy 700 18 9, C. Miles 694 0 0, J. Linton 690 0 0, H. C. Parfit 690 0 0, W. Liston 687 0 0, W. Blackburn 677 0 0, Lier 658 10 0, T. Westcott 646 0 0, W. Jones & Son 645 0 0, C. Colley 642 0 0, E. Richards 629 0 0, T. Webb 629 0 0, W. Price 569 0 0. [All of Newport.]

WEST KENSINGTON.—For rebuilding Cedars Mews for the London Road Car Co. (Limited). Mr. P. Dollar, architect, Great Marlborough-street:—

Table with 2 columns: Item and Amount. Includes Allow for Old Materials, A. R. Flew & Co. (accepted) £2,270 £184.

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 15, Abchurch-lane, W.C., not later than four p.m. on THURSDAYS.

FIRE BRICKS.

E. BOWEN, Fire Brick Manufacturer, STOURBRIDGE. Manufacturer of Best Stourbridge Fire Bricks, and Cement Fire Clay, Old Redrort, Muffins, &c. Fire Bricks and Blocks for the Highest Range, for Iron, Blast Furnaces, Forging, Rolling, and Steel Furnaces, Pottery, Bottle, and Flint Glass Furnaces, Boiling and Retorting Furnaces, Chemical Works, Coke Ovens, &c. Boiler Setting Blocks, Flue Covers, Locomotive Bricks, Tires, Steel Runners, Gate Backs.

R. CULL & SON, Palmerston-buildings, E.C. Stores:—Railway Arches, Corner of London-street and Brady-street, near Bethnal Green Station.

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GLAZED BRICKS (White and Coloured), Special Salt Glazed Bricks Sanitary Tubes, Glazed Earthenware Sinks, Cattle, Sheep, and Pig Troughs, Horse Mangers, Patent Automatic Trunk Closet, Patent Flush Tank, Churnmills for Sticks and Yards, Salt Glazed Bricks for Stables, Sewers, &c. Scutching Bricks, Patent Ventilating flues and Traps, Garden Edging, Patent Chimney Pots and Covers for Down Draught, Patent Drain-Cleaning Rods. Six Prize Medals. Copies of Testimonials sent if required. London Agents:— R. CULL & SON, Palmerston-buildings, E.C. Stores:—Railway Arches, Corner of London-street and Brady-street, near Bethnal Green Station.

BLUE BRICKS.

THE KETLEY BRICK COMPANY, Manufacturers of Sandbricks and Blue Bricks, KINGSWINFORD, near Dudley, Staffordshire. London Agents:— R. CULL & SON, Palmerston-buildings, E.C. Stores:—Railway Arches, Corner of London-street and Brady-street, near Bethnal Green Station.

DRAIN PIPES.

Lime, Cement, Bricks, Slates, Laths, Hair, Sand, Plaster, Stable Faving Bricks, Wall Copings, Channel Bricks, Blue and Red Ridges, Red Flue Tiles and Pan Tiles, Churn-pots and Traps, Drain Pipes, Bends, Junctions, &c. all sizes. Chimney Pots, Red and White. Fire Bricks, Limes, Tiles, Fire Clay. PRICES on APPLICATION. R. CULL & SON'S Stores, Railway Arches, Corner of London-street and Brady-st., near Bethnal Green Station. Chief Office:—72, Palmerston-buildings, Old Broad-street, E.C.

TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

P. O.—C. S.—G. T. W. (Impossible we can say without seeing the work itself; you had better consult a local architect; correspondents should always give full name and address).—J. P. S.—O. & Co. (our advertising columns are open).—I. V. All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors. We cannot undertake to return rejected communications. Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED. All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

Best Bath Stone.

CORSHAM DOWN, } SUMMER DRIED. FARLEIGH DOWN, }

BOX GROUND, COMBE DOWN. WESTWOOD GROUND. RANDELL, SAUNDERS, & CO., LD., CORSHAM, WILTS.

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The stone from these quarries is known as the "Weather Beds," and is of a very crystalline nature, and undoubtedly one of the most durable stones in England. It is of the same crystalline nature as the Chelwyck Stone, but finer in texture, and more suitable for fine moulded work.

HAM HILL STONE.

Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.

Prices, and every information given, on application to CHARLES TRASK & SONS, Norton-sub-Hamdon, near Ilminster, Somerset. London Agent — Mr. E. WILLIAMS, 16, Craven-street, Strand, W.C. [ADVT.]

Doubling Free Stone

For prices, &c., address S. & J. STAPLE, HAM HILL STONE, Quarry Owners, Stone and Lime Merchants, Stoke - under - Ham, Ilminster. [ADVT.]

Asphalts.—The Seyssel and Metallic Lava

Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.]

Asphalts.

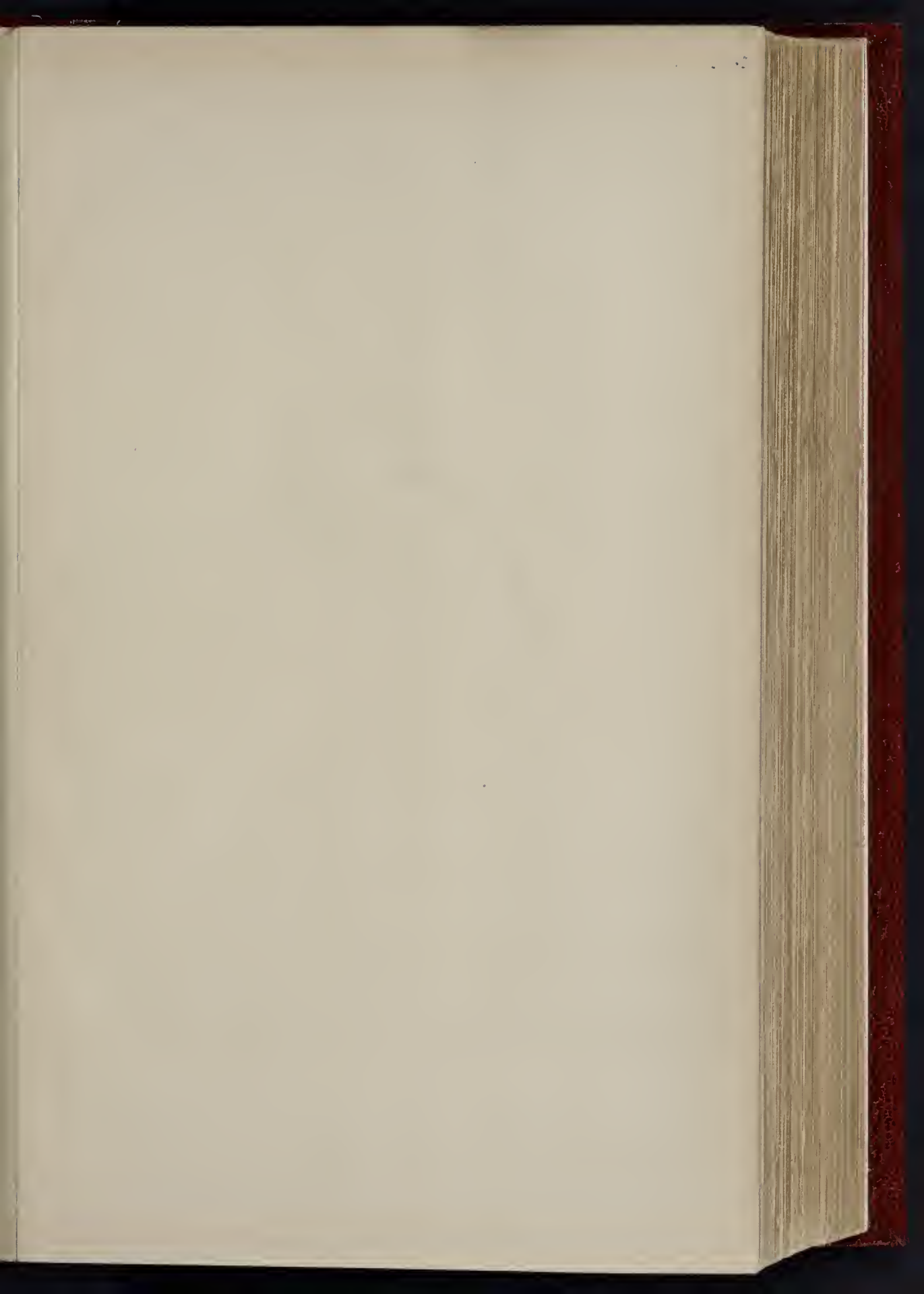
Seyssel, Patent Metallic Lava, and White Asphaltes. M. STODART & CO. Office: No. 99, Cannon-street, E.O. [ADVT.]

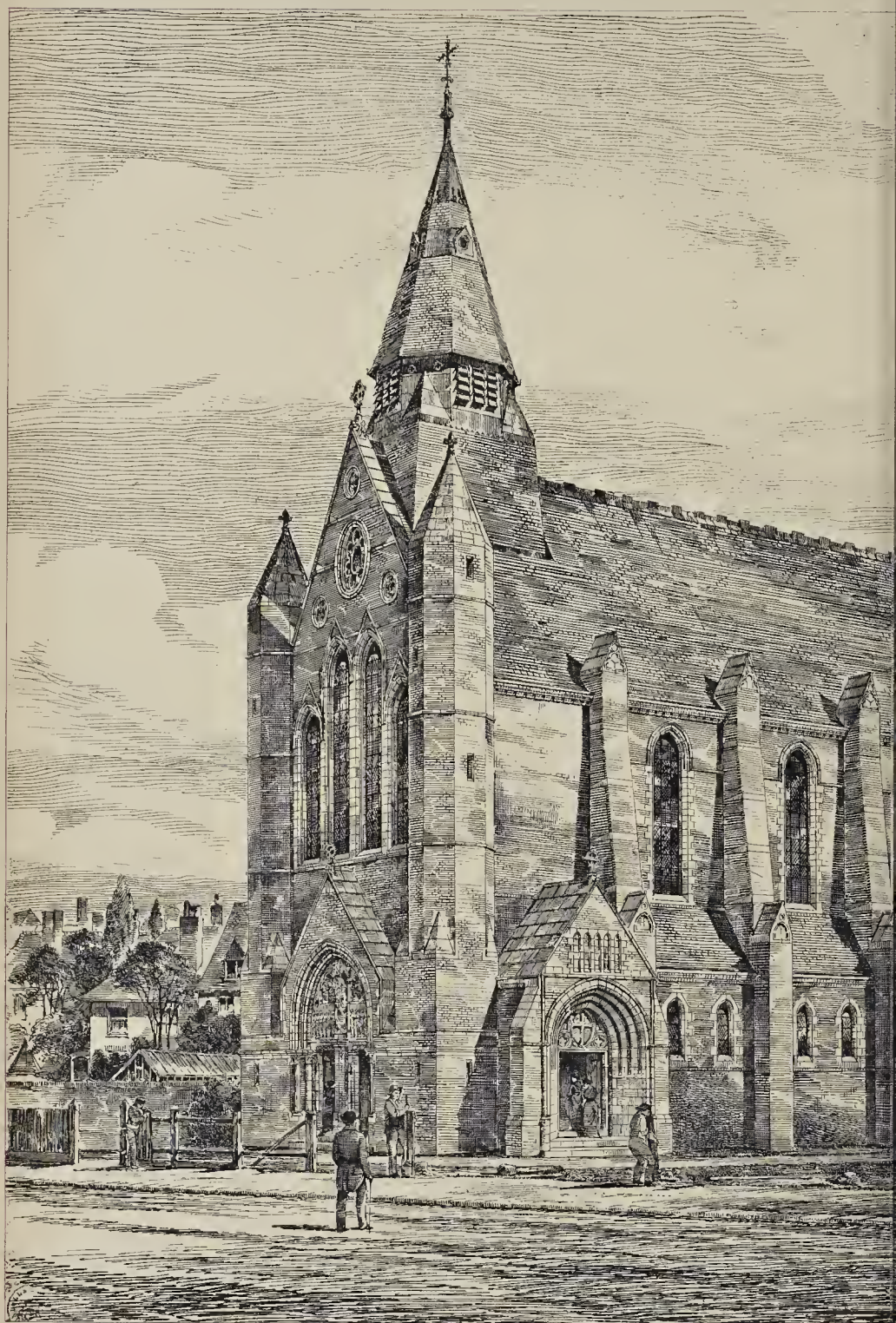
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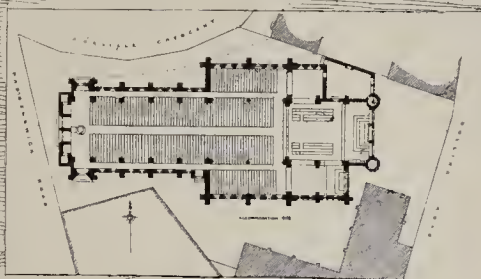
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The Strongest Exhaust Ventilators for all Buildings, Public Halls, Churches, Billiard-Rooms, &c. HIGHEST PRICES at all the most Important EXHIBITIONS. Gold Medal. Health Exhibition, 1884.

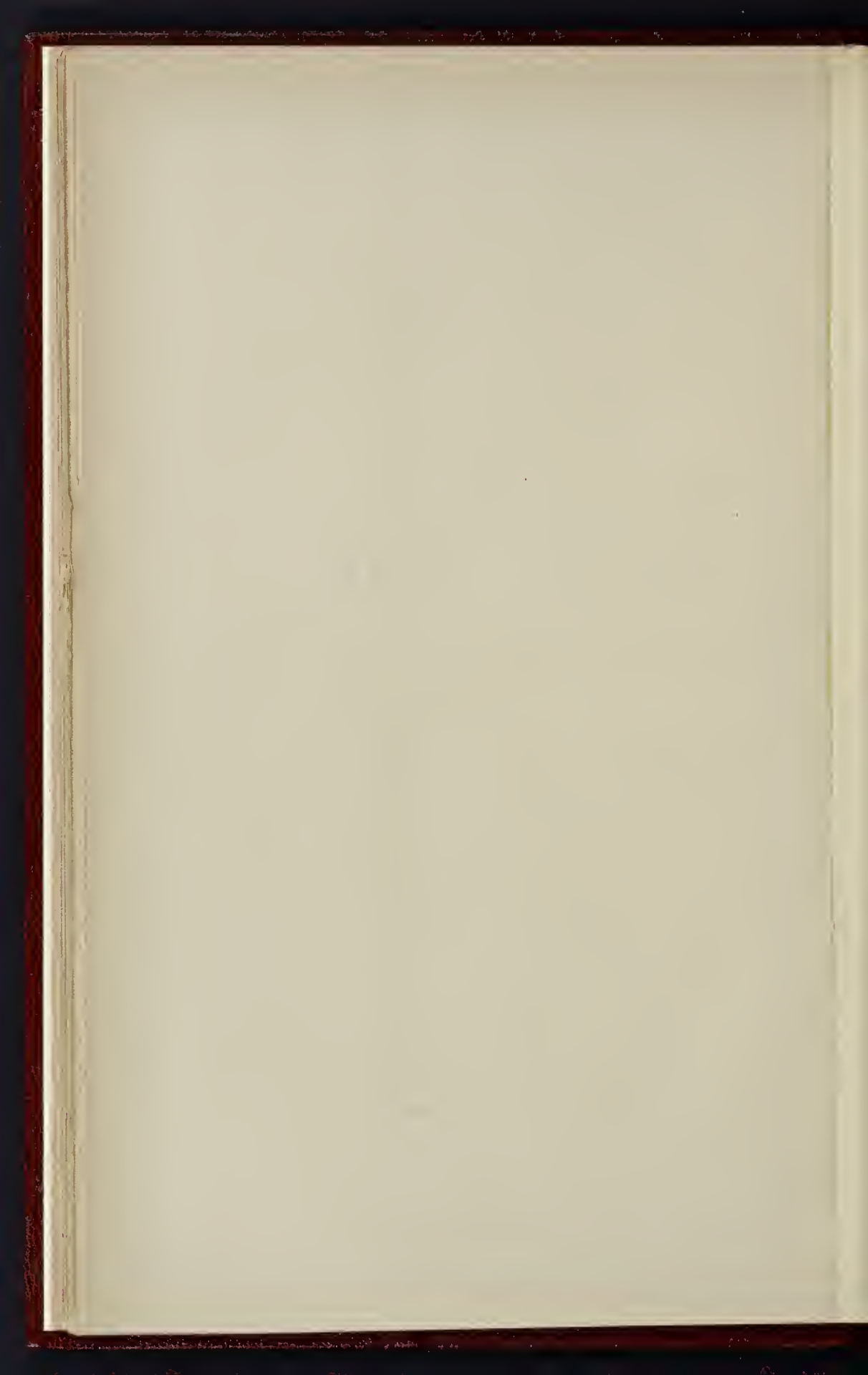
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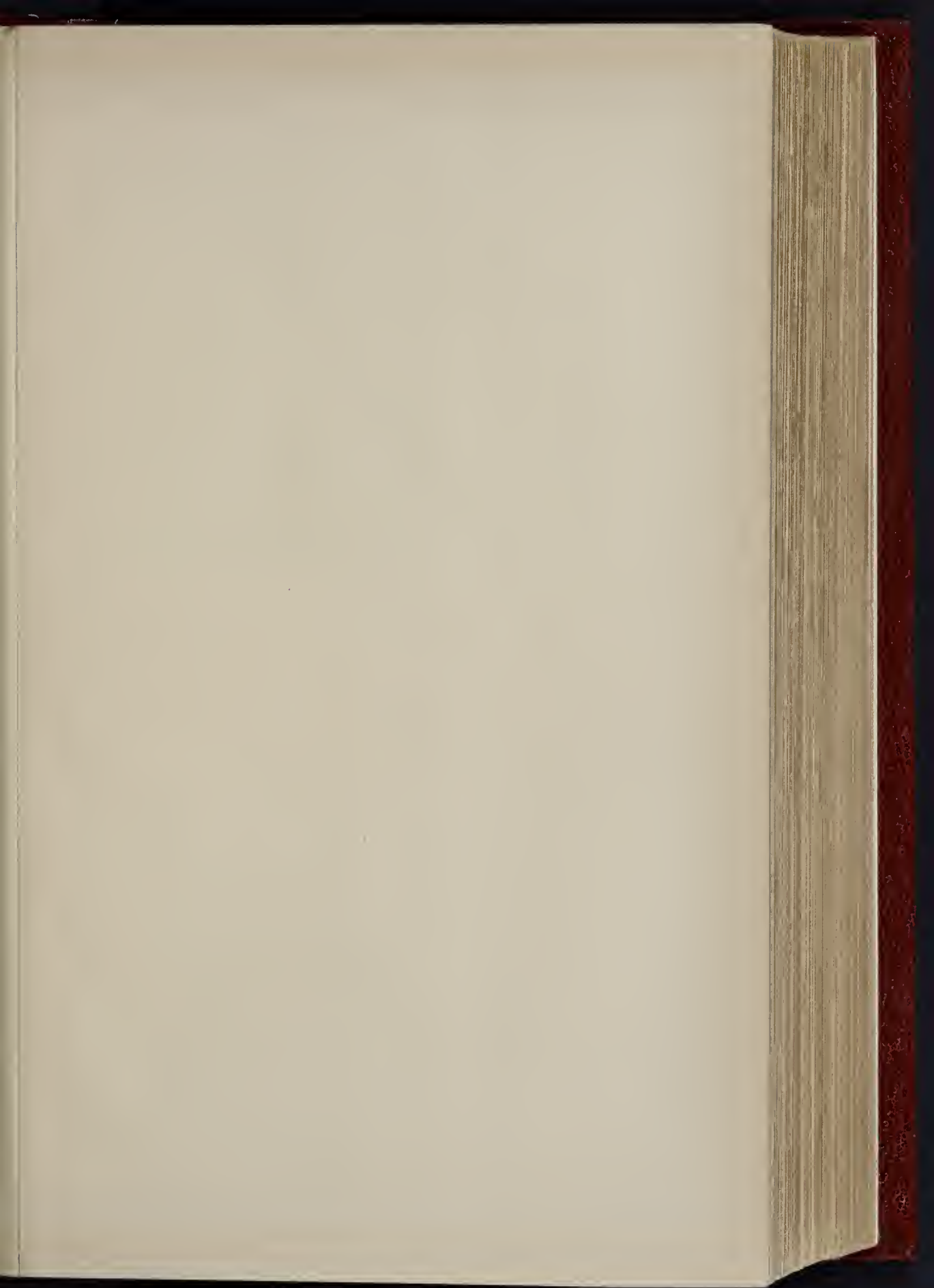




Church of ye Holy Innocents 1816  
Hammersmith · W.  
James Brooks Arch<sup>t</sup>

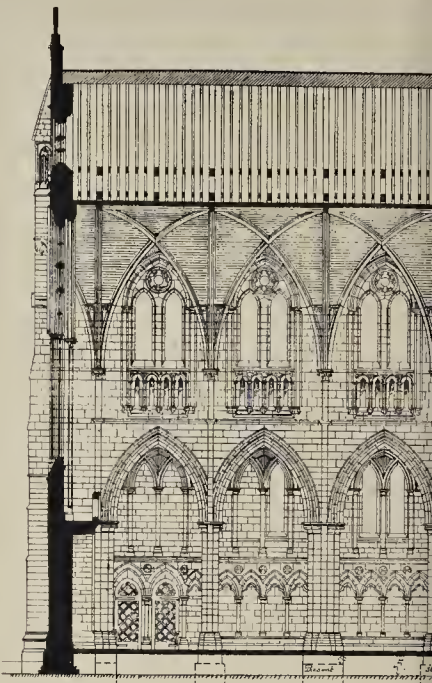








Section looking East

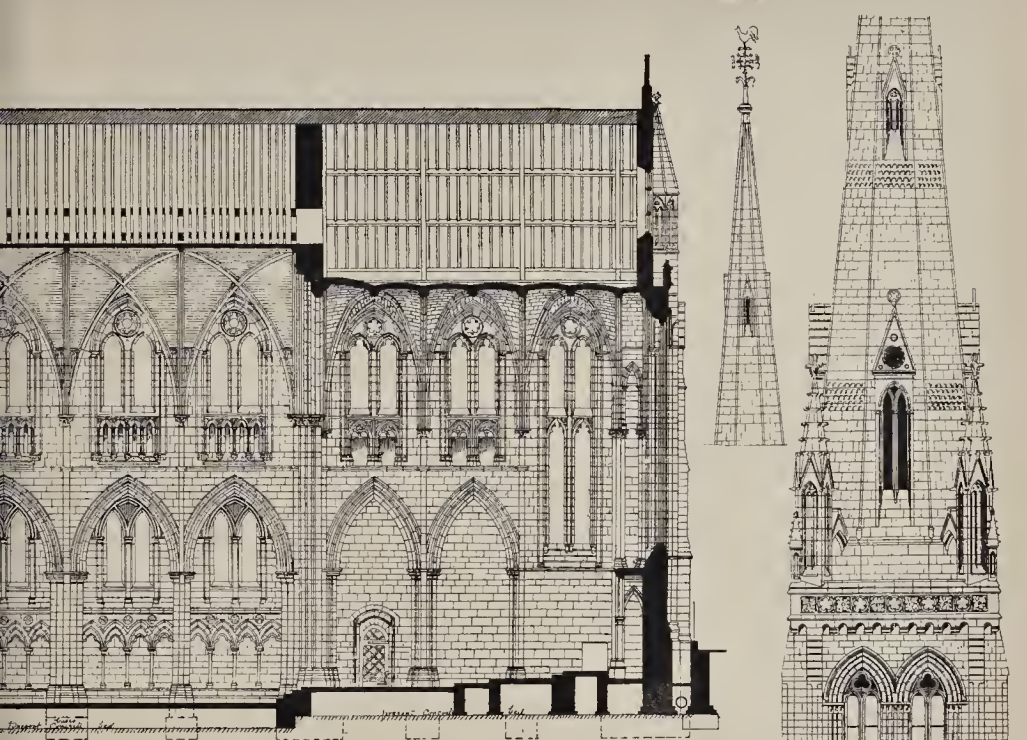


Longitudinal Section



East Elevation





ing North.

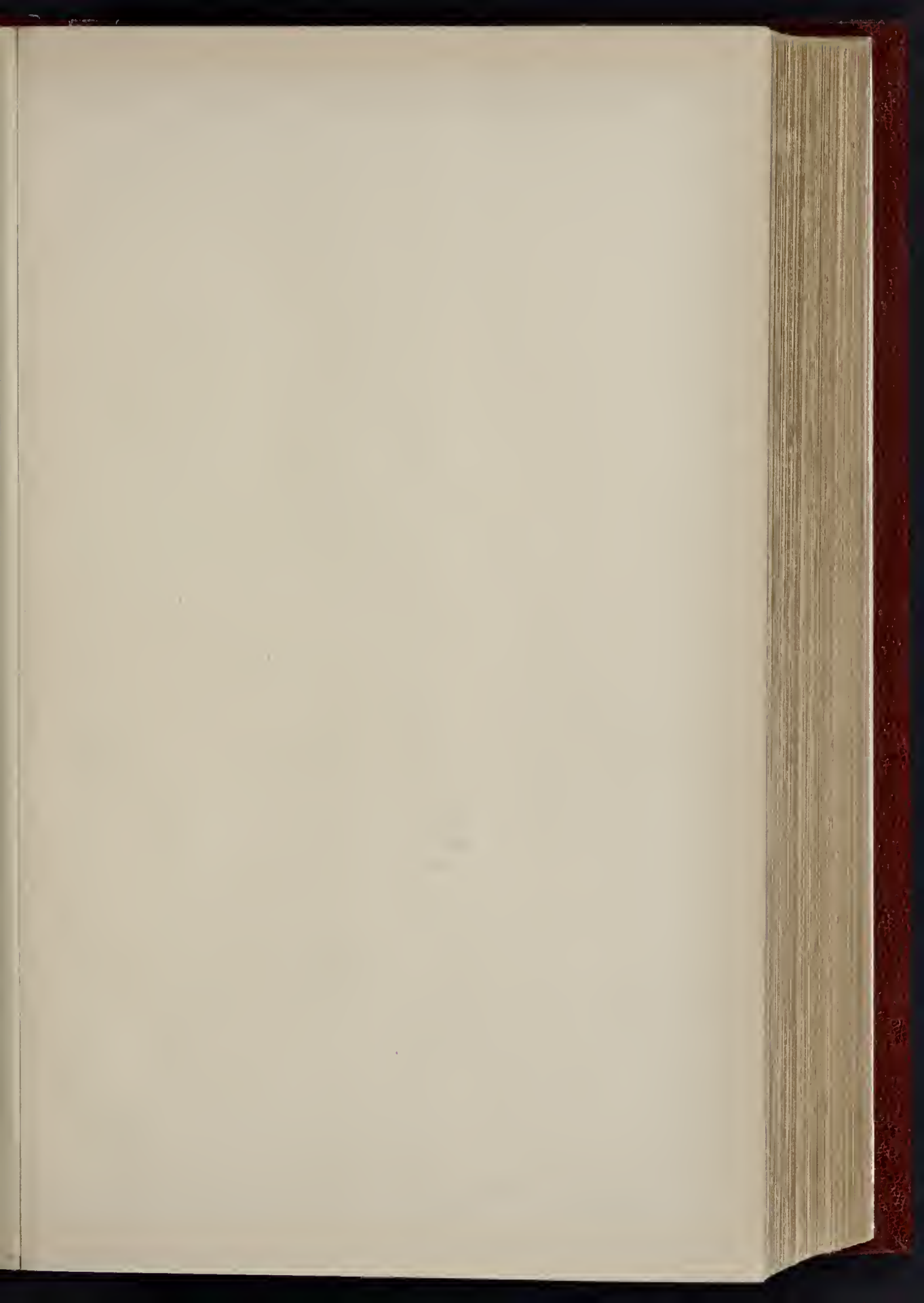


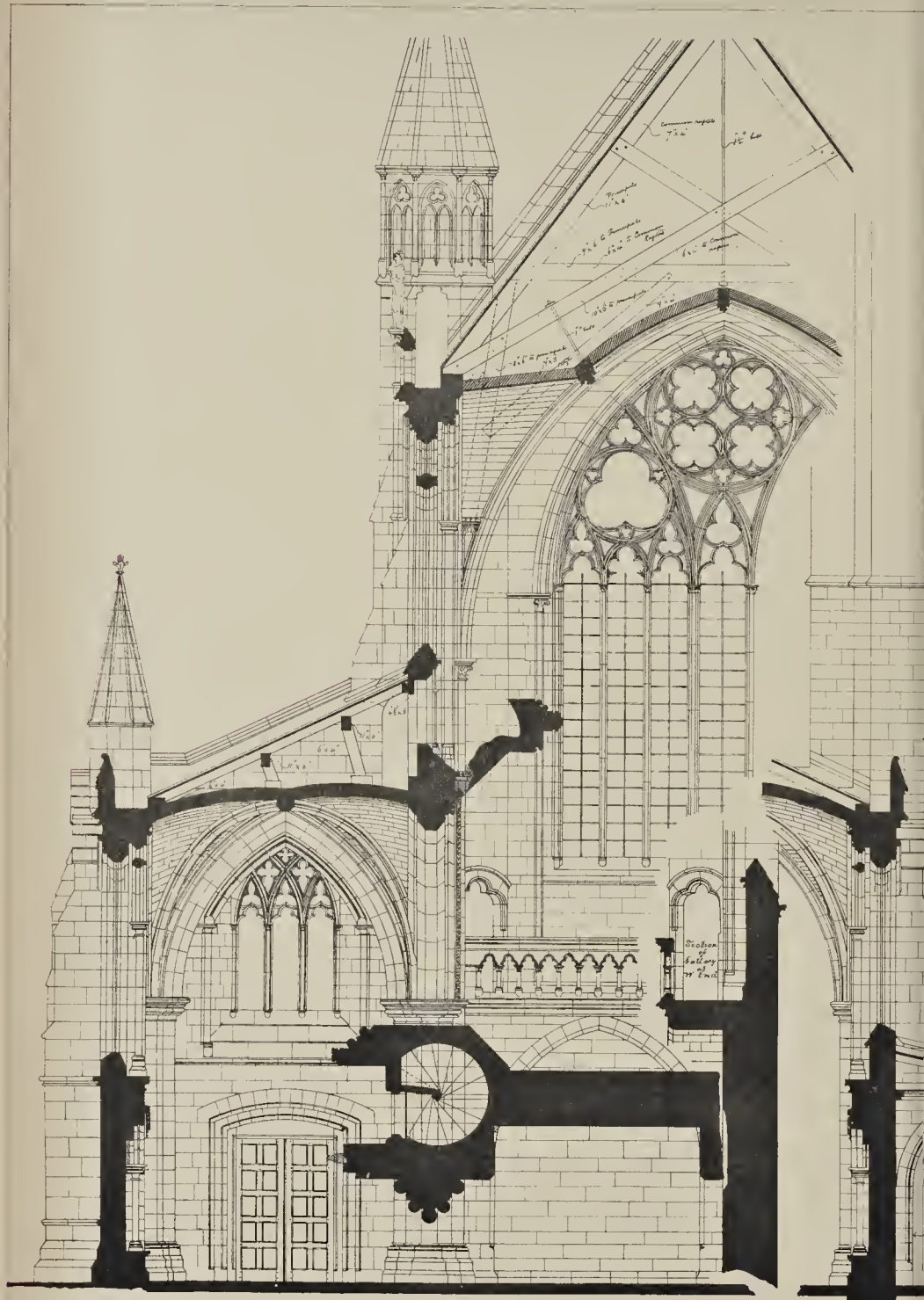
*North Elevation and Section thro Vestries.*

PHOTO-LITHO. BRAGUE & CO. 28, MARK LANE, CANNON ST. LONDON E.C.

STREET AND MR. ARTHUR E. STREET, ARCHITECTS.

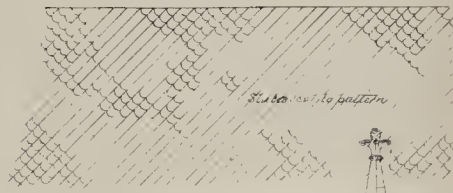
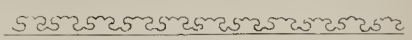




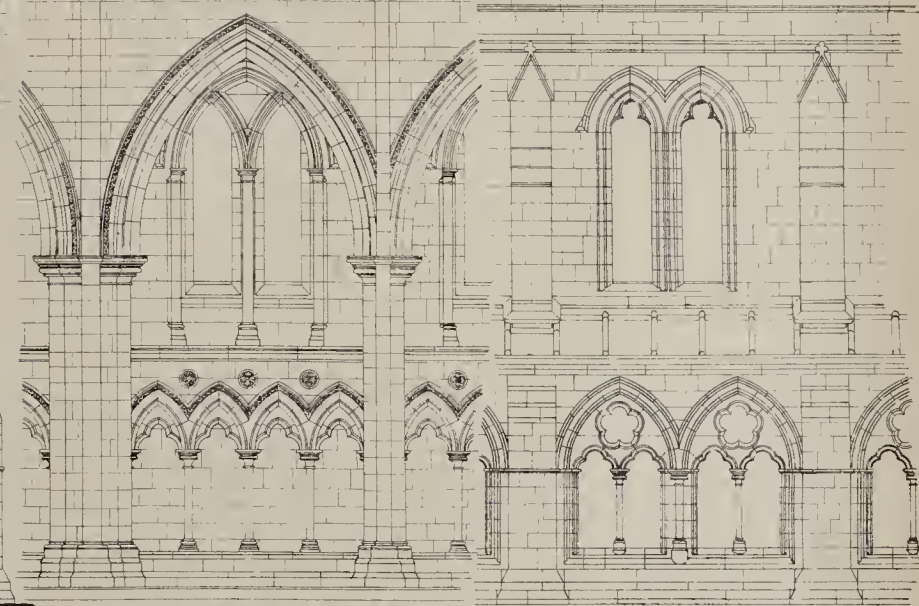


*Section: l'abside - West*

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100



*Decorative pattern*



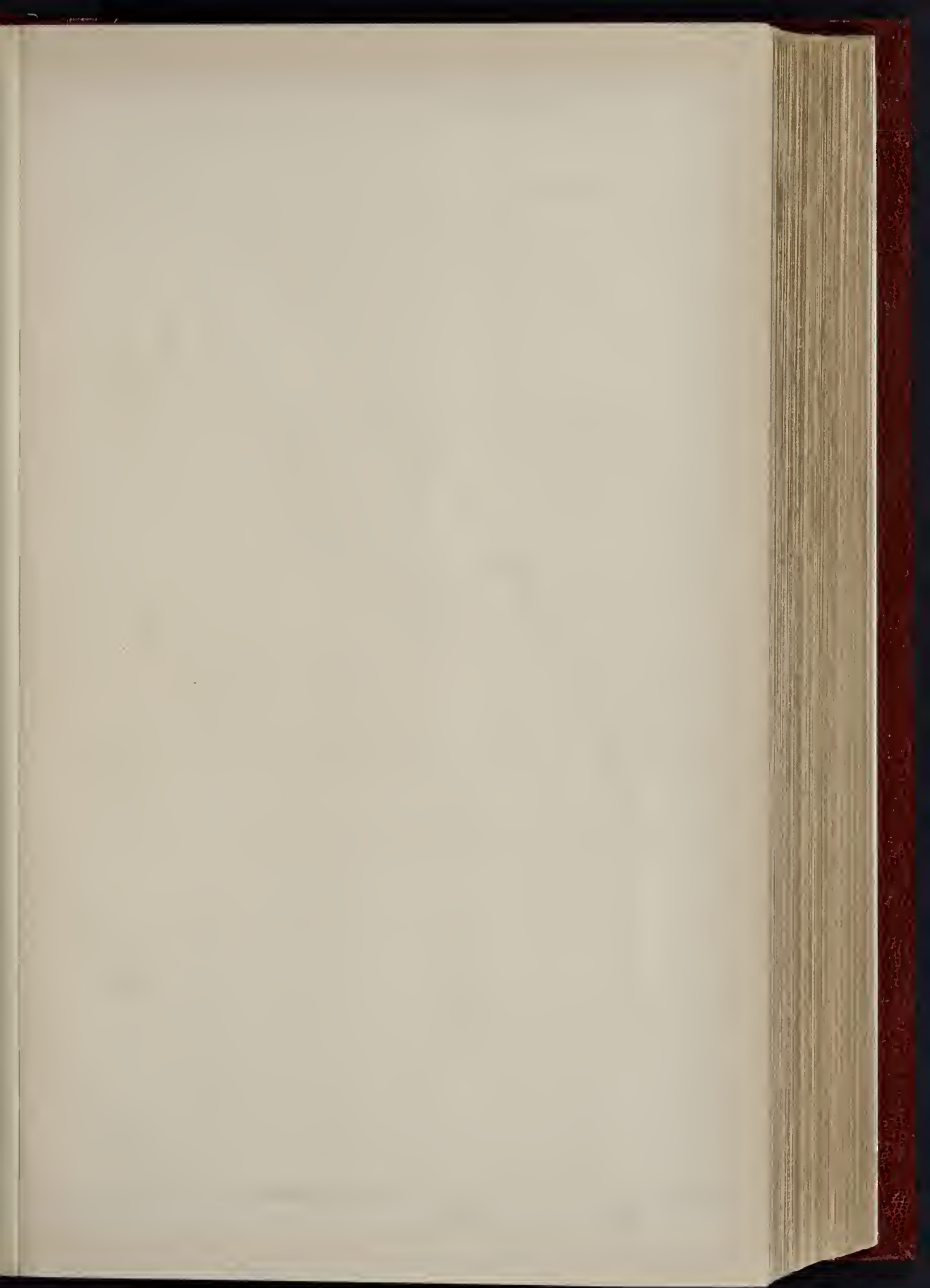
*Section through the building ..*

*Elevation of one bay of North Side ..*

PHOTO LITHO SPRAGUE & CO 22 MARTIN LANE CANON ST. LONDON E.C.



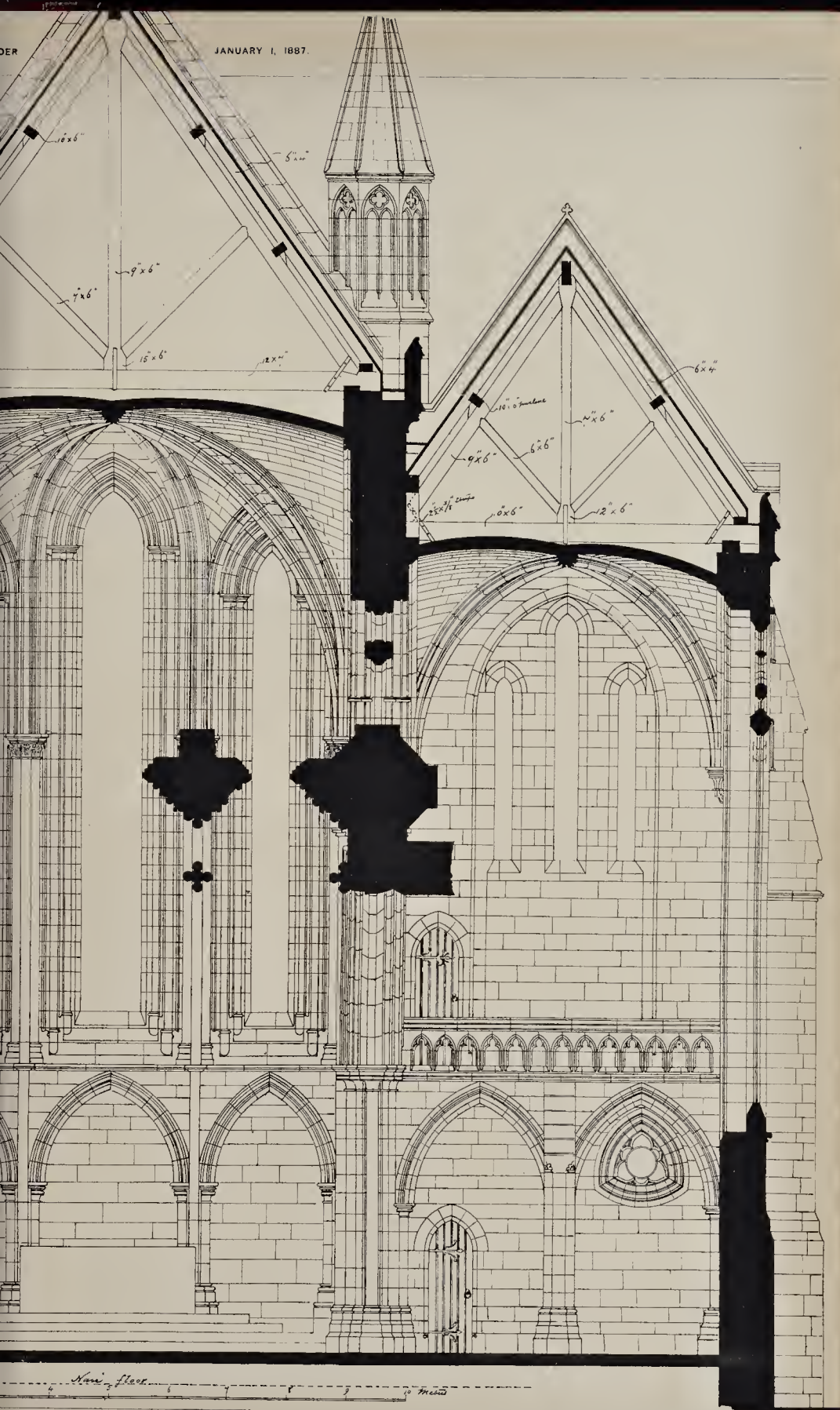




*Detail Section across Chancel.*

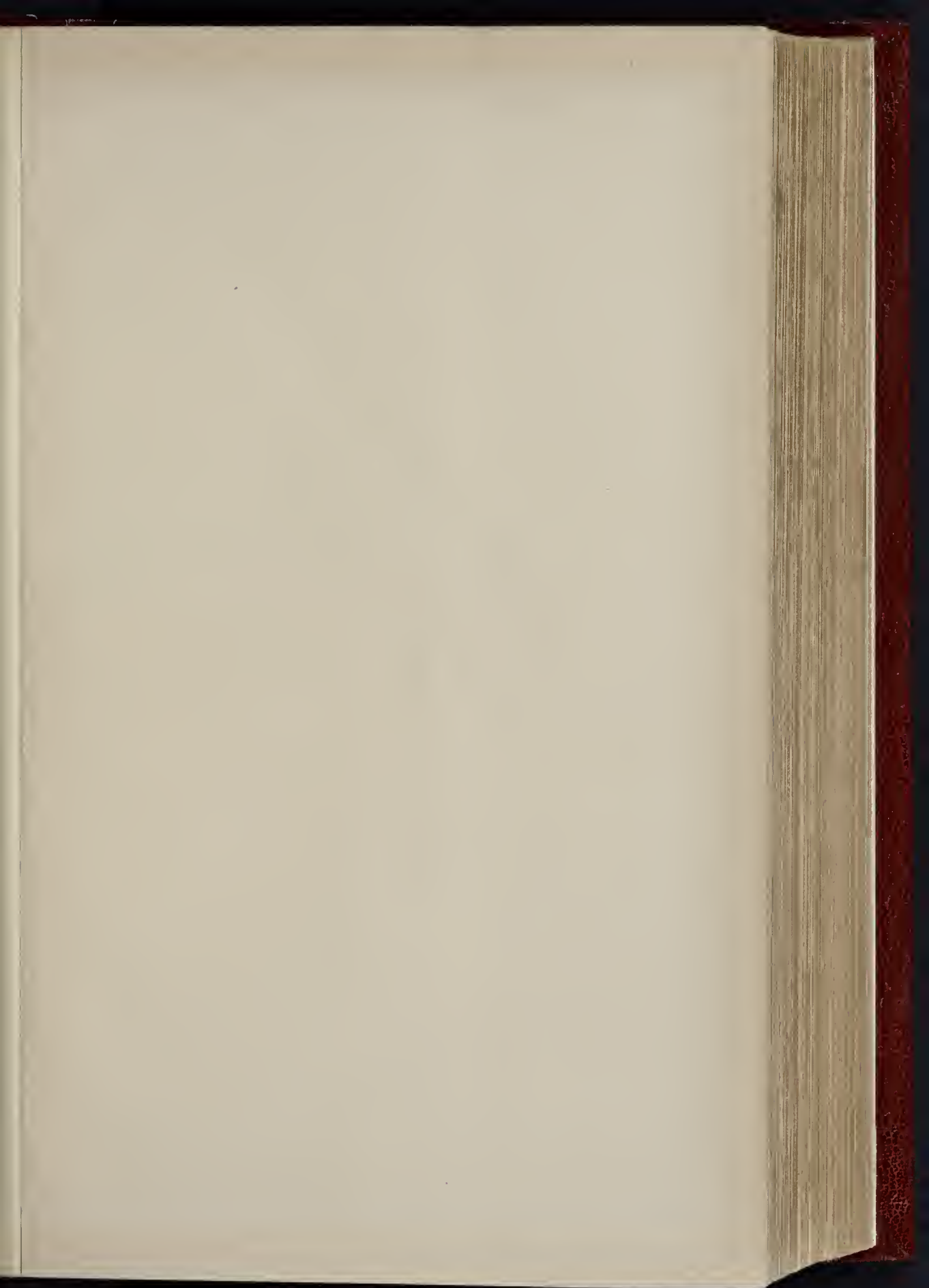


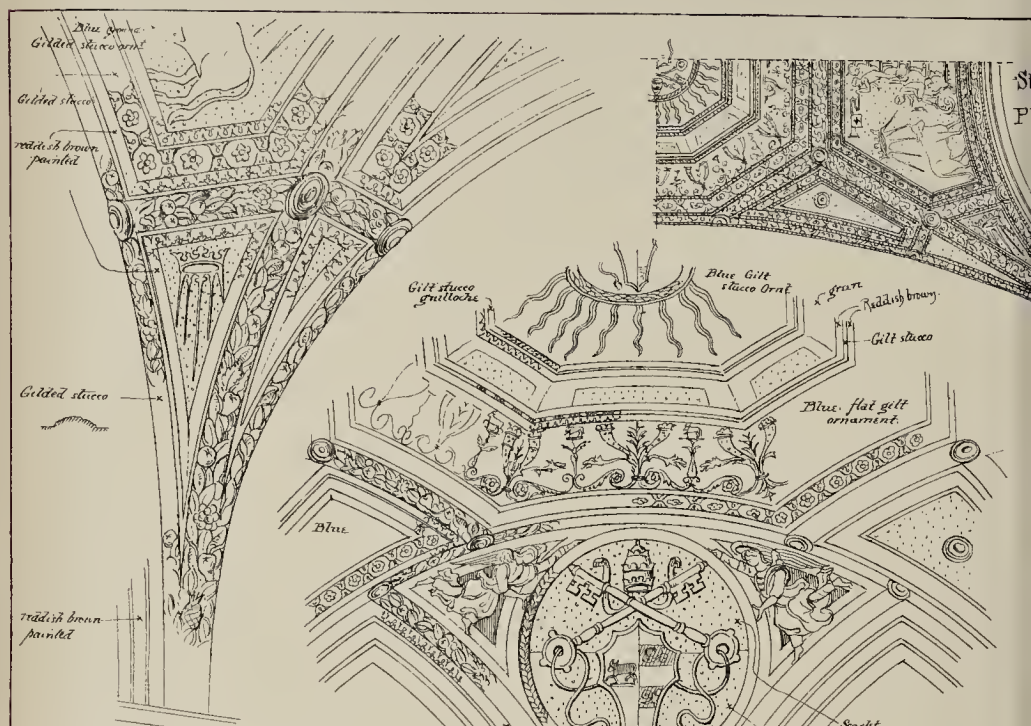
JANUARY 1, 1887.



*Half feet*  
0 1 2 3 4 5 6 7 8 9 10 *feet*







Stanza-III. Pendentive.

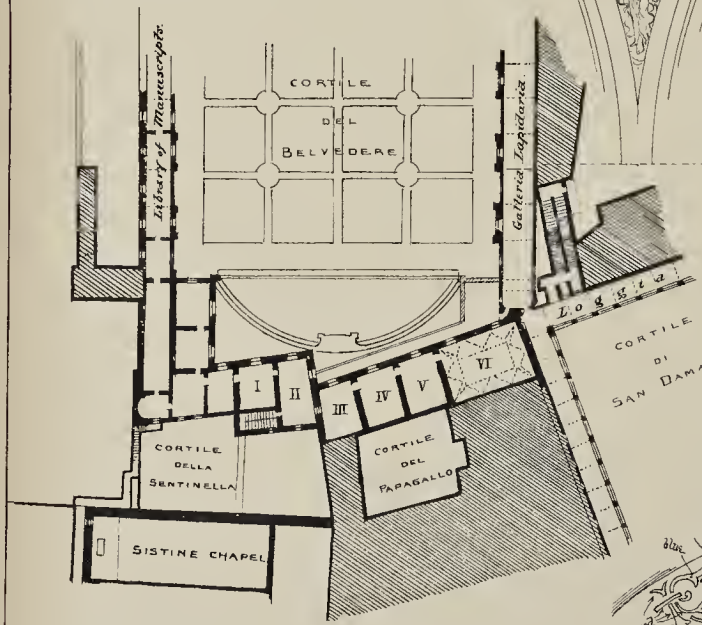
SKETCH PLAN

showing the position of the "Appartamenti Borgia"

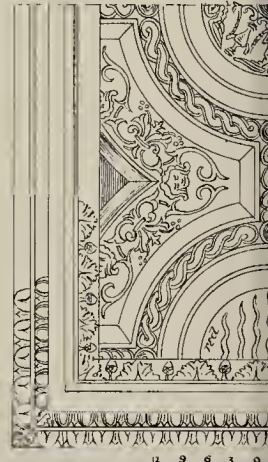
Subject of Trinita "Rhetoric"

"Geometry"

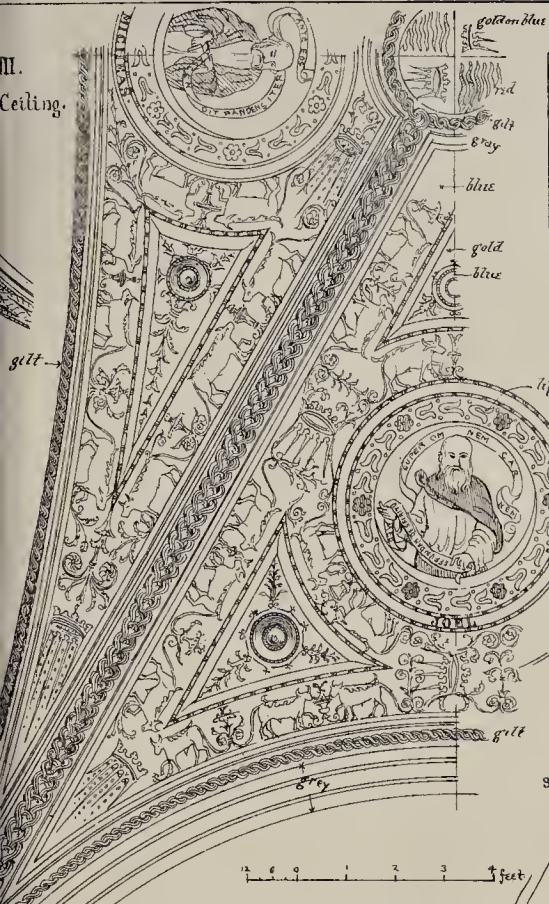
Stanza III. Spandrel & Part of Ceiling. {similar spandrel in N°5}



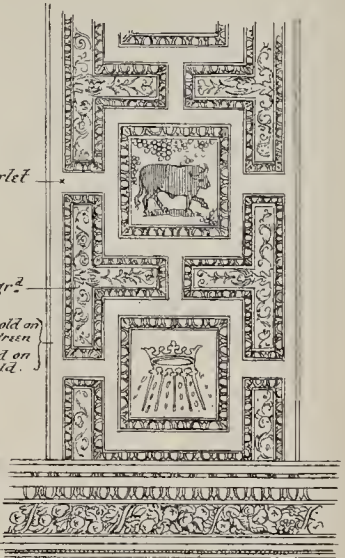
R.W. WOODHOUSE, MENEY & DEL



THE "APPARTAMENTI BORGIA".  
 VATICAN · ROME ·  
 SOME DETAILS OF THE DECORATION  
 BY BERNARDINO DI BETTO — PINTURICCHIO.



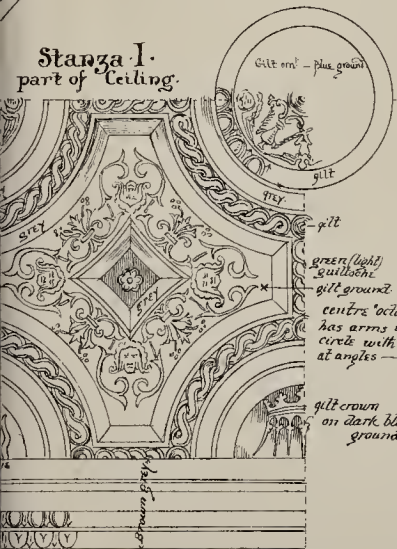
1 2 3 feet.



Stanza V. Soffit of Arch.

Stanza V. Part of Ceiling.

Stanza I. part of Ceiling.



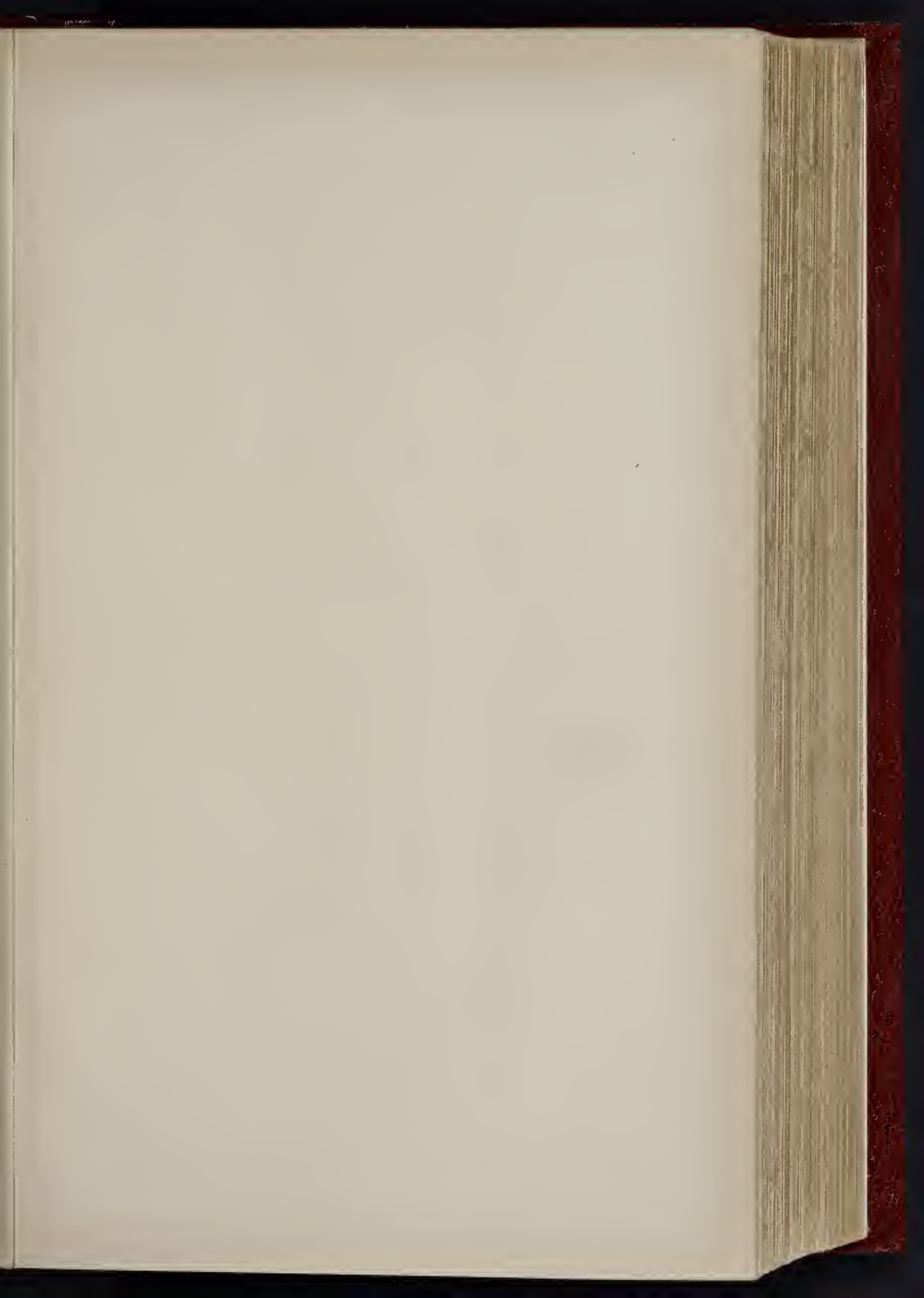
1 2 feet.



Part of Fresco No 6 · Stanza IV.

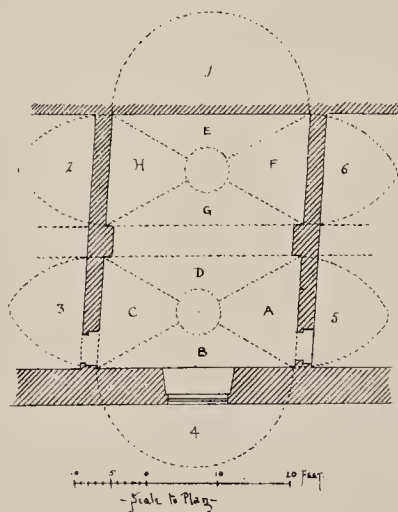








⊗ SKETCH PERSPECTIVE ⊗



Medallion from soffit  
of Great Arch



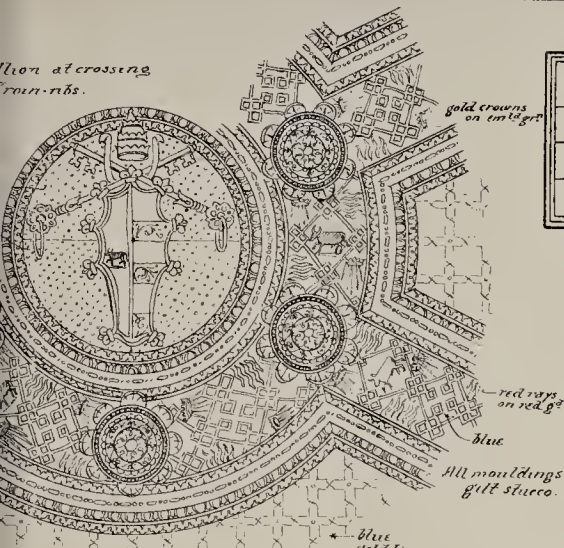
Subjects of Ceiling-Decoration

- A. *Oris teaches Egyptians agriculture*
- B. *He teaches them Viticulture*
- C. *He gathers the harvest*
- D. *His marriage with Isis*
- E. *His murder by Hyphon*
- F. *Isis finds his tombs*
- G. *Appearance of Apis*
- H. *Worship of Apis*

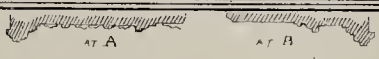
Subjects of Lunettes

- 1. *S. Calharins before Emperor Maximian*
- 2. *Escape of S. Barbara*
- 3. *S. Julian's refusal to obey his father*
- 4. *Martyrdom of S. Sebastian*
- 5. *Visitation of the B. V. M.*
- 6. *Visitation of S. Paul the Hermit by S. Antony*

lion at crossing  
in ribs.

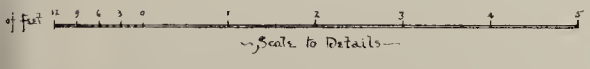


THE "APPARTAMENTI BORGIA".  
VATICAN · ROME ·  
SOME DETAILS OF THE DECORATION  
BY BERNARDINO DI BETTO - PINTURICCHIO.



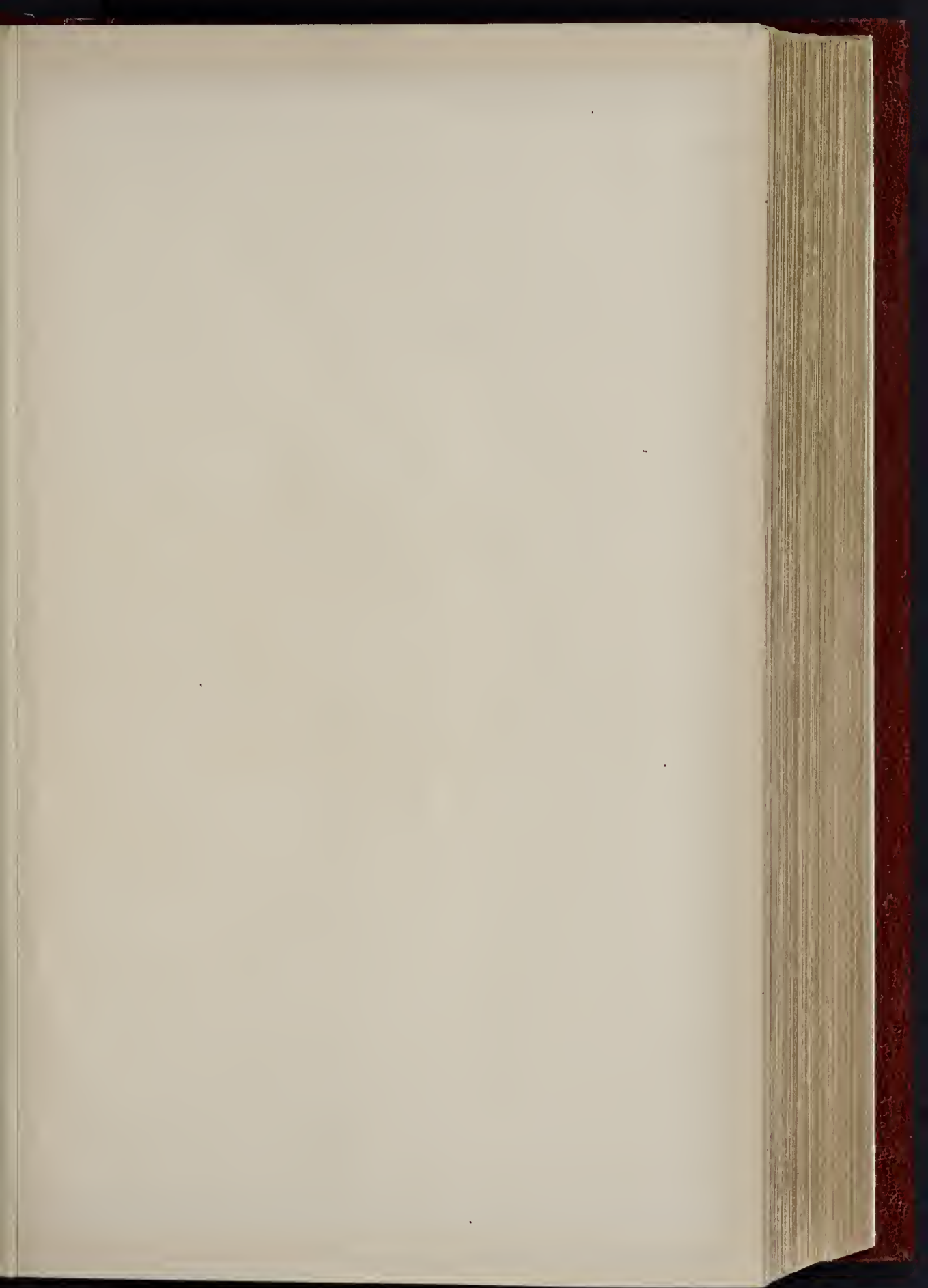
A Group from Fresco N<sup>o</sup>. 1.

Part of Arch. soffit.  
(developed.)



F. W. WOODHOUSE.  
MENS: ET DELT.  
1885





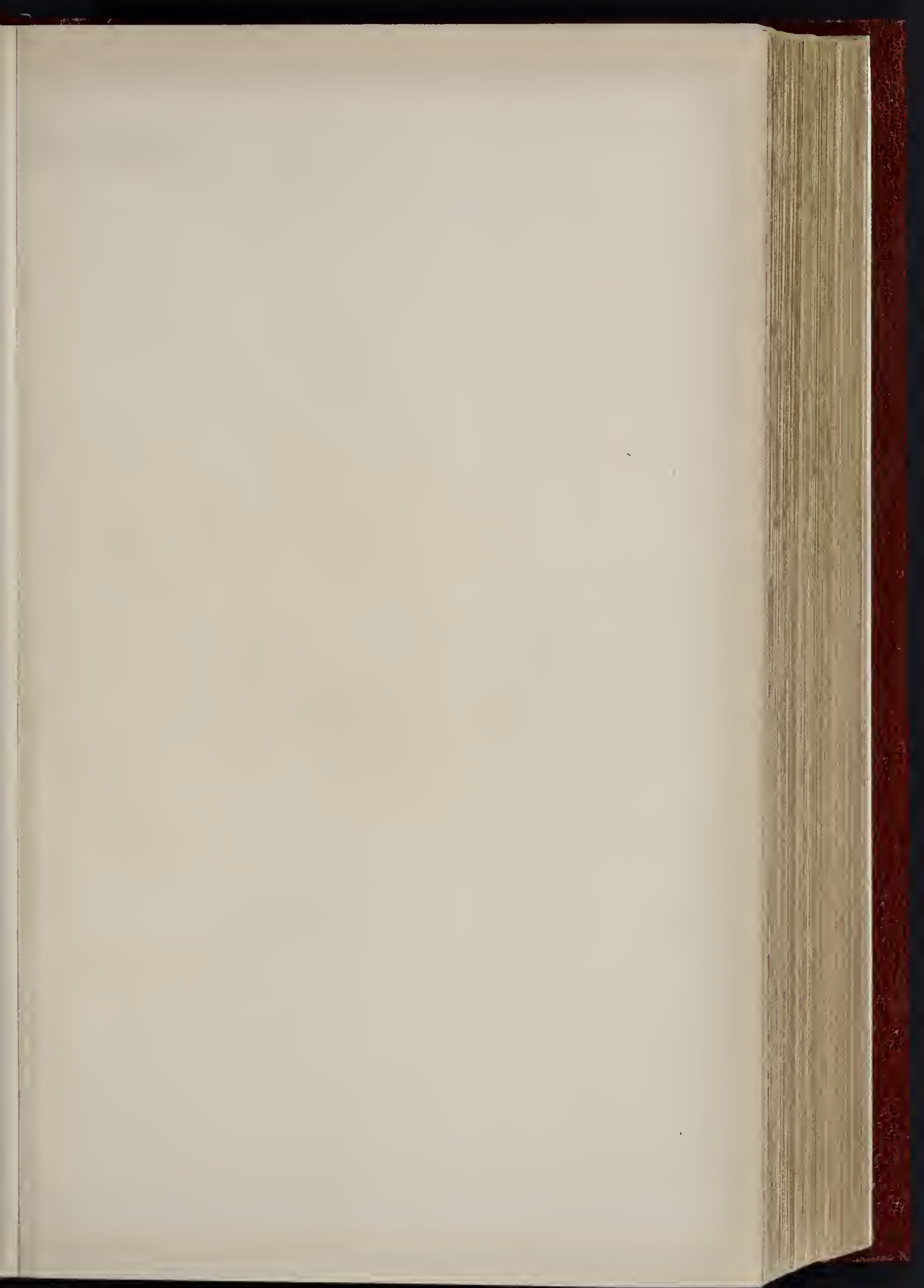


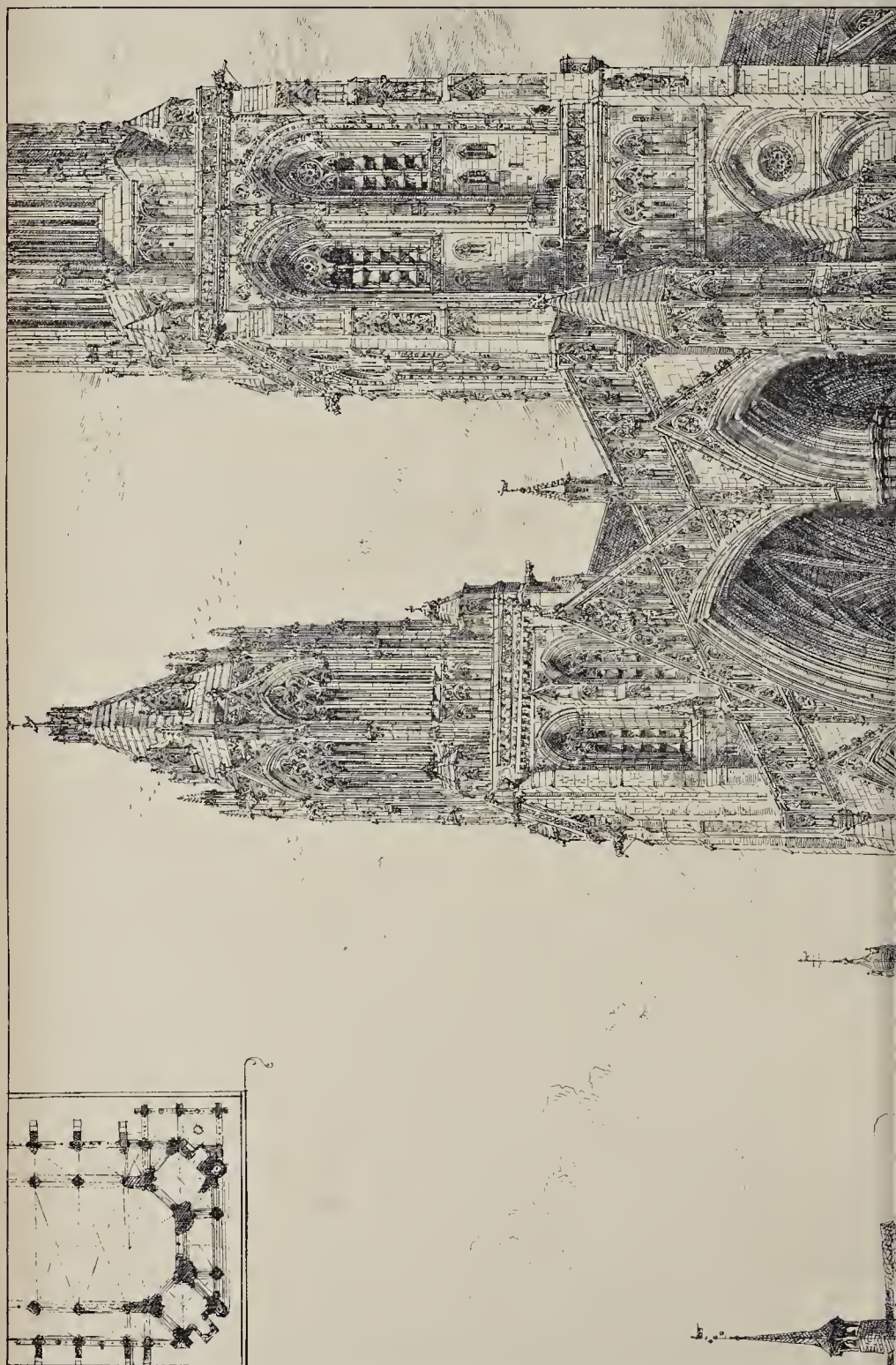


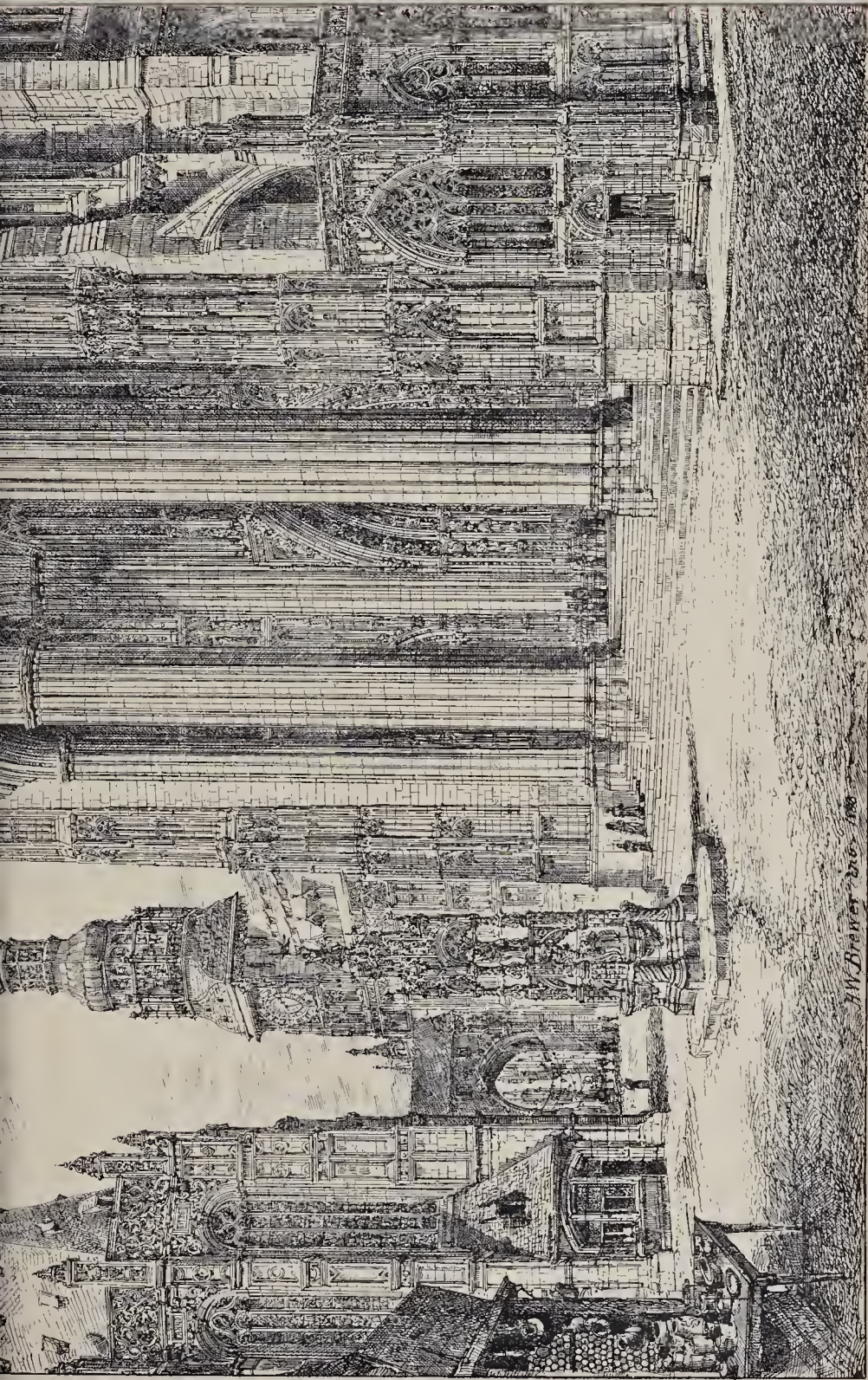
THE PRINCE OF THE ...







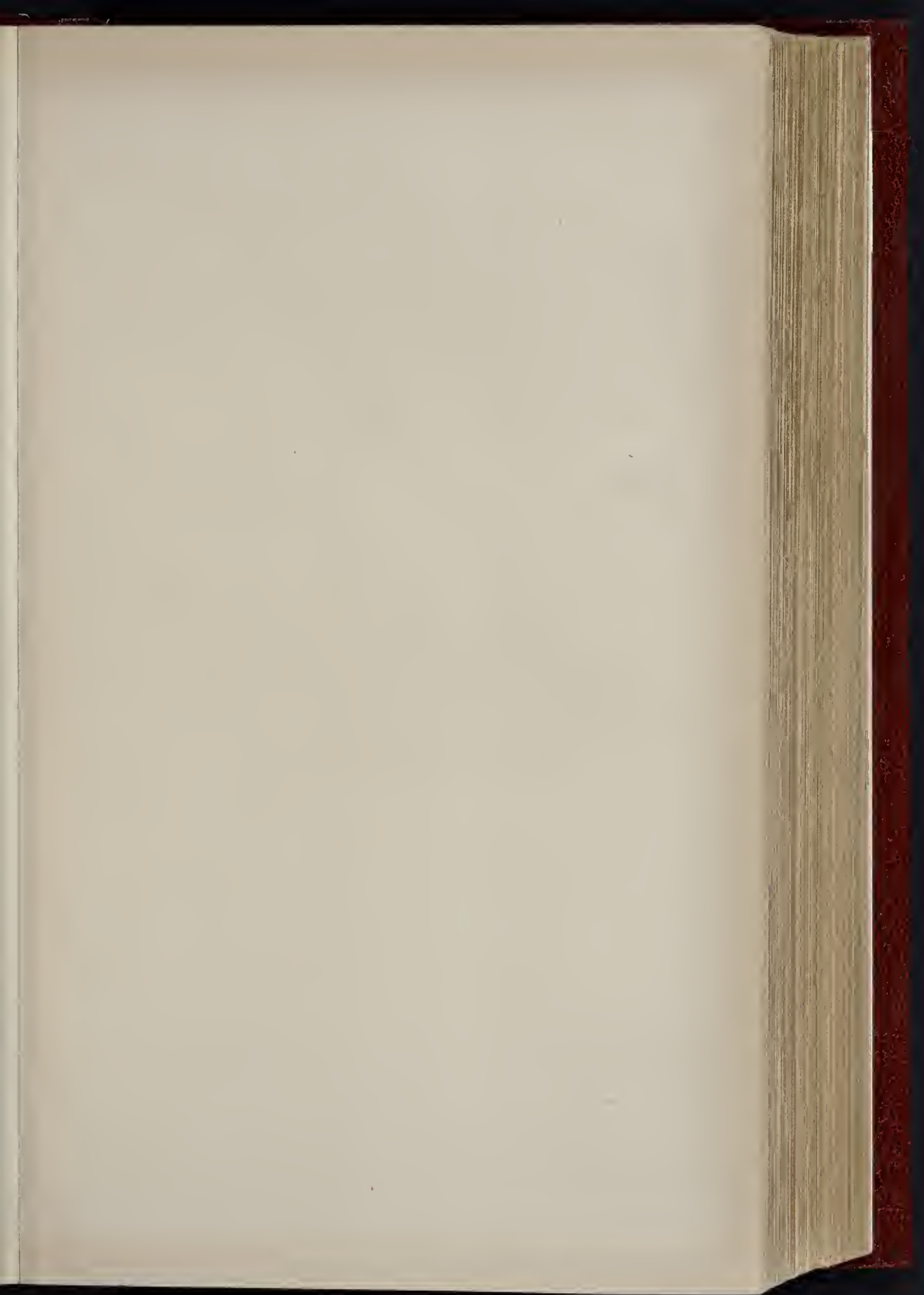


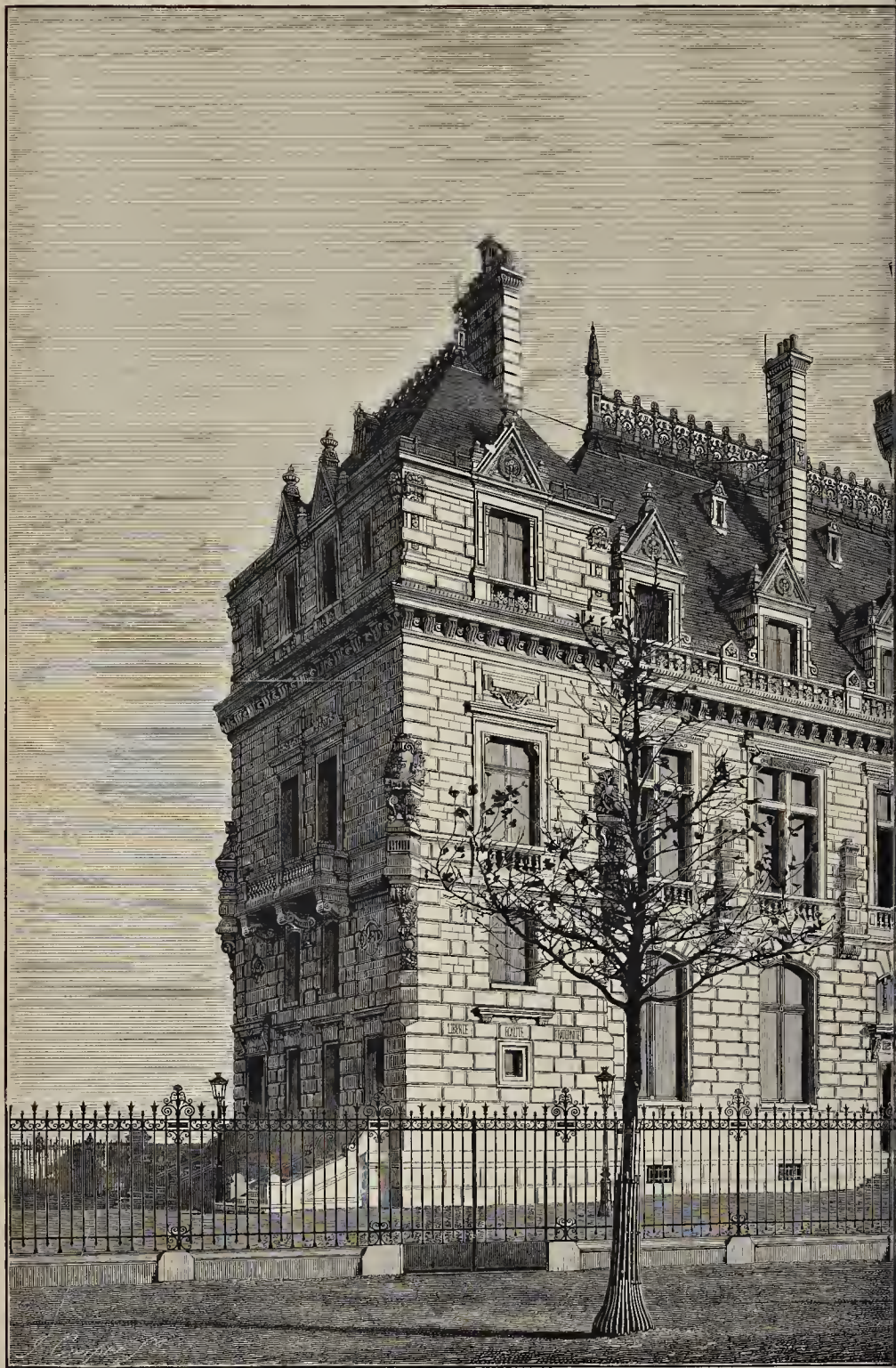


Kgl. Photo. ed. v. Erdp. 9.

3. Furna in Bolzano, Lombard.





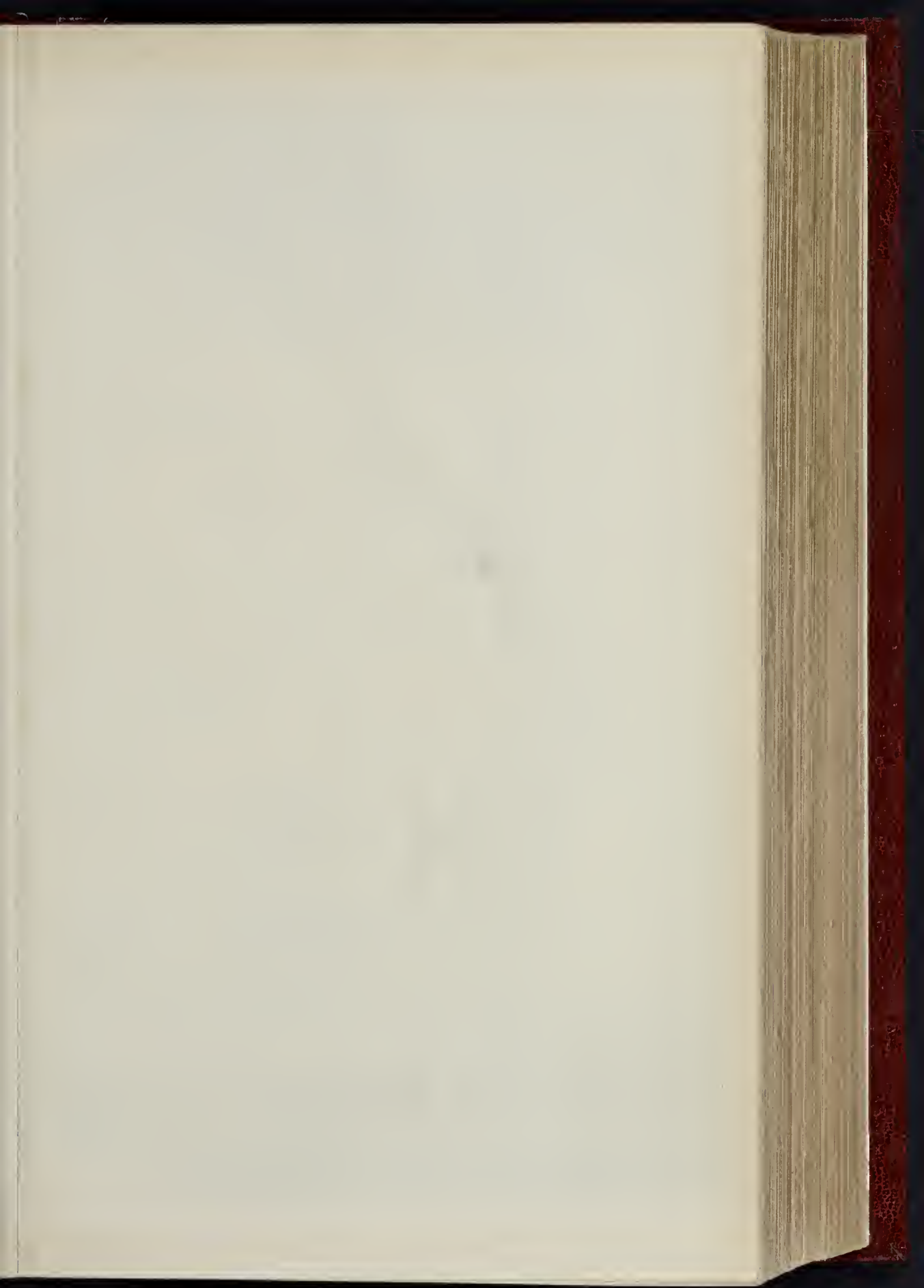


HÔTEL DE VILLE, PANTIN, P

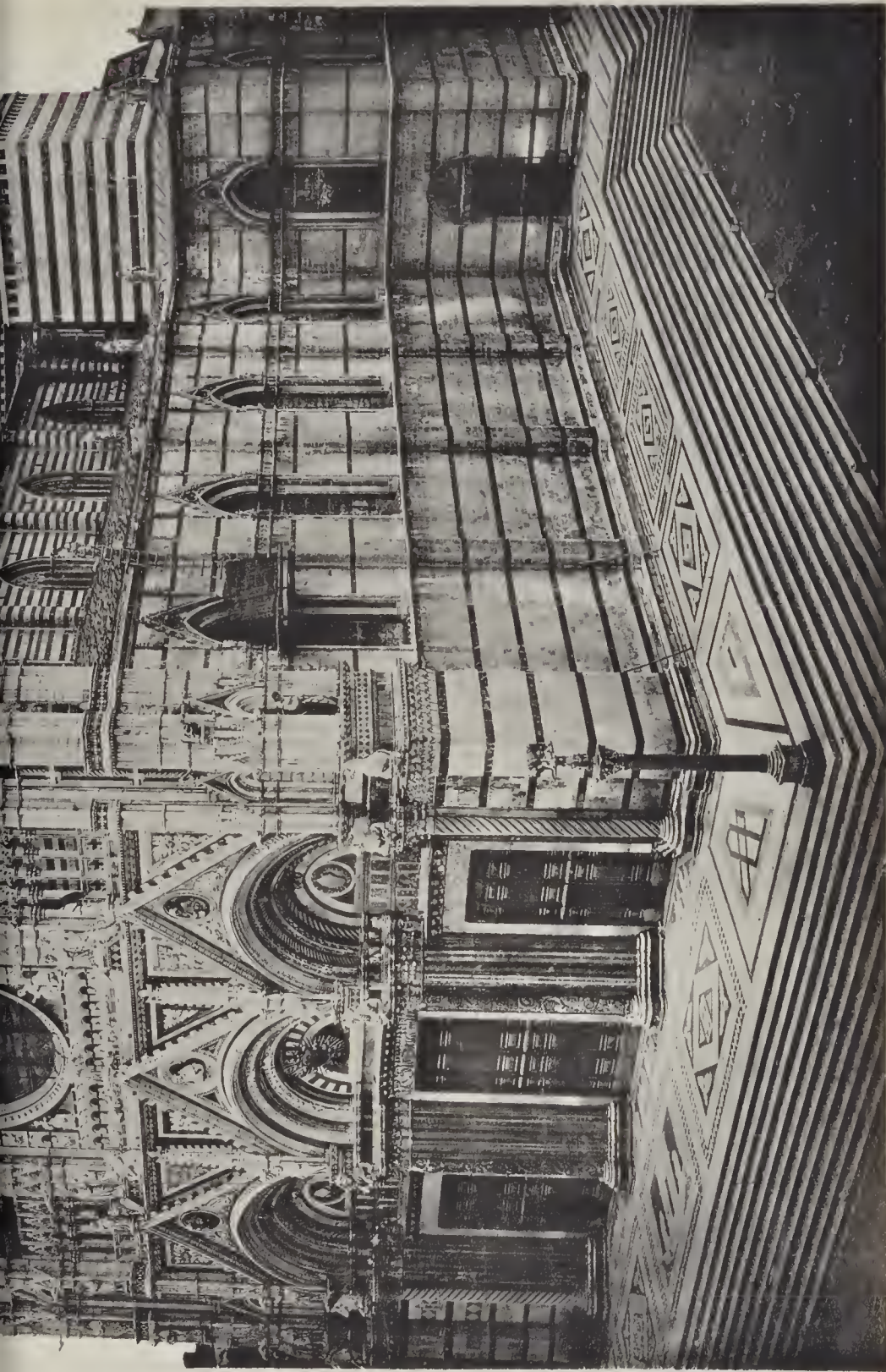












THE PHOTOTYPE CO., 96, STRAND, LONDON.



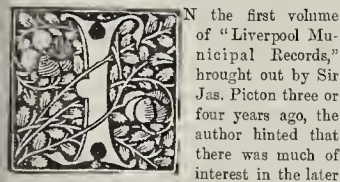
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### Municipal Records of Liverpool.\*



N the first volume of "Liverpool Municipal Records," brought out by Sir Jas. Picton three or four years ago, the author hinted that there was much of interest in the later records beyond the period with which he then dealt, but concluded that he must leave them to some future chronicler; and we expressed a hope in reviewing them at the time that such a chronicler would be found. We are glad to find that Sir Jas. Picton has, after all, been able himself to carry on the work which he had begun, in another thick and goodly volume, a suitable companion to the first one, and which brings the record down to the extinction of the old Corporation by the Municipal Reform Act.

These "Records," our readers may remember, are based on the MS. archives of the Liverpool Corporation and Council; and the first volume, ranging from the thirteenth to the seventeenth century, was full of passages throwing the most curious and interesting light on the manners and ways of past generations, and on the early history of the city which in recent days has, from a variety of causes, developed with such extraordinary rapidity from a sleepy little hamlet with a precarious coasting trade to one of the most noted seaport towns of the world. It can hardly be expected that the present volume, dating from 1700 to 1835, should have the same kind of interest as its predecessor; but it was certainly quite worth undertaking, and we cannot help questioning how much of interest might be found if the municipal records of some other leading towns were similarly looked up, selected, and edited: the records thus unearthed having a "local colour" and character of their own which can hardly be imparted to a formally written history, though perhaps founded on some of the very same class of documents.

The progress of Liverpool commences, the author tells us, from the beginning of the eighteenth century, up to which time the town had been all but stationary. At this period the population of Liverpool was about 8,000. The first chapter of Sir James's book is devoted to Municipal Government, which now, as in the former period, seems to have had a good

deal of the storm in the saucer about it, and "the proceedings in the Council at this period were anything but harmonious, being mixed up with party national politics on the one hand, and the local disputes about the charter on the other"; for at this time there was fierce dispute and recrimination as to the real meaning and power of the charter granted to the town in 1695. Into these semi-political portions of the history it is not so much our special interest to enter, though they contain a deal that is of interest in its way, and show the Town Council of the period as an amusingly pedantic and peppery body, very jealous of its privileges and very snappish in calling those to order who showed any disposition to encroach. We turn rather to some of the records as to the engineering and architectural doings of Liverpool as illustrated here. At the early part of last century it appears that the water supply question had already begun to cause trouble. Natural springs at the outcrop of the sandstone strata had been the source of supply for a long time, but as the town began to increase these failed in quantity and became polluted as to quality, and various tentative schemes are recorded, one after another, for bringing water into the town from the springs at Bootle, three or four miles off, all of which seem to have proved abortive for lack of energy or of money; an Act of Parliament was even obtained for making a grant to Sir Cleave Moor, "to bring water into Liverpool from Bootle Springs"; and eight years after two other proposers came forward; but all with the like result of a *fiasco*. 1731 and 1749 brought other schemes, all conferred about and all coming to naught. In 1779 the Bootle scheme again appears in reference to a dispute between the Council and Mr. John Jordan, "who is, or pretends to be, the assignee of the late Sir Cleave Moor" (these little amenities are quite common in the documents of the period); but the quarrelling did not bring the water; and it was not till 1797 that the matter (become pretty urgent by that time, we may suppose), was really taken up seriously, and the proprietors of the Bootle Springs received powers to treat for a water supply; and even then the Council, in one of its fits of jealousy, tried to stop the matter by asserting their own privilege to look for and supply water. However, two companies seem at last to have been formed, one on the part of the Bootle owners, and one under the name of the "Liverpool and Harrington Waterworks Company," on the part of the Corporation; and these existed till 1846, when they were superseded by the Rivington scheme, now in its turn to be superseded by the Vyrnwy scheme.

In turning to the chapter on "Trade and

Commerce," we come on the record of the construction of the first dock, which was set about in 1709; a characteristic minute recording that:—

"One Henry Huss, of Derby in Derbyshire, who came to survey the place where to make a dock with Mr. Sorocold, and draw a plan and estimate of the charge thereof, is admitted free of this Corporation *gratis*. But this is not to be a President."

The first intention was to deepen the stream which fed the Pool (a creek now completely extinct) and make a kind of ship's canal, but ultimately ground was granted for a dock properly so called, to be used for the purpose "for ever." This improvement appears to have been due to Thomas Steers, an engineer of ability and energy, who was at that time settled in Liverpool, and who was also appointed Harbour Master, and was architect for the erection of St. George's Church, still one of the Corporation churches. He was elected Mayor eventually. His "salary" as Dock Master, on starting the work, was 20*l.* per annum from the Corporation and 30*l.* from the Dock. There was some quarrelling, however, over the making of the new dock; complaints that the "cawsey of the dock is so low that the tide overflows it into the adjacent cellars, to the great damage of the town," and subsequently a denunciation from the Council in regard to "a most unjust insinuation and groundless protest" which had been circulated, "as if the Common Council (except a few of them) called and represented therein by the style of a Sett of men, have sold the dock to themselves and all the strand, in manifest breach of their trust" &c. That the council should be called "a Sett of men" was probably the great offence of this scandalous proclamation. On the next page we find a claim made by a certain Captain Nicholas Webb, who had taken the unusually bold step of building "a large ship, by recommendation of our representative in Parliament Thomas Bootle, Esq.," to the effect that having agreed to take some lead upon freight from Wales, "which he runs the risque of hither by boat rather than take his ship to fetch it or load it from thence," he should be excused the town's custom for such lead; a request granted, but in the usual cautious manner, viz: that he should pay the usual custom, but the town's treasurer is ordered to return it to him again; apparently lest any kind of inconvenient "President" should be established. Then comes an order in Council to send thirty pounds weight in gunpowder and seven pounds in cash "to blow up two great stones that lye just at the edge of the chaunell into Bowmaris (where many of our ships frequently putt into);" which shows what strides Liverpool was now making in foreign commerce.

\* City of Liverpool, Municipal Archives and Records, from A.D. 1700 to the passing of the Municipal Reform Act. Extracted and Annotated by Sir Jas. A. Picton, F.R.S.A. Published with the sanction of the City Council. Liverpool: G. G. Walsley, 1856.

In commencing the chapter on streets and buildings, the author remarks that the founders of Liverpool "seem to have been singularly blind to any provision for the extension and improvement of the town." This, however, cannot be regarded as anything uncommon in the history of the development of a town; witness the narrow streets in the City in London, now so inadequate to their traffic. The chapters devoted to the subject of streets and buildings in the four periods into which these Records are divided contain much interesting information, and give a very graphic picture of the architectural and sanitary growth of Liverpool. In 1719 the unsatisfactory state of the pavement attracts the paternal Government, and it is ordered "that the Corporation do allow eight pounds towards amending the same, on the condition that the person who shall undertake to do it shall do it effectually or repay the said 8<sup>l</sup>." In the same year a contract is entered into with Alderman Gildart and Mr. Samuel Dove, to take away all the muck and dirt in the streets and passages twice every week, "and that they have liberty at their own charge to make a convenient hole, with an iron grate over it, at every street end, to be approved of by the mayor." In case of failure in this duty they were to forfeit 5s. a week. The same subject comes up in February, 1731:—

"The mayor now propounding that a proper person be appointed to take away the dirt out of the streets; it is now Ordered that if any person will undertake to carry away the dirt in the streets twice a week, he shall have the muck for his pains, and two or three guineas a year, and that every inhabitant shall be obliged to clean their respective streets every Wednesday and Saturday, whereof public notice to be given."

The "great necessity" of cleansing the streets seems to have been increasingly evident, however, a few years afterwards, and in 1742 Mr. W. Hornby, the Surveyor of Public Streets and Highways, was specially commissioned to take the matter under his charge, and see "that all the dirt and filth should be immediately carried away, and not suffered to lie or remain in the streets"; all former by-laws on the subject to be confirmed, and a bell to be rung to warn all persons to bring out his and their ashes and dirt to the carts. An improvement in lighting the streets was instituted, or attempted, in 1731, on the offer of several persons to be at the expense each of maintaining a street lamp, "if they can have such lamps placed at or near their dwelling-house free of the charge thereof,"—a curious mingling of public spirit with a regard for personal interests. In 1749, however, lamps at the end of the principal streets were ordered and provided for by the corporation.

The building of the Exchange, now the Town-hall, comes in question in 1740, the mayor representing that the Exchange is become decayed, "and that the pillars and one of the arches below have given way and are greatly sbrunk, and that it is apprehended the great weight of the turret doth greatly tend thereto"; it was accordingly ordered that the turret be immediately taken down, and a survey made of the state of the rest of the building. This Exchange (the second) was built in 1673. In 1749 the plan of the new Exchange, "now laid before this Council by John Wood, Esq., architect (of Bath)," was approved, and the freedom of the town was conferred without fees ("be admitted free, gratis," are the words) both on "John Wood, Esquire, Architeck," and on "John Wood, junior, gentleman"; the latter, the son of the architect, acted as resident architect during the work; and Mr. Wood was to receive five per cent. on the cost of the building, and his travelling charges whenever he should come to Liverpool to superintend the building; young Mr. Wood's services as resident architect being given as a *quid pro quo* for this latter accommodation. Wood's building, tame though it may be in detail, is a very elegant structure in its way, and perhaps superior to any one of the buildings which he carried out at Bath, where his reputation was made. It appears, however, that the construction of the building was not con-

sidered satisfactory, for in 1764 occurs the memorandum:—

"Ordered that a survey of the Doom [sic] of the Exchange be made as to the expense of taking it down and fitting up a lantern in lieu thereof, to give light into the court room, as it is represented to the council that a continuance of the said Doom may endanger the building."

Twenty years or so improved the municipal spelling, for in an entry in 1786 it is written "Dome." After this latter entry there follow (1787) some directions for the alteration and further carrying out of the building, one façade of which it seems had not been completed; these plans to be submitted to a London architect of eminence; the consulting architect finally selected being Mr. Jas. Wyatt. It is worth noting that nearly a century later it was Mr. Thomas Henry Wyatt who was employed to design the present Exchange buildings surrounding the quadrangle in the rear of Wood's building. In connexion with the Town Hall there are some interesting entries about the presentation of some decorative paintings by "Mr. William Martin, historical painter," who wrote what would probably have been spoken of as a "very handsome letter" to the Council, expressing his admiration for all the improvements going on in Liverpool, and offering to present for the decoration of the Town Hall four large historical paintings of his execution, besides some smaller works in tempera, on the sole condition of the cost of carriage, frames, and packing-cases being paid, and permission given to have them engraved by Bartolozzi. The subjects of the paintings were: Lady Macduff surprised in her Castle at Fife; Cleopatra arming Antony; Queen Katherine's Vision; and Ferdinand's first interview with Miranda. The offer was gratefully accepted; but the pictures were destroyed four years afterwards in a fire in 1795.\*

An entry under March 6, 1765, shows how the present duties of Borough Surveyor, in the absence of any Building Act, were anticipated:—

"It having been represented to the Council that Mr. Pickance and Mr. John Parr are going to project out Bow windows from their houses in Water-street, which designs, if carried into execution, may be attended with great inconveniences and annoyance to the town and inhabitants from the narrowness of the streets. It is Ordered that the Town Clerk do write to those gentlemen or any other persons who have formed such designs, desiring them to desist carrying the same into execution."

How far this request was successful does not appear.

The subject of street improvement on a large scale seems to have first come up about 1774, in and after which year there are several entries referring to schemes for the purchase of premises with the object of widening the streets; but these efforts seem to have been rather desultory until, in 1785, an Improvement Committee was formed, and an advertisement inserted in the Liverpool papers that this Committee would sit at the Exchange on every Tuesday till further notice to consider the best methods of improving the town, and that the Committee would be ready to receive and inspect such plans from any person who might please to offer them. The next year it is "the unanimous opinion of the Council" that a Bill should be drawn and brought into Parliament for the purpose of improving and widening the streets; and two or three weeks afterwards it is ordered "that Mr. Statham, Mr. John Gregson, and Mr. Brooks do, as soon as they conveniently can, go up to London to solicit the intended Bill for improving the streets," and they were to have a discretionary power to alter, defeat, or add such clauses as they might think proper. The petition was read, and the common seal affixed, on the 6th of February, 1786, and that one at least of the delegates earned the gratitude of the Council appears from the following entry of the same date:—

"Ordered unanimously. That the thanks of this Council be given to Mr. Richard Statham for the very great professional services he has rendered to this Corporation as one of the Select Committee in the purchasing of houses for the purpose of widening the streets in this town, and for the improvement thereof."

The Act, Sir James tells us, gave power, among other things, to improve the sewerage, which was now becoming a cause of great trouble, in very much the same way as it frequently has in parts of London, from the flooding of the lower streets, especially those on the line of the old "Pool," at high water; and an interesting passage, too long to quote, under date March 22, 1791, records the distress arising in the lower-lying parts of the town from the flooding of the cellar dwellings, many of the people not being acquainted with their situation till they found the water coming into their beds. The committee concerned with the matter take it very seriously, and say: "we should be wanting in our duty if we did not in the most earnest manner point out the means by which this dreadful evil may be remedied." They suggest enlarging the sewers and making some re-arrangement of levels to secure a better fall, but the author notes that this flooding from the continued action of rains and tides continued to be a source of serious mischief for half a century after.

We have touched only on a few of the points of interest in these curiously naïve and outspoken records, which, in spite of the selfishness and intolerance not unfrequently discernible in them, on the whole bear out Sir James Picton's claim for the old corporation, that its proceedings and policy were marked by vigour, tenacity, courage, and in the main by good sense. The two volumes furnish a remarkably realistic record of the struggles and progress of a city community, and the author is not saying too much in his concluding sentence, that "if five hundred years hence the Municipality of the coming age can present a record as full of interest and progress, of difficulties overcome, and of bright anticipation of the future, the task of its historian will be as pleasing as the one now brought to a close." We congratulate Sir James Picton on having so ably completed his self-imposed task, which has evidently been a labour of love, and may congratulate his local subscribers also on possessing so graphic a record of the history of their city.

#### THE TREATMENT OF SEWAGE.

**T**HEN dealing with sewage on the practical scale of daily necessity, the command has always been to take the sewage to the land, and this has always commended itself to common sense. It has been known for long enough that sewage, after passing properly through the soil, does not pollute rivers or other streams of water, and all that town authorities have to do is to procure the land. They are not confined by any necessity to certain land not suitable, for if suitable land does not lie conveniently for receiving the sewage from the town by gravitation, it can be raised at very moderate expense to land which is suitable; and perhaps if there had been no chemists, with their bottles and laboratories, landowners might have been persuaded with a little pressure to come to fair terms with the town authorities. But because of the objections which have been made by the owners of land in suitable situations and of suitable quality for the purpose, town authorities have in many instances been driven to deal with the sewage in tanks. When that system has once been adopted it is not readily given up for another, notwithstanding that the proper working of it is a very expensive affair. It has been said by one, and confirmed by so many other men of experience as to have become an axiom, that towns must pay for getting rid of their sewage, and not, as they formerly did, look upon it as something out of which they could make money. That is the case in every instance, and however moderate the expense may be under favourable circumstances of situation; but where the tank system has been adopted and is continued, there seems some likelihood that the expenses will become enormous; for,

\* In connexion with the town-hall it may be noted that there is an entry, Feb. 14, 1782, for the surveyor to consult Mr. Wyatt about the propriety of getting the four figures for the north front of the Exchange executed "in artificial stone," also in Portland, with a comparison of the cost. What "artificial stone" was this?

according to a paper read before the Society of Arts in April last by Dr. C. Meymott Tidy, the sewage ought, after undergoing the tank process, to be conveyed to land to effect the purification which cannot be wholly effected in the tanks. A smaller area of land is required for this purpose than is required for dealing with the sewage *in toto*, but, nevertheless, the expense of its conveyance must be the same, and what land is required must be purchased out and out; for, the area being so contracted, it cannot be farmed with profit, but will be a filter merely. An acre for from 5,000 to 7,000 of the population is what Dr. Tidy says would be required. If this would be sufficient,—and we are not doubting that it would be,—the requisite space of ground might be purchased at or near the outfall of the sewers, and the expense of conveying it to land at a distance would be unnecessary. But there are many things to be considered before we come to that detail. We will give them in the order in which Dr. Tidy stated them, not in his own flowing language when he read an abstract of his paper in April, but as they are stated in the full paper afterwards sent in, and printed in the Society's *Journal* of the 8th of October. Herein we find that the various precipitants which have been suggested to throw down in tanks the suspended and coagulate a part of the dissolved slimy organic matter of sewage,—lime, chloride of magnesium, sulphate and phosphate of alumina, and salts of iron,—are those for practical purposes to be used, alone or in conjunction with each other. In addition to these, clay and other weighting bodies, together with charcoal and other absorbing substances, have been added under various patents. In selecting a chemical precipitant five main points must be attended to:—

1. That, consistently with purity of effluent, the chemicals used should be cheap.
2. That the precipitant should act as a deodoriser and disinfectant as well as a precipitant.
3. That the precipitated matters should subside rapidly.
4. That the maximum purity should be obtained with the minimum of deposit,—in other words, with the smallest quantity possible of chemicals.
5. That the sludge should part with its water readily. If lime and the sulphate of alumina combined be adopted as the precipitant, the quantity of lime, which is to be added first, should be such as to render the sewage faintly alkaline; probably at the rate of from five to seven grains per gallon will be needed for this purpose. It should be added as a milk of lime, and should be thoroughly stirred in by means of a paddle-wheel or other efficient mixer. A flow of a few yards should now be allowed, to permit the aggregation of the precipitate. This having taken place, a solution of crude sulphate of alumina, in the proportion of about five grains of the sulphate of alumina, is to be added, and the sewage again actively stirred. In the alkaline condition of the sewage the alumina will be precipitated, and will then combine with a portion of the organic matter, forming together an insoluble precipitate. Thus treated, the sewage should be allowed to flow into tanks, for the precipitated matter to collect. A portion of the lime will be at once converted into carbonate of lime, by combining with the carbonic acid present in the sewage, and serve as a weighting material, to aid in the deposition of the lighter flocculent materials. This mechanical action of the lime carbonate is of great importance. The flocculent suspended matter is, no doubt, one of the most important materials to remove, because it is that ingredient of the sewage which readily putrefies, and in this way causes a nuisance. It is, moreover, so light that, unless weighted, it is difficult to precipitate. A second portion of the lime combines with some of the organic matter in solution, producing an insoluble precipitate (of uncertain composition) of a compound of lime and organic matter, the subsidence of which is again assisted by the formation of the carbonate of lime previously described, and a third portion of the lime renders the sewage slightly alkaline. The alumina salt is now to be added. The alumina is precipitated, owing to the alkalinity effected by the slight excess of lime.

This alumina combines with some of the organic matter in solution, not precipitated by the action of the lime. The power of alumina in combining with dissolved organic matter, and so removing it from solution, is taken advantage of in many commercial processes.

Respecting the iron salts, one strong objection to their use is that if the effluent be discharged into a river the stream is liable to be blackened from the formation of a sulphide of iron, a condition likely to be mistaken by the general public for a sewage deposit. As regards the use of phosphates as precipitants, the effluent is almost certain to contain some phosphoric acid, which greatly aids the growth of low forms of fungoid growths, amongst which may be included the so-called sewage fungus.

It is advisable that the effluent, before its discharge into a stream, be at least neutral and preferably slightly acid. This condition is easily brought about by the addition of a small quantity of acid to the effluent before its escape.

These directions are, no doubt, highly judicious and important; but there are others, as, for instance, that it is essential that sufficient chemicals be employed to effect complete precipitation, disinfection, and deodorisation of the sewage. No greater mistake can be committed than to starve the chemicals. To this must be attributed many cases where a precipitation process has proved a failure. A local authority will spend a large sum in erecting works, perfect in architectural detail, excellent for sewage treatment, whilst they shirk a small annual payment for the necessary chemicals. It is essential that after the chemicals are added the mixture should be well stirred; if not, they do not precipitate so much as they might, the process of flocculation is imperfect, and the difficulty of obtaining a clear effluent is correspondingly great. It is essential that there should be sufficient tank accommodation, so that, as well as for other reasons, the sludge may be frequently removed; otherwise, the freshly-precipitated sewage may be contaminated by the decomposing materials of a previous precipitation, or a nuisance result from a collection of decomposing matter. Many a good effluent is spoiled by foul materials being allowed to collect in the subsiding tanks. These materials undergo putrefaction, the gases given off contaminating the effluent. The solid matters becoming specifically lighter than the liquid by the gases of putrefaction developed in and amongst them, rise to the surface, the floating black masses presenting an objectionable appearance, and discharging offensive products into the air. After a time these black masses sink, and thus, by constant commotion of the precipitated matters, a turbid effluent results, which has a more or less foul smell. The defecated water should flow through a shallow open conduit of not less than a quarter of a mile before being discharged into the stream. The volume of the stream into which the effluent is discharged should be not less than eight times the volume of the stream of defecated sewage. The tanks should not only be emptied of the sludge, but thoroughly cleaned before being refilled. It is essential that the sludge should be frequently removed from the tanks. This frequent removal is necessary, firstly so that the effluent may not be polluted, and secondly, so that no nuisance may result during the removal of the sludge and the cleansing of the tanks. It is not enough merely to empty the tank of sludge, but it is imperative that, after being emptied and before being refilled, the tank should be well cleansed,—in other words, that the matters which stick to the sides of the tank should be completely and efficiently removed to prevent nuisance or fouling by subsequent decomposition.

We strongly recommend these observations of an eminent chemist to the attention of the managers of the sewage-tank works at,—we were going to mention places, a few, but will refrain. We desire to throw no obloquy upon the tank system of dealing with sewage because it is badly carried out, almost everywhere; but, having a strong impression of the difficulties of carrying it out properly anywhere, we desire to

represent in contrast both the objections to and the advantages of the two chief systems of dealing with sewage, which are, on the one hand, the direct application to the soil of the sewage of towns,—whether by gravitation or by pumping; is but a small consideration; and, on the other, the treatment of sewage in tanks in the manner we have pointed out. Much praise, well deserved, has been given to the staff of persons engaged in the A B C process, the effluent from which is unobjectionable, as the process is carried out at Aylesbury. Dr. Tidy speaks much in favour of the process. The company who manage it appear to sell the residue at a considerable profit, and discharge from the works a clear and unobjectionable effluent water. Whether there is anything in it more than a strict obedience of orders by the staff we do not know, those orders being to give a full dose of each ingredient day by day without exception, and intelligently to deal out and use the chemicals proportionately to the strength and volume of the sewage from time to time. Perhaps herein lies the secret. But let anybody go and see the tank process daily carried on at,—again we refrain, although the knowledge is common enough,—certain large towns where the tank system is that by which the sewage is dealt with before it is discharged. He will surely be convinced that the common way of carrying on the tank system of sewage disposal is one which is to be avoided if possible, unless the perfection of management of which Dr. Tidy speaks can be ensured. If this cannot be ensured the better way is to revert to the disposal of sewage on land directly. Much to-do is made of the possible neglect to turn the sewage this way and that from time to time upon different parts of the land. Proper attendance, of course, is necessary, and always with a responsible foreman, and neglect of this duty is sheer idleness. But let the turning of the sewage upon different areas of ground from time to time, and keeping the gutters in order, and ploughing the soil every second year, or third, as may be required, be compared with the numerous little things to be done to satisfy the chemist in the treatment of sewage in tanks, and if it be asked which is the more likely to be observed, it may safely be said that the open and above-board duties will be the better performed.

#### THE EIGHTEENTH EXHIBITION OF "OLD MASTERS" AT THE ROYAL ACADEMY.

THE present exhibition is undoubtedly one of the most interesting that has ever been brought together under the auspices of the Royal Academy. This is due partly to the fact that it contains more than fifty pictures belonging to Mr. R. S. Holford's famous collection, and some of the gems of the Duke of Wellington's gallery. The show of early Italian pictures is indeed scanty, compared with what we have been accustomed to look for in Gallery IV. Amongst Madonna pictures there is a small and genuine panel by Matteo da Siena (169), one (172) of the School of Francia, a signed picture (entirely repainted) by the Umbrian Tommaso di Fadino (175), a typical Crivelli (180) dated 1472, and a large archaic panel (189) in good preservation, bearing the signature of Cola dell'Amatrice, and the date 1512. The gem of this room is a small, finely-finished picture, ascribed to Pesellino (204). It represents the Madonna enthroned between six standing saints. The faces are all beautiful and well characterised; and the chord of colour is particularly pleasant; and the foreground is filled with a lovely carpet of plants in flower, the execution of the whole being Flemish in care and completeness, the design Florentine in gentleness and grace. A "Flight into Egypt" (195), by Cosimo Tura; a small "Crucifixion" (205), perhaps by Albertinelli (certainly not Umbrian); a Milanese fancy portrait (177), wrongly ascribed to Luini; a fine portrait of a lady (170), ascribed to Lorenzo Lotto, but really by Dossò Dossò; and a charming little "Holy Family" in a landscape (161), credited to Titian, but more probably by

Bonifazio Veneziano, also deserve attention. The portrait of a lady (156) does not represent Anne of Austria, and cannot be by Coello; it is a moderately good painting by some imitator of Sir Anthony More. The portrait of the Marquis of Caspice (158) is only a poor copy of the original by Murillo, which is in the Louvre. The study of a head (168) is perhaps a copy of some drawing by Leonardo, but is certainly not an original picture. "The Madonna" (171), ascribed to Fra Bartolommeo, is a copy of a well-known original, in an Italian gallery. Col. Sterling's full-size black chalk drawing (173), which agrees with the Rogers Madonna by Raffaele, is not the cartoon for that beautiful picture, but is an old copy from the picture itself, perhaps done by Andrea del Sarto. The complete picture, from which the little panel (206) has been cut out, must have been a fine Madonna by one of the best Flemish artists of the fifteenth century. In some respects it reminds one of the "Exhumation of St. Hubert," at the National Gallery, by whomsoever that may be. Mr. Willett's Madonna (179), ascribed to Piero Pollainolo, deserves careful attention. It is a well-preserved example of a work of the important school of Verrocchio, and may be compared with the fine Madonna in the National Gallery, which it somewhat resembles, the position of the angel being changed. The forms of the features, the build of the child, the shape of his legs, and the brown tones of the whole are all clearly perceptible characteristics of the school.

The last picture in this room to which reference need be made is the magnificent bust portrait of Pope Innocent X. (160), by Velasquez, certainly one of the finest works of portraiture which it has been our good fortune to behold, and in faultless condition. The three-quarter-length portrait of the same pope, seated, in the Doria Palace at Rome, is world-renowned. The Duke of Wellington's picture is in every respect as fine as that. We need not waste space in attempting to describe the beauties in it, which every spectator can see for himself, and which are practically impossible of translation into words.

Three more pictures in the Long Gallery claim the same master for their maker. The bust portrait of Francesco Gomez de Quevedo (111), likewise lent by the Duke of Wellington, is certainly the work of a good Spanish painter, but can scarcely be by Velasquez. The full-length portrait of Philip IV., with its fine scheme of colour, its powerful design, and its unequal execution, may not improbably have come from the master's studio, and have been touched by him in certain parts. The full-length portrait of "El Conde Duque" d'Olivarez is more reminiscent of Velasquez's touch, but in it also the hands of assistants have taken the largest share. The bust portrait of the Pope is the only picture here upon which no hand but the master's has been employed. Murillo's own bust portrait by himself (143) is a picture that should certainly attract attention. It is of unpretending character, low in tone, and simple in treatment, but it renders the aspect of the man as in a mirror, and bears unmistakable evidence of truthfulness to life. The same artist's picture of "Las Gallegas" (114), if it be by him, is a minor work.

No less than six pictures here are ascribed to Titian. One of these has already been referred to. Of the rest the portrait of Caterina Cornaro (129) can be at best a copy; the charming "Holy Family" (133), a good school piece closely connected with the fine original in the Louvre. The "Supper, Emmaus," lent by the National Gallery of Ireland, is an interesting school replica, but can scarcely be considered as an example of the master's handiwork. The influence exercised by Titian upon later painters is clearly seen in the very Venetian "Holy Family" (141) by Rubens and in the richly-coloured "Pan and Syrinx" (115) from Buckingham Palace, a picture not unnaturally ascribed to the same artist, but probably painted by Diepenbeek or some such person. Turner's "Venus and Adonis" (149) is no less intentionally Titianesque, and was, doubtless, painted by the English artist after

study of the "S. Peter Martyr," which perished in the flames at Venice.

A genuine Rubens, and a very fine one, is the "Elevation of the Cross" (123), the connexion of which with the famous Antwerp triptych is at once evident. It can scarcely be called a study for that picture, for it is a finished picture itself, and the grouping of the figures has been altered with a view to bringing the three parts together on to a single panel. The "Adoration of the Shepherds" (65) and the "Adoration of the Magi" (68) are genuine sketches worthy of notice. The latter subject handled by Rembrandt (123) in his most imaginative vein is the finest of the Queen's contributions to this year's display. It is in excellent preservation and quite unnecessarily authenticated by the artist's signature and the date 1637. Even more splendidly imaginative, more magical in execution, more lovely in effect is the glorious little sketch of an angel (183) by the same artist, lent by Mr. Sellar. The beautiful head is surrounded by a circle of mysterious lights framed within the outline of the shadowed wings. The portrait of Martin Looten (93), painted in the same year as the "Anatomy Lecture," is a first-rate example of Rembrandt's earlier style.

Lorenzo Lotto's noble portrait of a lady (124), of somewhat florid charms, is doubtless one of the three or four pictures by which this exhibition is likely to be remembered. The picture certainly requires explanation, for the drawing the lady holds in her hand and the inscription below it appear to be only interpretable as an insult. Holbein's "Lais Corinthiaica" in the Basel Museum may be mentioned as analogous in this respect. The "Portrait Group" (134), by Jacopo Bassano, is a good picture, and the "Holy Family" (136) is, perhaps, the best example in England of the work of that very unequal artist Gaudenzio Ferrari. A full-length portrait (138) of "Alfonzo d'Este" is ascribed to Dosso Dossi. It looks more like a Spanish picture, but might, perhaps, be an early Moroni. The portrait ascribed to Tintoretto (139) can scarcely be by that master, unless it is a very early work of his. In some respects, notably in the landscape, it recalls the work of Sebastiano del Piombo.

Two fine portraits by Van Dyck (140 and 142) are lent by Lord Leonfield. The first, representing "Anne, Countess of Bedford," is a very charming picture. The original of the full-length portrait group of the "Earl of Arundel and his Grandson" (144) will be found in the exhibition at the Grosvenor Gallery.

The long south wall of Gallery III. is, as usual, occupied by a fine set of large pictures of the English school. The series commences with an unusually stately Romney, a full-length portrait of Mrs. Townley Ward (145); a full-length by Gainsborough follows, and then a landscape (147) painted by the same artist in his middle period, and consisting of the usual elements,—figures, with horses, a pond, a bare tree-trunk, a grove of trees, and a glimpse of distance. The finest Gainsborough here is the portrait of the Countess of Buckinghamshire (148). She is seen in full length, standing. Her dress is of the fashion made memorable by this artist's brush, which he has here wielded with all the dexterity attained by him in his years of completest power. Constable's "Dell in Helmingham Park" (151) is a picture well known to all lovers of that artist's works, thoroughly characteristic, and well worth the amateur's most careful study.

We had almost forgotten to mention the "Jubilee" pictures which occupy the place of honour at the end of the room. They are all well known from engravings. The only one of the four which possesses any pictorial qualities is Sir David Wilkie's "First Council of Queen Victoria" (117). The interest attaching to the other three is historical rather than artistic.

The gem of the second room, in which so many fine Dutch pictures have in former years been shown, is Mr. Holford's wonderful Cyp (75), the long and narrow "View of Dort," once cut in half and framed as two separate canvases. It is flanked by two good examples

of the work of Wouvermans (73 and 79). One of the most attractive of the group of pictures ascribed to Anthony Palamedes, a little interior (64) peopled by nicely-dressed folk, finds a place in this room, as does a more than usually interesting portrait of a lady (85), by Grente. The sketch of a camp (88) ascribed to Watteau is more probably by Pater, who is again represented by another picture in the room. The landscape (92) is a more than usually good example of the work of Solomon Ruysdael, and the signed landscape (89) likewise shows Karel du Jardin at his best. Franz Hals is not so well represented as in some years he has been, but the portraits (80 and 97) are at all events genuine, whilst the sketch of three heads (95), if one of the slightest, is also one of the cleverest of the artist's works.

The exhibition of Turner's drawings commenced last year finds worthy continuance in the seventy-two examples with which two rooms are hung. The previous exhibition was memorable for the series lent by Mr. Fawkes, this year the place of honour is taken by Mr. J. E. Taylor, whilst Miss Swinburne and Mr. Vaughan also send important contributions. The drawings are hung in chronological order, we are thankful to observe, and the catalogue is unusually complete and accurate in its chronological data, doubtless owing to the co-operation of Mr. Rawlinson. Mr. Rawlinson's pamphlet guide to these two rooms (published by the Fine Art Society) should be in the hand of every visitor. The sketch of Winstead Church is one of the landscapes drawn by the lad of twelve, and which his father took to Mr. Hardwick, the architect; it is lent by one of Mr. Hardwick's descendants. The "Lambeth Palace" of 1790 was the first work contributed by Turner to the Royal Academy's exhibitions. The "Abbey Church, Bath," is evidence of remarkable advance in power of architectural drawing, whilst the two "Salisbury" drawings stand on the highest attainable level in this kind. The "Norham Castle" of 1798 is stated to have been the drawing which chanced to lay the foundations of the artist's fame. Then follow a series of fine and finely-preserved works of the painter's period of power. The Richmondshire series of 1817 is represented this year by two of its most famous examples. Many splendid drawings follow. An early view of Durham (the property of the Academy) is placed out of its right chronological position, for the sake of comparison with a late rendering of the same subject. The collection worthily concludes with the so-called "Black Rigi," whose two companions were so much noticed last year.

## NOTES.

WE have received some lithographs (plan, section, and view), issued by the "Niagara River Hydraulic Tunnel, Power, and Sewer Company," showing the manner in which it is proposed to utilise the fall of the Niagara for a perpetual power on a large scale. This, be it understood, is not by utilising the actual fall, but by diverting some of the water from the upper level through a long tunnel, with a fall of 1 in 200 over part of its course and 1 in 100 over the lower part, discharging into the lower river near the foot of the falls. This tunnel stream is to actuate a series of great wheels in pits at distances of half a mile apart, supplying power to a number of mills to be built on land to be conceded for the purpose, one section supplying fifty mills of 500 horse-power each. Of disfigurement of the actual Falls there appears to be no fear whatever from the scheme; but, of course, the country just adjoining the head of the Falls would be converted into a large manufacturing town. It must be remembered, however, that it will be free, to a great extent, from one of the great curses of manufacturing towns, smoke and vitiated air from furnaces. How far the scheme would be really beneficial to its promoters and the public depends to some extent on what may be thought of the convenience of the spot as a centre of manufacture. There is no doubt the scheme is prac-



ticable, and would supply an immense motive power at no cost after the first outlay, except ordinary wear and tear of machinery and plant. The first outlay would no doubt be large. It is difficult to make up one's mind how to regard such a scheme. It would sadly drive away the romance from one of Nature's great scenes; yet we cannot hastily condemn an idea which may prove a great practical benefit, although it is a shock to the feelings at first sight. At all events, if the commercial value of the undertaking is satisfactorily proved, we are of opinion that it will be done, and that protests will be unavailing. It might be otherwise if it were proposed to degrade the Falls themselves to the level of a mill sluice. Then the civilised world would probably be up in arms. But as the actual Falls will not be touched, there is room for two sides to the question.

THE fourth annual report of the "Metropolitan Public Gardens Association" indicates that the Association is very actively at work in schemes for securing breathing spaces and playgrounds for London. It shows a good record of work done, and a long list of places (disused burial grounds, &c.) which it is desired to secure and to lay out for public enjoyment. We wish the Association every success in its beneficent labours.

IT is not much to be wondered at that a certain feeling of suspicion is beginning to creep into men's minds as to the real intensity of the distress that is so prominently put before us each day. One would have thought that now, if ever, there would have been an eagerness to obtain a job, if only of a temporary nature, and that the only difficulty would have been to make a selection from the numerous applicants. But apparently there is no plethora of unemployed labour, for, notwithstanding earnest appeals, it is said that in different parts of London the offer was contemptuously refused. Mr. Hyndman, who of course sees no wrong in his socialist friends, defends them by various excuses, such as bad weather, too little pay, defective boots, &c.—all excellent reasons for not working when other and better labour is to be had for the choosing. Cases of refusal were so numerous that we are constrained to believe that Mr. Hyndman has a very rotten case, and that there is not that amount of distress which he avers,—at all events, not in that section to which he belongs. The report of the Belgian iron trade for 1885, lately issued, contains some useful statistics on labour points well worth studying by our artisans, though doubtless they would not be very palatable. The wages at the foundries where the pig iron is worked up were at the rate of 2-96 francs per head (under 2s. 6d.) per day; in the steel works, 3-28 francs (2s. 8½d.). The wages of men working the coal averaged for the greater part of the year 2-22 francs (1s. 10d.) for surface work, and 2-99 (2s. 6d.) for underground work. A worse feature than all, perhaps, is the continued employment of women underground, to the number of 4,256, and 1,612 girls under sixteen years of age. We have, at all events, got rid of that reproach in this country.

THE general spread of the conviction that the neglect of our inland canals has placed our agriculturists at the mercy of the railway companies, has led to the formation at Sittingbourne of an association for the conveyance of fruit and vegetables to London by water. During the few weeks that have elapsed since the establishment of the service, it is stated that nearly 800 tons of fruit and potatoes, consisting mainly of hard fruits, have been conveyed by it to the markets; and that the amount thus saved by the consignees, as compared with the cost to which they would have been put for sending the same consignments by railway, amounts to nearly 250l. A saving of 6s. 3d. a ton on so short a distance as that from Sittingbourne to London is a matter of no little moment for producers. One advantage of the short distance is that the difference,—the possible difference, that is to say,—between the time consumed by the two

nodes of transit, is comparatively small. As to the cost, apart from fancy charges, or attempts to put on any description of traffic "what it will bear," which is the avowed policy of many railway companies, the fact is indisputable that water carriage will pay a good 5 per cent. profit at less than a third of the rate of freight at which 4 per cent. can be earned on a railway. This is a fact depending on the two items of capital and working charges, and is independent of any other consideration. It is one of which manufacturers as much as agriculturists are gradually but practically becoming aware; nor can it be too widely known.

AMONG the hundreds of suggestions for commemorating the Jubilee Year of the reign of Queen Victoria, one of the most deserving of attention and support comes from our sailors. And perhaps it would be difficult to rear any monument at once so beneficial to the country, and so appropriate to the memory of the sovereign of our island kingdom, as would be a Harbour of Refuge for our fishing and mercantile navy. As to the urgent need of such shelter, there is no room for doubt. The Reports from the Select Committee of the House of Commons on Harbour Accommodation are most outspoken and decisive. On the East coast of Great Britain, with the exception of the natural advantages offered by Cromarty Frith, by the Firth of Forth, and by the Estuary of the Thames, there is not a single harbour which is adapted to meet the requirements of the Navy. During the five years from 1876 to 1882, the number of ascertained shipping casualties on the coasts of the United Kingdom averaged 3,300 per annum; of which 497 vessels per annum were totally lost, as were 738 lives in each year. Twelve million tons of shipping frequent the fairway of the North Sea. To provide a place to which this great fleet could run in time of danger would be a work worthy of the Jubilee of Queen Victoria. It would be an offering twice blessed in its results,—a means of saving picked and valuable lives, and a self-supporting mode of insuring mercantile property.

WE have received the preliminary prospectus of the "Roads Improvement Association," which has been formed with the view of taking up generally the question of roads in the whole kingdom, and digging an often much-needed spur into the sides of official bodies whose proper duty it is to keep the roads of their districts in good condition. The Association in its prospectus remarks that "various causes have operated to produce the existing state of things," which "state," we observe they do not define; but we are left to the conclusion that they consider it very bad. Among the "various causes" one of the chief is said to be "the employment of inefficient surveyors, ignorant of the first principles of scientific road construction and maintenance." This may be the case in many places, for aught we know, but we must say, on the other hand, that it is only a very short time since we received a letter from a county surveyor complaining of the apathy and indifference of his Board on the subject of roads, and that they would not allow him to carry out the treatment he thought necessary. The state of our roads, in fact, varies very much in different districts; in some places they are well looked after, in others they are, unquestionably, disgracefully neglected; and as far as we have noted we think this neglect is more common and more marked in suburban neighbourhoods than in the case of country roads. At all events, there is plenty of field in this country for the exertions of the Roads Improvement Association, and we wish them success. Lieut.-Col. Savile is the Chairman of the Association, and Mr. Frank Thomas the Secretary.

TWO old London landmarks will be obliterated by the widening of Little Tower Hill for making an approach, on the Middlesex side, to the Tower Bridge, which is in course of construction. On the left, or eastern side, is the site, at present partly covered by the

premises of the St. Katharine's Docks Company, of Hangman's, *alias* Hanson's (also Hamsden's) Gains. So strange an appellation carries us back to more than 300 years ago. It is, in fact, a corruption of Hammes and Guynes, and was given to a locality which was assigned to the poor traders therefrom when those places, along with Calais, were lost to the English. Across the road, and directly opposite, is a little burial-ground, lying within the Tower Gardens railing, and occupying part of the glacis to the counterscarp of the moat below. The graveyard is said to have been made for the use of the garrison on the breaking out of the cholera epidemic in 1832, and to have been finally closed twenty years afterwards. Now almost entirely occupied by Mr. John Jackson the contractor's temporary offices, it has hitherto escaped the notice of topographers. Some headstones may still be seen against the low parapet wall. The Corporation are about to remove the remains of interments therein to the City of London cemetery at Ilford. The memorial stone to the watermen's dog has also gone, together with the wall in which it was set, at the head of Iron Gate stairs. The recent destruction of Postern-row (*olim* St. Swithin's alley), and the southern side of George-street, just across the ancient London wall, on the northern side of the Tower, involves the disappearance of a once notorious quarter; for there used to assemble the press-gangs before setting out upon their expeditions amongst the parishes of East Smithfield, Wapping, and Ratcliffe.

SOME interesting particulars are given in the *Annales des Ponts et Chaussées* of the evils that may arise through the use of cement made from stone containing a large proportion of magnesia. In consequence of the favourable nature of some tests made in the laboratory of the Ecole des Ponts et Chaussées, and others made at the Port St. Nazaire, permission was given to use, in the construction of some railway bridges, a cement made in some newly-established works at Campbon, in Loire-Inférieure. The arches in which this cement was used were in three bridges over the River Oust, opened in 1881. It was also used in the abutments of a railway bridge at Nantes. About a year after completion fissures appeared in these works, and these were clearly attributable to the cement in the joints having expanded by absorbing moisture. In other parts of the country, too, the distortion of arches, destruction of walls, &c., in which Campbon cement was used, clearly indicated that it was not a suitable material for constructive purposes, even when not brought in contact with salt water. This Campbon cement contains a large proportion of magnesia, analysis of five samples showing the proportions to vary between sixteen and twenty-eight per cent., and the swelling of the cement was attributed to its presence, a view which was confirmed by comparative tests made with ordinary cements.

SINCE the excavation of the Temple of Æsculapius at Athens, and more recently of the mother temple at Epidaurus,—to which we have frequently had occasion to draw attention,—special interest has been roused in all monuments connected with the worship of the healing god. Prof. Von Duhn (in the *Bulletino* of the Roman Section of the German Archaeological Institute, vol. iii., part 3) publishes two bas-reliefs which have remained in the Palazzo Rondinini since 1764; they are valuable both as to subject and workmanship, and seem to have been two of a series connected with the cult of Æsculapius, on the Insula Tibernia, now known as the Isola di S. Bartolemeo. The first bas-relief represents the river god Tiber, in the form of a bearded man, rising from the reeds of his bed and extending a cup to catch the water flowing from a fountain on the rocky island. In the background, on the island, is a temple; the sacred snake (the symbol, and, indeed, in some cases, the incarnation, of the god) issues from a hole in the rock, and seems to be stretching out its head to drink. It will be remembered that about 290 B.C., when Rome was attacked

by a pestilence, her citizens sent an embassy to Epidaurus to ask help of Æsculapius; the ship on its return was followed by a sacred snake, which swam up the Tiber, and then chose the place for its own temple. The pestilence, of course, ceased.

**G**REAT interest attaches to the bas-relief because it is closely analogous to a coin of the time of Antoninus Pius, of which a good impression exists in the British Museum. On the coin we have, in a very similar composition, the snake, the rocky island and temple, and the river-god, but the Tiber seems here to be welcoming the snake instead of drawing water. The new element in the relief is the fountain, represented conventionally by an urn overturned. *A priori*, we should, of course, have expected that the snake would select a spot where a spring of water was close at hand, for the temples of Æsculapius were, to a great extent, hydropathic establishments. The spring is now lost, but, oddly enough, in the Medieval church of St. Bartolemeo, founded by Otto III. (A.D. 1001), there still exists between the third and fourth steps that lead to the presbyterium, an antique puteal, with the inscription, "*Qui sinit ad fontem veniat potumque salubrem aurial ex vena . . .*" and we may fairly suppose that the *vena* represents the spring from which, in ancient days, the serpent of Æsculapius drank. The meaning of the second relief is less clear; it represents a woman figure crowned, seated in a ship, of which she holds the helm. Taking it in conjunction with another coin in which Tiber is seated near the prow of a ship, it may possibly represent the sacred embassy to Epidauris. The style of both reliefs dates them securely about the time of the Antonines.

**T**HE same number of the *Bulletino* contains an account of the terra-cottas found at Nemi. The excavations there should have some claim on English attention, as they are being carried out by Sir J. Savile-Lunley, our ambassador at Rome. Dr. Rohden, who writes the account, is perhaps the first European authority on ancient terra-cottas, and we must refer to his paper for details. The terra-cottas are both architectural and sculptural; a number of akroteria have been found with figures of Diana as the huntress, but the cult of the place was for the most part addressed to the goddess in her life and health-giving aspect as Lucia. In this capacity an immense number of figures were offered to her, with hands, feet, legs, and wounded limbs showing surgical treatment.

**A** DESCRIPTIVE Guide to Kirkstall Abbey\* has been sent to us, headed with the title of the "Leeds Literary and Philosophical Society," and presumably read by its author, Mr. J. Wreghitt Connon, as a "paper" before that society. Mr. Connon has turned to good account his opportunities for studying the great abbey ruin which is so easily accessible from Leeds, and he has produced a good and readable account of it, accompanied by a small restored plan and birdseye view of the abbey as it probably existed in 1190; a sketch which, to those who are unacquainted with the history and habits of the Cistercians, gives a better idea than any words could give of the stern and severe architecture of that rigorous order, whose iron rule must have slowly withered out the feelings and lives of its votaries. Mr. Connon follows Mr. Sharpe in the general restoration of the plan, and the appropriation of the long western building as the lay brethren's quarters,—an interpretation which seems more natural and probable than any other that has been offered. A conjectural restoration of the abbey in the sixteenth century is also given. The author notes the curious kind of Nemesis whereby, when the old sternness of Cistercian rule had long departed, the raising of a more ornate upper story to the tower met with a kind of practical rebuke in the falling of the piers, which were not designed to carry anything more than the low unpretending Cistercian

tower. Mr. Connon speaks, by the way, of the idea of a timber cloister or cloistral roof in the Cistercian building as conjectural only; it is surely about as certain as anything can be of which there are not the actual materials now remaining.

**T**HE German Cement Makers' Association is an important body, its members representing a production of cement not far off a million tons a year. At the annual meeting last year, held in Berlin, a report was presented of an elaborate series of experiments made upon German cements purchased in the ordinary way of trade. The following are some of the most prominent results. The quickest time in which any sample set was three-quarters of an hour, and the longest time thirteen hours. To test for coarseness, a sieve of 5,000 meshes per square centimetre was used (over 32,000 per square inch), and upon this 49 per cent. of the total remained as a maximum, while the least residue was 20 per cent. The greatest specific gravity of any of the samples under test was 3.137, and the lowest 2.976. The greatest tensile strength was 49.4 kilograms per square centimetre (702 lb. per square inch), and the least tensile strength 22.75 kilograms per square centimetre (323 lb. per square inch). These tensile strengths were obtained after twenty-eight days with hand-made briquettes. Some sand tests, made after the German method, first introduced into this country by Mr. Grant,—a mixture of one of cement to three of sand,—gave a maximum tensile strength of 23.45 kilograms per square centimetre (333 lb. per square inch), after twenty-eight days' immersion. The lowest results on such a test were 6.66 kilograms per square centimetre (94.7 lb. per square inch). Hand-made briquettes gave slightly higher results than those made by machine. Crushing tests of the same sand mixture gave a maximum of 235.43 kilograms per square centimetre (3,348 lb. per square inch), the minimum being 40.4 kilograms per square centimetre (574 lb. per square inch). Briquettes that were submerged for fourteen days, and then exposed to the air for fourteen days, had 50 per cent. increased strength compared to those immersed in water for the whole twenty-eight days. The table in which the results of the trials are set forth contains a great number of figures, there being three independent operators engaged in making the tests. A discussion arose on the paper, in which the subject of machines for making briquettes took a prominent part. Bohme's and Kemp's machines appear to have been used; but the latter is said not to be relied upon for regularity in result, and it was decided to use Dr. Bohme's apparatus, which compresses the material in the mould by means of a falling hammer for standard tests. In Kemp's machine any irregularity in lubrication was found to vary the results. The adulteration of cement was also discussed at some length. In the tests referred to, one sample was found to contain slag, and this took greatly from the quality. It was stated that the large export trade of cement once carried on between Germany and Australia had been greatly injured by the adulteration of German cements.

**T**HE two explosions of kitchen boilers which have occurred this week, and which were attended, unfortunately, with fatal consequences, suggest forcibly the urgency of supplying these domestic reservoirs with safety valves, or with lead or other fusible plugs which will melt or give way under high pressure or heat, and afford an escape for the pent-up steam. Without disparaging the general order of intelligence which is usually engaged in the kitchen, it may be said that it is not of that kind which is likely to be conversant with, or sufficiently on the alert to take at the proper time the necessary precautions to prevent, such explosions as occurred at Acton and Shepherd's Bush. In the former case it was a self-acting, high-pressure boiler. There had been no fire in the grate from six o'clock on Saturday evening till twelve o'clock next day; and the fire had been on for about two hours and a half

when the explosion occurred. In the interval between Saturday night and Sunday midday, the keen frost had rendered not only the cold-water tank, but the hot-water tank, and all the pipes connecting with both for a considerable length, one mass of ice. The sudden putting on of a fire, with the whole domestic water apparatus in a completely frozen state, with no escape for the steam generated in a boiler already partially filled with water, and gathering fresh sources of steam from the slowly-thawing ice in the pipes nearest the boiler, was followed by the inevitable result mentioned in another column.

**A** CORRESPONDENT of the *Pall Mall Gazette* on the snow removal question seems to have hit on the true solution of the difficulty. He says:—"Now that another snowstorm has come, let us turn the editors of the London papers into surveyors, and the surveyors into editors. The editors are the persons who know what should be done and how to do it. If there is any sceptic who would doubt this, let him read the leaders on the question which proceed from their pens, and he will see at a glance that they have the whole matter at their finger-ends." Cynical correspondent!

**M**R. EMERSON'S letter, which we print in another column, gives an explanation of his selection of drawings of his Cathedral design for publication. Certain drawings, it appears, were selected by the emissary of a certain journal who "called first," and then it was considered important that all other published drawings should agree with these. We are, of course, bound to accept the explanation, but we cannot regard it as an entirely satisfactory one ever from Mr. Emerson's own point of view. Surely it would have been easy to say "that design is an alternative suggestion and not in accordance with the conditions of the competition; it cannot be published alone, but only as a suggestion to accompany the main design." That is certainly how the matter would have presented itself to us. Instead of that, Mr. Emerson allows a design which was not in accordance with the conditions to be published as his design, to the exclusion of the less effective design which was within the limits of site prescribed in the conditions of competition. This, we must suppose, was no more than an unfortunate carelessness; but Mr. Emerson can hardly be surprised if it gives occasion for comment.

#### TWO OLD PARISIAN JEWELLERS: BOURGUET AND BOURDON.

II.—PIERRE BOURDON.

**A**ND now it is time to introduce Monsieur Pierre Bourdon to our readers. Here he is (or at least, here is part of him), cap on head and pipe in mouth (fig. 7), working out some new fancy in his mind, and by his side a little playful device which the smoke from his pipe very probably suggested to him. Like Bourguet's, his hook is printed in a small oblong octavo form; it consists of three hooks or parts, each with its own title-page, and in one of the corners of the first page of each, a sketch of M. Bourdon himself busy designing. The three title-pages are almost identical; here is the third:—"*Sic fana circuit orbem. Livre troisième. Essais de Gravure. Par Pierre Bourdon, Maître Graveur à Paris, où l'on voit de beaux Contours d'Ornements traités dans le Goût de l'Art, propre aux Horlogers, Orfèvres, Ciseleurs, Graveurs, et à toutes Personnes curieuses. Se vendent à Paris, chez l'Auteur, Place Dauphine. 1702.*"

The work therefore appeared at least twenty years before Bourguet's, and the designs it contains have little in common with those which were afterwards published by his fellow-craftsman and citizen. In the first place, he devoted himself entirely to practical work and not to the study of decorative principles pure and simple; that is to say, to designs intended for the beautifying of the objects he dealt in; and in the second place, his work is almost exclusively confined to pure Renaissance ornament. But though their work had little in common, the workers had much: they both strove towards one end,—the purification of the taste of those who wrought in silver and gold: "Ces livres on

\* MacCormac & Co., Leeds. 1886.

essais de gravure," says Bourdon, "sont auey utile à la Jeunesse pour apprendre le gont de l'art, et j'ai fait en Relief quelq'un de ces ornemens pour miecx conoître la vérité des contours listels et feuilles qui lui sont propre."

them for the benefit of those who would follow in his footsteps. The idea had already been utilised by Von Bommel about two hundred years previously, not as a study, but as part of the design, in one of the most curious of those

introduction of a number of extraneous objects, such as shields, torsos, heads, vases, fruits, *et hoc genus omne*, which have absolutely no part nor lot in the general structure of the design, has opened a smooth and easy way to a herd of incapable draughtsmen, who, not pausing to study the alphabet of their craft, have flooded the world with the veriest hodge-podge of heterogeneous rubbish that it is possible to conceive or dream of. We have said that in our estimation Bourdon's Renaissance work is excellent and worthy of the greatest admiration. Our criticism is directed not against the peculiar style of ornament which the Renaissance brought forth, but against those modern artists who, picking here a little, there a little, a torso or a shield from this, a vase or a scroll from that, have plastered our modern walls in every direction with monstrous nightmares of ornament. If there is one object more than another which designers in the Renaissance style affect to beautify, it is the long and narrow oblong panel on a plaster. We must admit the task they set themselves to be an exceedingly difficult one, but the grotesque way in which they almost invariably accomplish it is worthy only of the speediest form of obliteration that can be devised. If any one doubts what we are saying, he will find a dozen examples to his hand at every turn; let him study them carefully, and honestly say if he can see a *scintilla* of grace or beauty in the ribbon and bunches of fossil flowers with which the space is choked, in the inaccurate weapons and armour, in the impossible pillars and other architectural scraps, in the hideous masks and faces, and in the high-class confectionery style of the appendages generally.



Fig. 7.

It is, however, impossible to pass by without remark, the curious little drawing (from which we have only taken the bead, fig. 7), which he gives of himself and his "churchwarden." He has evidently been impressed by the grace

curious grotesques which so delighted the hearts of German designers in the seventeenth century, and of which we propose to give some examples in a subsequent article.

Although Bourdon has only preserved one of



Fig. 8.



Fig. 9.

of the curves of the smoke as it curls upwards from his mouth and the pipe-bowl, and, catching their airy spirit, he has deliberately set them on his paper in conventional form. It is a pleasant fancy, and though he was not the

his smoke studies, everything that came from his hand, however "cabin'd, cribb'd, confin'd" by the exigencies of the object to be decorated, reveals his mastery over this fundamental principle of the tangential flow of curves. We know

For ourselves, we think that the Renaissance style is at its best when the human or animal forms are worked into the general design and are more or less conventionalised, and that it begins to develop germs of weakness directly these forms are detached from the scrollwork and disport themselves among the branches thereof (in modern work we are frequently not even honoured by anything so homogeneous as a scroll); for this reason we prefer fig. 8 to fig. 9, though in this latter one the beauty and compactness of the scrollwork is such as to almost entirely conceal the bird and dog from view.

In fig. 10 we have sketched one of many designs for watch-backs, and a little piece of the interior economy of a watch: the former, as, indeed, all these watch-back designs are, is specially noticeable for the delightful way in which the surface is covered; the latter for its rigid simplicity and grace. In fig. 11 Bourdon has given his fancy greater play, and allowed it to run with greater freedom over the surface of a cup; and in fig. 12, over the slender form of what appears to be an embossed scent-bottle, or handle of some sort: in this the ascending and descending scrolls, with the stems and foliage working in opposite directions, seem to us especially good.

No other jewellers stand out so prominently as artists and designers as Bourguet and Bourdon. The collection of prints of ornaments in the British Museum reveals fragments of many books of designs of jewellery, which were issued as illustrated catalogues of the objects sold by the publisher. They must, for the most part, have been got up with considerable care and at great expense; but the designs are not of very great merit, and out of a great many plates we have been able to pick out two little designs for seals (fig. 13) as the only ones deserving of special notice; they are by F. J. Morrison, engraved by J. A. Pfeffel, and are interesting specimens of the goldsmith's art. It may be interesting to refer shortly to some of these catalogues. Louis Coquin, *alias* Corsin, *alias* Cauquin, published one, "fait par Gilles Legaré, Orfèvre du Roy," in 1663; the designs are fairly good and elaborate, but the whole of the details are realistic and bad; the chief features of the book are the jewels arranged as bunches of flowers tied up with ribbon. Balthasar Moncornet published in 1665 a similar book, with very weak designs; the special attraction to his customer being a series of landscapes, one of which appears at the bottom of each page; but the landscapes are as poor as the designs. Moncornet was a publisher, and merely issued a variety of "Collections" of works from other hands; the book in question has the following title-page:—"Livres nouveaux de toutes sortes d'Ouvrages d'Orfèvres recueillies des meilleurs Ouvriers de ce Temps, et se vendent chez



Fig. 10.



Fig. 11.



Fig. 13.



Fig. 12.

first who had caught an inspiration so directly from the ebb and flow of natural curves, the little study of them which he has preserved reveals his own clear insight into the leading principles of decorative art, and emphasises

of no pure Renaissance work that can beat it, little that even approaches it in excellence. These two little borders (figs. 8 and 9) we think will speak for themselves. The fact is that Renaissance ornament, by sanctioning the

Baltazar Moncornet, Rue St. Jacques, à la Belle Croix, vis-à-vis St. Yves. 1665."

Jean Vanquer's book, "Livres de Fleurs pour Orfèvres et Graveurs," contains some delightful engravings of flowers; but they are botanically correct, and as careful studies of real flowers as the most accurate botanist could desire. They are useless for the purpose for which they were designed. "Jardiniers" should certainly have been substituted on the title-page for "Orfèvres et Graveurs."

There is one other book of jewellers' designs, however, of great excellence, by Johann Bartholome Herbat, published in 1708; but he was a designer pure and simple, and not a goldsmith. His work has so many excellent qualities that we must reserve it for another article.



Fig. 14.—Tailpiece from a Plate in Bourdon's "Essais de Gravure."

#### THE ENGLISH IRON TRADE IN 1886.

In closing our review of the iron trade during the year 1885 twelve months ago, we observed that the future did not appear nearly so dark as the year then at its close had led people to anticipate. To some extent this anticipated forecast has not proved quite correct. The expected improvement did not set in quite so early as was hoped, although it made its welcome appearance at last. Now have the causes which, it was thought, would operate towards a better state of trade been quite those upon which our anticipations were based. Shipbuilding, for instance, did not give the desired impulse to trade, the tonnage returns for 1886 being lower than those of 1885. The replacement of old material by new also did not proceed at the rapid rate hoped for, industrial undertakings being carried out with a caution learned from previous experience. But in one respect the past year has not only fulfilled, but even exceeded, the opinions formed at the close of 1885. The United States once more have given the chief impulse so much needed by the English iron trade, the demand from that country having been far heavier than was expected. Taking it altogether, the past year shows a substantial improvement upon its predecessor.

This improvement finds expression in the Board of Trade Returns. For the first eleven months of 1886,—the complete returns for the year are not yet available at the time of writing,—we exported 3,123,264 tons of iron and steel, of a total value of 20,098,968*l.*, against 2,910,347 tons of a value of 20,123,374*l.*, in the corresponding period of 1885. It is estimated that the total exports of 1886 will exceed those of 1885 by about a quarter of a million tons. The serious feature in the above figures is the decrease in the value of the exported products, and this diminution is the chief characteristic of the trade of the past year. Prices, which were unremunerative enough at its beginning, steadily fell until the lowest ever paid were reached. Towards the last quarter of the year, an improved demand setting in from all quarters, and production, especially of crude iron, having been at last curtailed, values began to recover, until they are now better for pig-iron than last January, whilst finished iron and steel, if they have not quite reached the point they occupied at the beginning of the year, are at present exceptionally strong in price, with every prospect of reaching their former standards.

The chief causes of the drop in pig-iron, by the side of a decreasing demand, as shown by the shipments, were still production in excess of requirements, and the consequent accumulation of stocks. The total output of Scotch pig during the past year was 935,801 tons, against 1,003,562 tons in 1885; of Cleveland iron, about 2,403,000 tons, against 2,458,889 tons in 1885; of hematite iron in West Cumberland, 1,229,000 tons, against 1,219,300 tons in 1885. The quantity of crude iron at present stored in Scotland, according to latest returns, is 1,182,039 tons, against 1,050,633 tons at the

close of 1885, an increase of 132,356 tons; in the North of England, about 600,000 tons, against 517,488 tons in 1885; in West Cumberland and North Lancashire, 350,700 tons, against 368,600 tons in 1885, a decrease of 17,900 tons. Finally, the shipments of Scotch iron, for the year ending December 25th, 1886, were 332,637 tons, compared with 429,610 tons at the same time in 1885; of North of England iron, 774,813 tons, compared with 835,033 tons in 1885; of West Cumberland iron, 507,767 tons, compared with 487,884 tons in 1885. Exact returns of the English production of pig-iron and the stocks at the end of the year will not be published until about the beginning of March; but the figures given above are sufficient to show that the output of crude iron in 1886 was below that of the preceding year, although for hematite iron there is a slight increase, owing to the growing demand for steel.

The value of pig-iron No. 3 G.M.B. was, in January, 31*s.* 3*d.*; the lowest price of the year (29*s.*) was reached in July; after which, under the influence of a better inquiry and the restriction of production by the Cleveland ironmasters, far too long delayed, it began to rise steadily, until it has reached 33*s.* 9*d.* for early delivery, 31*s.* and 31*s.* 6*d.* being quoted for spring and early summer contracts. Scotch warrants were 41*s.* 0*d.* at the beginning of January last, from which price they receded to their bottom value (37*s.* 11*d.*) in the first week in March. Since then they have been fluctuating, but with a rising tendency, and they are now firm, with 44*s.* 7*d.* as the highest quotation of the year, or 3*s.* 6*d.* higher than in January. Hematite iron was pretty steady at 42*s.* for mixed Bessemer parcels in the north-west of England for the best part of the year, but with the revival in trade the price went up to 46*s.*, and was at the close of the year 45*s.* The rise in pig-iron, it will be seen, has been from 2*s.* 6*d.* to 3*s.* 6*d.* per ton on the year, and it need only be added that the crude iron produced in other districts has shared in this advance. The same cannot be said of finished iron, which has been very much depressed for ten months of the year, and consequently lost in value, although the difference in the quotations ruling at the opening and close of the past year was not great, the fact being that manufacturers could not go very much lower, and stopped work rather than take orders at prices involving positive loss. To give an idea of the general depreciation of finished iron, it need only be stated that the net average price of bars, plates, angles, and rails in the North of England at the end of October last was 4*l.* 11*s.* 6*d.*, compared with 4*l.* 15*s.* at the end of 1885. But the last two months of 1886 will probably show a slight recovery from the lowest price. On the whole, finished iron has never been bought so cheaply in this country as during the past year.

The steel trade presents by far the best record of the past year, and it will probably be found, when the returns for the year are published, that, notwithstanding the depression prevailing in other branches of the iron trade, the production of steel of all descriptions during 1886 was as large as that of any previous year, if it does not exceed it, and that it will more than counterbalance the deficit in the out-turn of manufactured iron. The extensive substitution of steel for iron in shipbuilding is making itself felt, whilst the growing employment of the former material for other purposes in which iron has hitherto been exclusively used will add to the bulk of steel produced. The revival in the construction of railways in the United States has brought important contracts for steel rails to this country, and, with the orders on colonial account and by home railways, has helped to steady prices again. Owing to the operation of the international rail syndicate, which, however, we are happy to say, ended in April last, it was possible to keep up prices of rails at 4*l.* 15*s.*; but as soon as the combination collapsed, they went down to 3*l.* 10*s.* In consequence of the increasing demand, and the rise of rails in America, their value has crept up, and is now 4*l.* per ton for average sections. Steel for shipbuilding has enjoyed a tolerably steady inquiry throughout the year, but, notwithstanding this, prices went down in sympathy with the downward tendency of other classes of iron and steel. Steel and ship plates were at the beginning of the year 6*l.* 7*s.* 6*d.* to 6*l.* 10*s.*, and angles 6*l.* 2*s.* 6*d.*, and they are now 6*l.* and 5*l.* 15*s.* respectively.

The past year has been a bad one for the shipbuilding trade, the total tonnage launched

amounting to only 473,675, compared with 540,422 tons in 1885, 750,000 tons in 1884, 1,250,000 tons in 1883, and 1,000,000 tons in 1882. The two latter years were abnormal as regards the tonnage of new ships, and the decline since then has been the direct consequence of the previous over-production. But there is every indication that the shipbuilding industry is reviving, and that 1887 will present a better record than 1886. Marine-engineers have felt the effects of the dulness in ship construction. It is hoped, however, that with its revival and through the introduction of triple-expansion engines, more work will be provided for them. Other branches of the engineering trade have been equally depressed, excepting for special work. The consequence of the dull state of trade has been an almost general reduction in wages, in some cases quietly acquiesced in by the workmen, but in others leading to cessation of work of longer or shorter duration.

It will be seen from the above brief review of the English iron trade that the long depression of the last few years is over. Whilst the demand from America has been the principal factor in the revival, it should not be left out of account that the colonies also are buying more largely, and that the home consumption is growing, the improved trade in shipbuilding having likewise given a slight impulse to the iron and steel making business. To conclude. The clouded political horizon is giving rise to apprehensions as to a coming great war and to its baneful influence upon trade and industry; but with this exception, and unless every indication is deceiving, appearances are for a much improved trade during the year upon which we have now entered.

#### EDINBURGH NOTES.

QUESTIONS regarding the proposed new Municipal Buildings continue to be debated in the Town Council, and considerable feeling has been exhibited between the contending parties. The *Scotsman* has taken up a position of rigorous antagonism to the proceedings adopted by the Lord Provost and the majority of the Council, advocating delay, and protesting that they have not the confidence of the ratepayers. Numerous letters have been published in that organ, and ward meetings have been held protesting against what is expected to be a heavy expenditure, which in the present state of the City finances would prove oppressive. Sir James Gowan made a very pithy speech in support of the scheme, maintaining that there was always sure to be opposition to any matter involving an increase of the rates, but indicating at the same time that a more modified plan might be adopted than what many might desire; that to retire from the position taken would be most impolitic, as speculators would be certain to acquire the property scheduled; and that the result of the competition for plans should be waited for, in order to see what may be learned from them. It has been resolved, in the meantime, to procure an Act of Parliament, reserving matters of detail for future consideration.

At the northern extremity of Inverleith-row, a new Episcopal Church has been commenced, from the designs of Dr. Rowand Anderson. This church supercedes St. James's in Broughton-place, which was in close proximity to two other Episcopal churches in York-place. The Broughton-place building has nothing outwardly to distinguish it as a place of worship, the facade being merely an end block in conformity with the dwelling-houses to which it is attached. The new church when completed will accommodate a congregation of 600, but the portion to be built at present makes provision for only half that number. The plan for the entire building shows a nave with aisles, and deep chancel, 36 ft. long. At the south-east angle is a tower 21 ft. square, having vestry and organ-chamber on the ground-floor, and choir vestry above. The style adopted is Gothic of the fourteenth century. The chancel is lighted by a window of five lights to the east, and two windows of two lights in the south side. The nave is divided into five bays, with three-light windows in each. Groped columns, having moulded bases and carved caps, sustain arches of two orders, and the roofs are open-timbered. The material to be used for exterior and internal dressings is Corsehill stone. The portion to be now completed will cost about 3,500*l.*

The Parliament Hall in Edinburgh Castle,

which is at present used as a military hospital, and has been divided by the introduction of floors and partitions, is about to be restored at the cost of Mr. William Nelson, publisher, under the supervision of Mr. Hippolyte J. Blanc, architect. The ball was constructed in 1431, and it is probable that when the plaster and other modern accretions are removed interesting features may be discovered. These will, of course, be carefully preserved and restored, and the open timber roof will receive due attention. The "garderobe" excrecence on the south front will be removed, and the built-up windows reopened. The number of patients at present accommodated in the building does not exceed a dozen, and arrangements have been made with the War Office whereby invalid soldiers of the garrison will be received into the Royal Infirmary.

A drinking-fountain has been placed in the Quadrangle of the University buildings. It is the gift of Dr. W. F. Cumming, and is designed by Mr. Sydney Mitchell in a style in harmony with the surrounding architecture. It is square on plan and 13 ft. high, and is built of freestone from Binny Quarry, which is of low tone and does not form a strong contrast with the time-coloured façade of the Quadrangle. At each angle are columns with green bronze bases and foliated caps of the same material. These support semicircular architraves, above which the roof slopes upwards, terminated by a foliated vase. At each angle of the roof there is a dolphin with its head slightly projecting, and their tails are gathered round the base of the vase. On each side of the square are semicircular niches with shell ornamentation at the top, and at the foot of this enrichment is a bronze head with two cups, attached to chains. From the bronze heads jets of water fall into projecting semicircular basins. The four pediments are enriched by the arms of Scotland, of the City, of the University, and of the donor respectively. The fountain is placed at the foot of the steps which lead up to the platform, on which stands the statue of Sir David Brewster.

The Warrender Private Baths Company, Limited, has received the sanction of the Dean of Guild Court to build baths in Thirlstane-road, at a cost of 8,000l. The plans have been prepared by Messrs. R. & R. Paterson, and the elevations, of two stories, are designed in the "Scottish Baronial style."

THE LION OF ST. MARK, VENICE.

SIGNOR GIACOMO BONI still pursues his indefatigable labours on the antiquities of his native city, and has addressed a long communication to the *Riforma* of Rome on the subject of the figure of the Lion of St. Mark; the one that acts "Stylites" on the column. It appears from Sig. Boni's two recent surveys, to one of which we recently alluded,\* that the figure of the lion belongs to different dates, the greater part being, as he asserts, of the twelfth century, when the columns were erected by the Doge Ziani (1176), but that considerable additions were made to the lion on its return from Paris in 1815, after the fall of Napoleon, by whom it was stupidly removed, together with the bronze horses in front of the basilica of St. Mark. From the hook which the lion holds between his paws, the words of the Gospel were effaced by the French, and the words "*Droit de l'Homme et du Citoyen*" substituted, which gave rise to the saying that St. Mark, like other folk, had turned over a new leaf. The wings, the paws, the tail, and the wreath upon the head appear to have been lost, as these parts are evidently modern. The Gospel is of lead, and the eyes of the lion are modern, and are not coloured. The other portions of the lion, including the body and the head and mane, are original, and are modelled without any parade of anatomical knowledge, but the details, where they occur, are remarkably well executed. The original wings, as was remarked by Mr. Ruskin ("*St. Mark's Rest*," i., 22), and corroborated by an old engraving and a picture by Bassano, were more extended than the present wings, and the feathers were more strongly marked so as to tell against the sky, as are the lions of St. Mark from the time of Jacobello del Fiore to the *donatus Venetus*.

The lion is 2 mètres 70 centimètres (about 8 ft. 6 in.) high; the capital upon which it

stands is 3 mètres (about 9 ft. 9 in.) wide, and is 15m. 20c. (about 49 ft. 6 in.) from the ground. The pieces forming the lion, which are of bronze, are supported upon an iron framework, and are put together by iron screws and nuts, which are extensively oxidised. The granite column upon which the lion is placed has an inclination of about 1 1/4 in. towards the south-east, and was damaged by fire in 1756, but the injury is only superficial. The capital of the column is split.

Signor Boni proposes to take down the lion, to remove the present iron framework in the interior, and to substitute a new framework of bronze, to restore the missing portions of the lion in the style of the twelfth century, and to replace the eyes by balls of crystal fixed in the bronze.

There can be no objection to the removal of the framework, provided it can be shown that there is any danger to be apprehended to the figure of the lion; but the proposal to restore the missing portions appears a mischievous suggestion, and may possibly lead to the entire figure, together with the capital upon which it stands, being entirely renewed, and this cannot be contemplated without a shudder by anybody who knows how these things are done in Italy.

The two columns on the piazzetta were brought from Constantinople, and are clearly Byzantine. They were placed in their present position by one Niccolò Barattiero, who claimed as his reward that games of chance which were prohibited in Venice might be played between the two columns. One of these columns is surmounted by the lion of St. Mark, and the other by a statue of St. Theodore Tyro by Pietro Guilombardo (1329). St. Theodore was the patron saint of the Republic, but was superseded by St. Mark.

MAP OF LONDON SHOWING THE BOUNDARIES OF SURVEYORS' DISTRICTS.

We publish this week the second section of this map.

Illustrations.

BANKING PREMISES, ETC., STEAMER POINT, ADEN.

BUILDING in Aden presents many difficulties quite peculiar to the place, consequent upon the exceptional circumstances.

There is abundance of stone, but most of it is excessively hard and difficult to work, but not one of the various kinds is durable or will stand the climate; and even did the place possess the most excellent of stone, there is no skilled labour to work it; consequently, all works are built of thick rubble, plastered, and are of the most unstable character.

Few timbers or woods will stand the effect of the climate, and none will stand the ravages of the white ant but the best teak.

There are a few Chinese carpenters, but they are not generally capable of working to drawings, and can only make what they are used to.

The great heat and humidity of the climate affects and rapidly destroys all unprotected iron.

Skilled labour of every kind appears to be conspicuous by its absence.

The excessive heat makes the great requirement of a comfortable house a constant current and free circulation of air, only attainable by many large openings; whilst sand and dust storms necessitate the ability to close all parts when they occur.

A building of iron enclosed with wood was suggested as the best way of meeting these last requirements, but the slight protection such a building would afford from the heat and the rapidity with which it would decay was fatal to the suggestion.

Referring to the building illustrated, the site, which was partially occupied by old buildings belonging to the same firm for which these have been executed, is situated at Steamer Point, Aden, facing the harbour, and is bounded by a roadway on three sides, and forms the end building of the crescent adjoining the premises of the Peninsular and Oriental Steamship Company, from which it is divided by a roadway.

The front portion of the site is occupied by the main building, attached to the adjoining premises on one side and surrounded by verandahs 10 ft. wide on the front and side, and 6 ft. wide at the back, on all floors.

This building comprises on the ground floor (which is raised on a plinth 4 ft. from the roadway) general office, European clerks' office, manager's office, strong room, store-rooms, &c., the upper part providing residential accommodation for the manager and some of the staff.

In the rear of the main building, in the centre of the site, is a compound, whilst the side and back is occupied by a smaller building, containing, on the ground floor, all the cook-houses, offices, and servants' quarters for the house, the upper story providing three complete suites of apartments for members of the staff.

The building as erected is a substantial framework of iron stanchions and beams all secretly bolted together, which carries the whole weight to be borne. The whole of these stanchions are incased in masonry, built up, after their erection, with local stone set in mortar, composed of cheram (coral lime), pumice, and sand, ground in a mortar-mill.

The whole of the front and side verandahs, and all pilasters, lintels, steps, landings, balusters, balustrades, and other architectural features of the main structure, are composed of artificial stone of a pleasant buff tint. The whole of this artificial stone was contracted to be made in England of a coloured cement facing and a backing of cement and coke breeze, and shipped ready to erect; but this was ultimately varied by one of the partners of the firm and two men going to Aden and, assisted by native labour, making all the large and simple work there, shipping only the moulds, mills, cement, and colour, and substituting pumice-stone for coke-breeze, whilst the ornamental and smaller parts were made and shipped in accordance with the original contract.

The walls are externally finished with a rendering of Portland cement stained a rich brown grey.

The plinth is built in coursed masonry, executed in a reddish-brown stone, but not tooled on the face.

The floors are formed of iron joists, 2 ft. 6 in. apart, filled in with 8 in. of concrete, composed of one of Portland cement, one of dust pumice, and four of pumice-stone broken to about a 1/4-in. gauge. This material has given the most remarkable results in strength. The flat roof is similarly formed of two thicknesses of the same material, one 7 in. and the other 4 in., with an air-space between, and forms a perfect protection from heat. The floors are finished with the borders and trowelled surfaces in coloured cements, whilst the undersides on ceilings are plastered with plaster of Paris.

This is stated to be the first concrete floor ever executed in Aden, and certainly the first plaster ceiling. The work was all executed by local labourers, who had to be first taught. The beams are also cased in solid concrete, and a mould run around all ceilings against beams and walls.

The walls internally are all plastered, the best rooms having skirtings, dados, walls, and friezes, all executed in Portland cement or plaster of Paris, stained with ground local marbles or other materials.

The windows are exceptionally large, and are all casements, and have fanlights nearly to the ceiling, glazed with stained glass. These open inwards, so that any current of air is directed downwards. All the ground-floor windows are fitted with outside shutters on jalousies so made as to fold into the thickness of the wall. On the first floor the verandahs are protected by lattice or jalousies on frames.

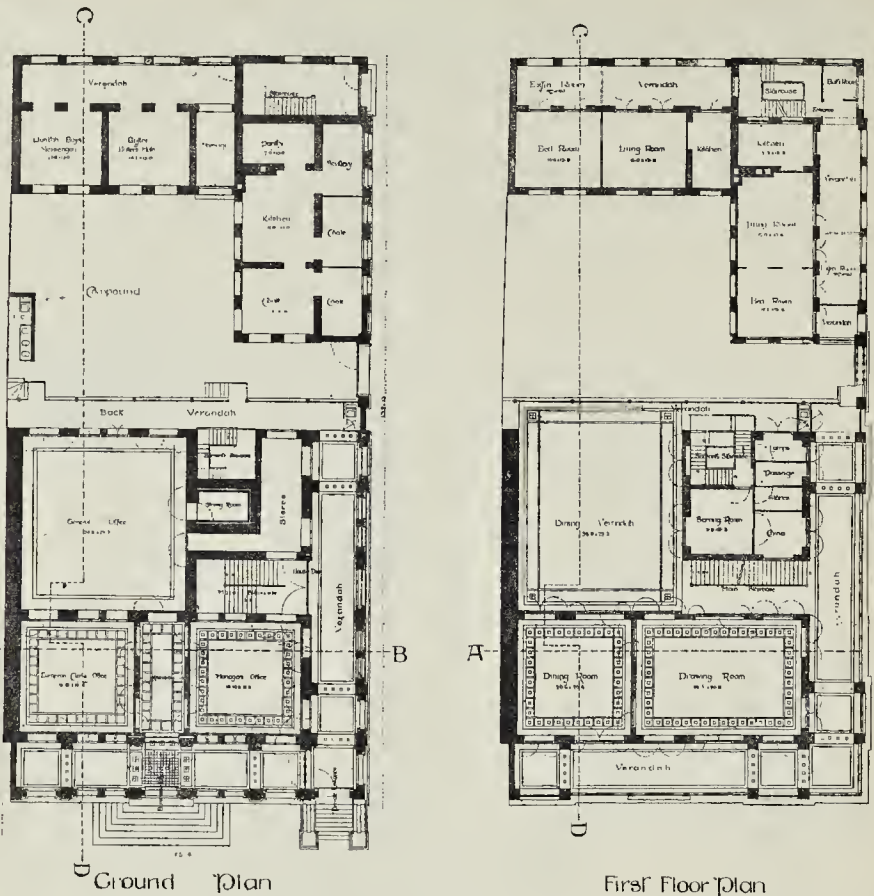
The doors and partitions inside the house are also all fitted with louvres, and all these louvres and those of the jalousies are made movable and adjustable, so that they can be closed and made to form a solid door or shutter, or open, so as to have in all cases thorough ventilation.

The whole of the fittings and fasteners, locks, keys, handles, casement (French and other), bolts, &c., were of special make and design, and executed in gun-metal and brass.

There are on the bedroom floor a great number of bath-rooms, this accommodation being necessitated by the climate. A large space in each of these rooms is formed as a water-tight tank, with a drain to the ground, and lined throughout with Dutch tiles, shipped direct from Holland.

The ironwork was executed by Messrs. Marshall & Hatch, of Birmingham Ironworks, and was so correctly set out, worked, marked, and numbered, that the whole was put together in Aden with the alteration of one or two bolt-holes only.

\* *Builder*, vol. II., p. 190.



Banking Premises, Steamer Point, Aden.

The artificial stone was executed by the Albion Concrete Company.

The excellent joinery, all executed in the finest seasoned Moulmein teak, kilned and put together with pins and red lead (glue being perishable in the climate), was from the shops of Messrs. F. Sage & Co. The fittings were supplied by Messrs. Boobbyer & Sons. All the cement used on the works was supplied by the Burham Brick Company.

The building is for Messrs. Luke Thomas & Co., Limited, of London and Aden, who themselves shipped all the goods sent from this country.

The architect is Mr. Alexander Henry Kersey, of London, who personally superintended everything in England; whilst the buildings were erected and all native labour and materials were procured and paid for, and the whole local business was transacted by a representative, Mr. A. Hemingway, whom he sent out for that purpose.

Drawings were made of every part of the building for each trade, and detailed everywhere full size, and the greatest care taken to prevent mistakes or mis-fits when the work had to be erected, and in all cases with the most perfect success.

Mr. Hemingway was supplied with duplicates of all drawings; and the greatest praise is due to him for his skill and energy in instructing the men in accomplishing the erection of a somewhat complicated building with unskilled labour, and under the greatest difficulties.

Some of the furniture was specially made from the designs of the architect, and shipped from England.

#### INTERIOR OF THE CHURCH, FOUNTAINS ABBEY.

THIS view shows a conjectural restoration of the choir of the abbey church, as reconstructed in the early part of the thirteenth century. The spectator, from his position in the south choir aisle, looks into the choir, and sees glimpses of the magnificent "chapel of the seven altars" beyond. Mr. Reeve was, some years ago, employed for a considerable time in making most careful and exact measured drawings of every part of the ruins of the abbey, for the Marquis of Ripon, and was naturally led to make conjectural restorations of many portions. Our illustration is a reproduction of the chief of these, which he describes as "the result of a considerable amount of study."

#### LADIES' HOME, WEST HOVE.

THIS Institution, now being erected at West Hove, from the designs of Messrs. Lamson & Son, is an asylum for ladies in reduced circumstances, and consists of eight separate tenements, each containing, on the ground floor, sitting-room, kitchen, scullery, &c.; and on the first floor two bedrooms and one w.c. The walls are constructed of stock-bricks with red tiles, brick facing; the dressings are of Douling stone; the gables are of framed timber, filled in with "rough cast" and backed by 9 in. walling. The walls are built hollow; the intervening space being filled in with  $\frac{3}{4}$  in. of asphalt, thus rendering the rooms perfectly

\* See report of a paper read by Mr. Reeve at the Architectural Association, and reported in the *Builder* of January 12th and 19th, 1881.

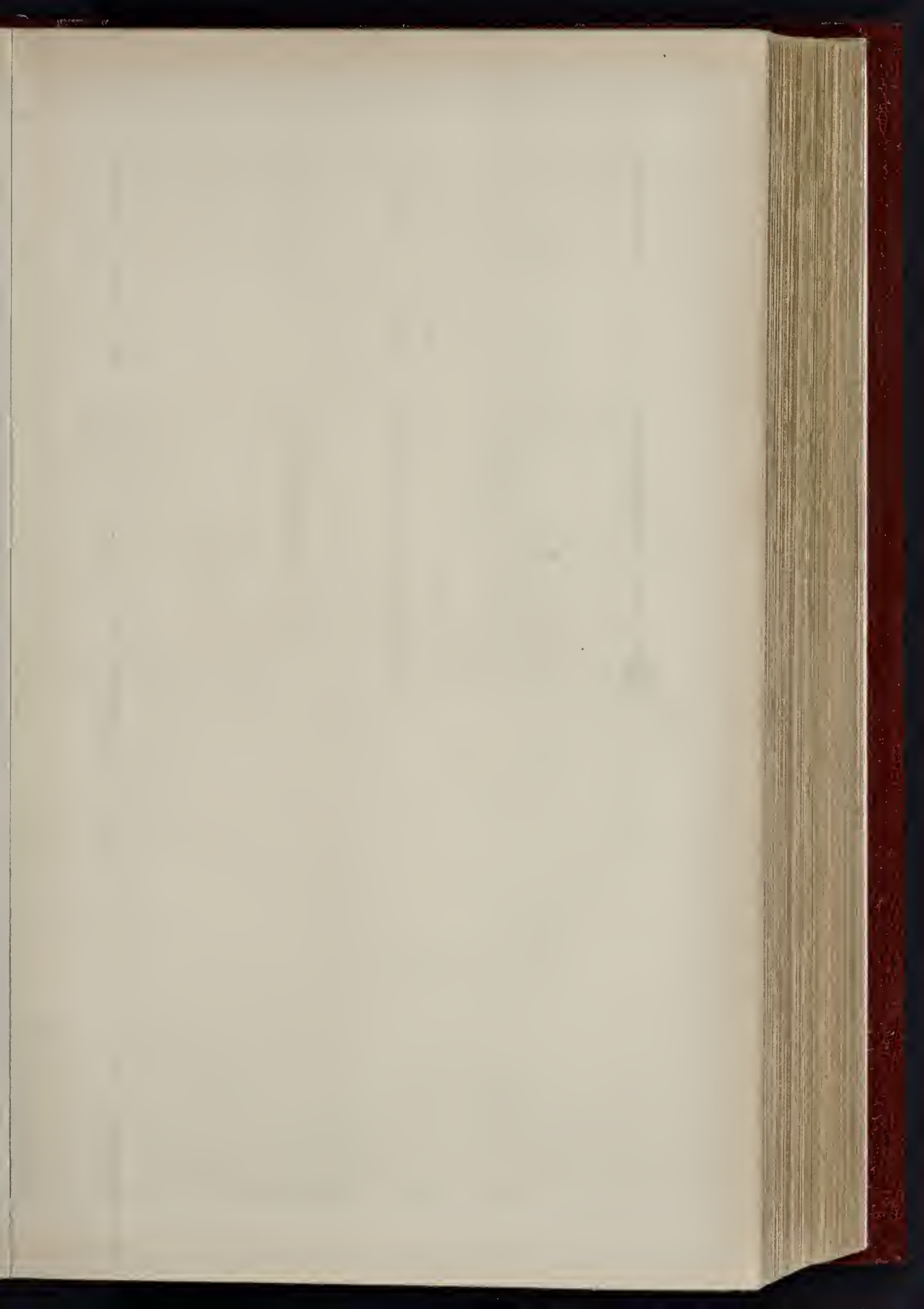
weather-proof. At the rear is a large garden, common to all the dwellings, with large shelter or summer-house in the centre. The cost of erection is being entirely defrayed by Mrs. F. H. McDonald, of Hove, who also intends to endow the institution. The builders are Messrs. Cheesman & Co., of Brighton.

#### ALL SAINTS' CHURCH, PETERBOROUGH.

THE design we publish this week, by Messrs. W. S. Weatherley & F. E. Jones, was placed second in the recent competition. The restricted nature of the site and the approaches to the same demanded some such treatment of plan as is here adopted. The church was also to be an exceedingly cheap one, and to be built in sections.

#### Masonry Classes for Architectural

**Students**—The next meeting of the large class of masonry carried on at the Guilds of London Central Institute, South Kensington, under the auspices of the Architectural Association, will take place on Tuesday evening, January 11th, at seven o'clock. It will be devoted to making the drawings and moulds required for cutting the voussoirs of a straight-arch, covering a doorway with splayed soft and sides. The members of the class are hereby informed that they will require cartridge paper and drawing instruments only. Students who wish to join the class are advised to join now while exercises in elementary masonry are still being done, for soon the class will be so far advanced that new comers will not be able to follow its studies.



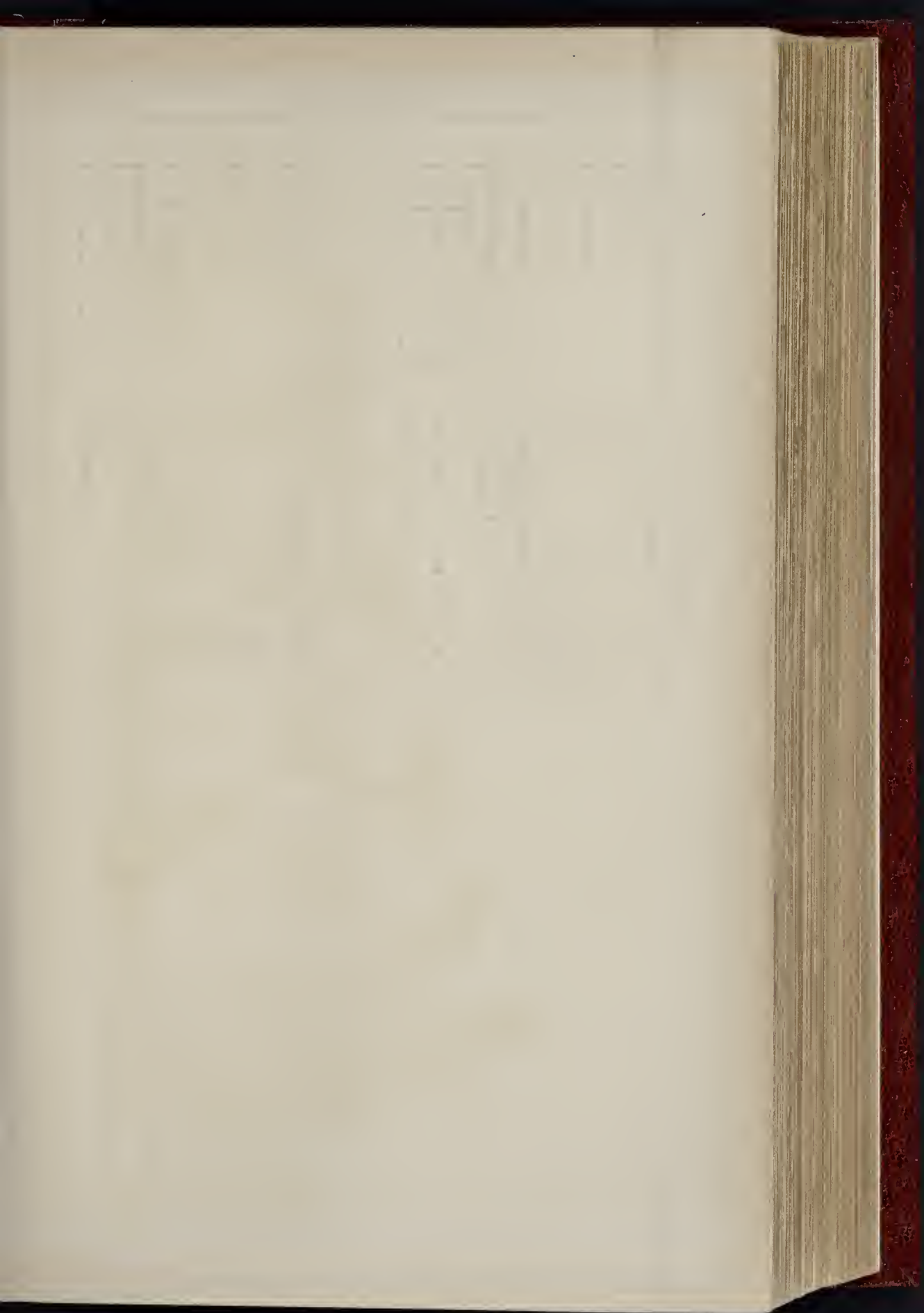






BANKING PREMISES AT ADEN.—MR. A. H. KERSEY, A.R.I.B.A., ARCHITECT.

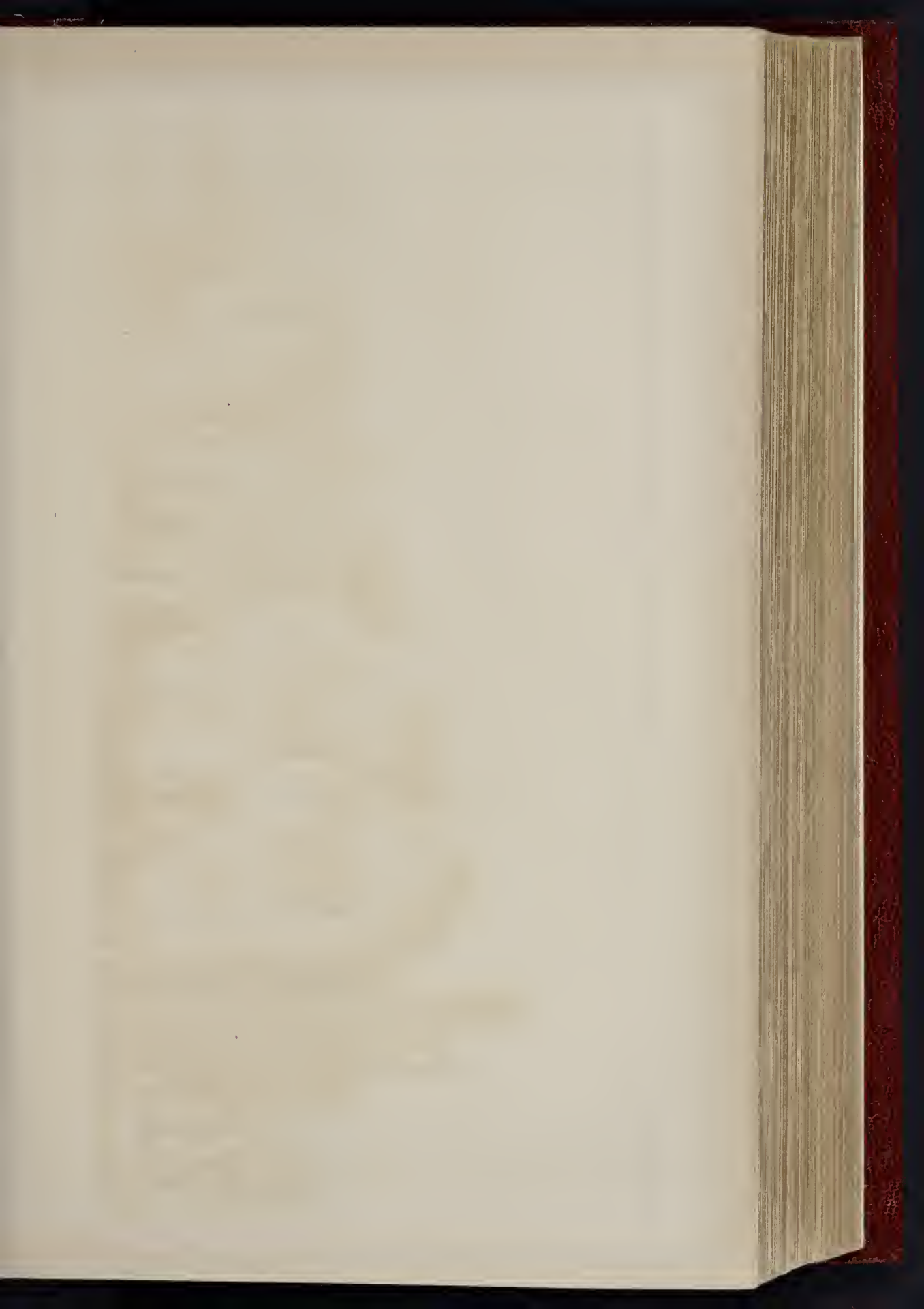




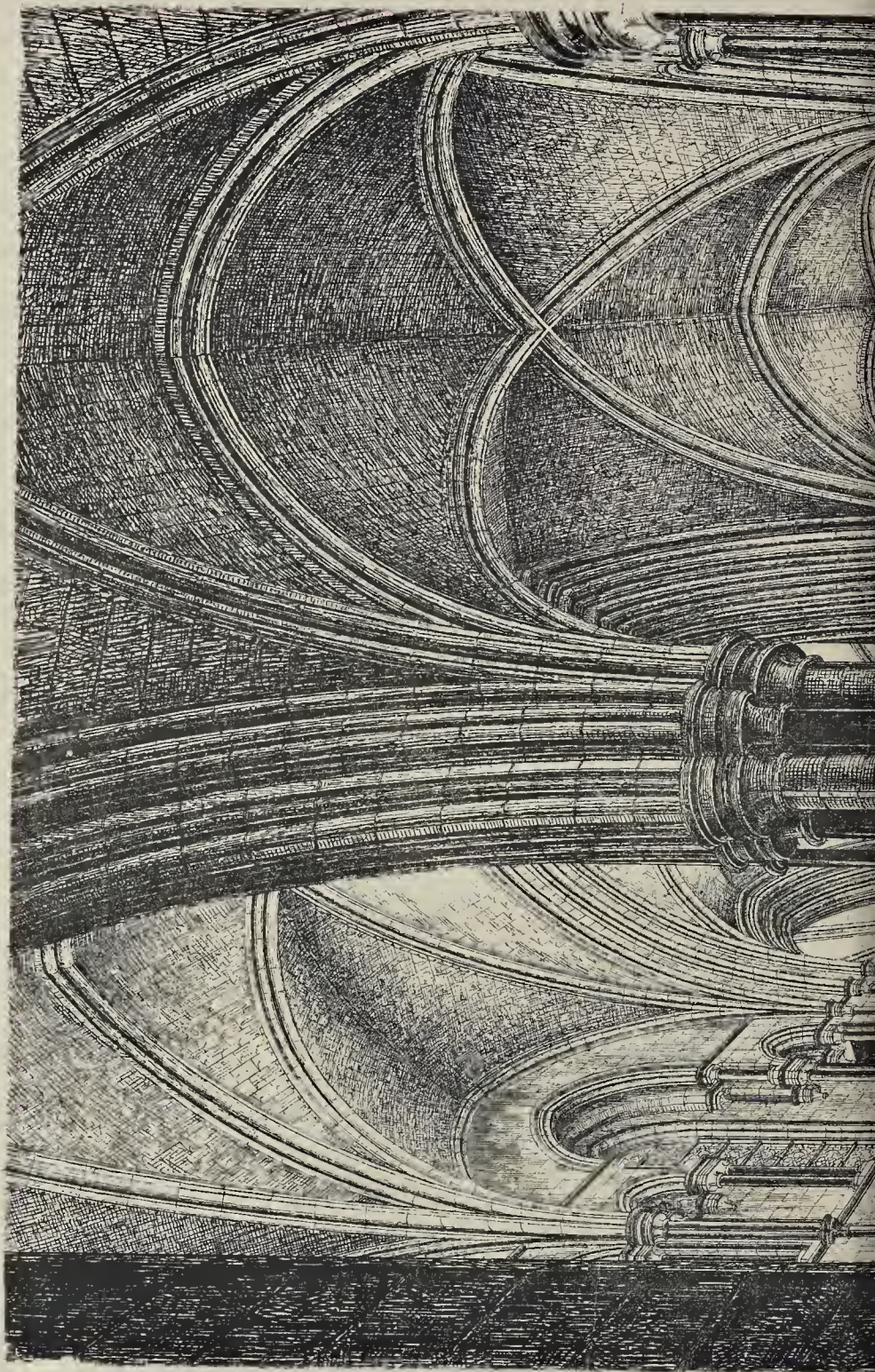
THE BUILDER, JANUARY 8, 1887

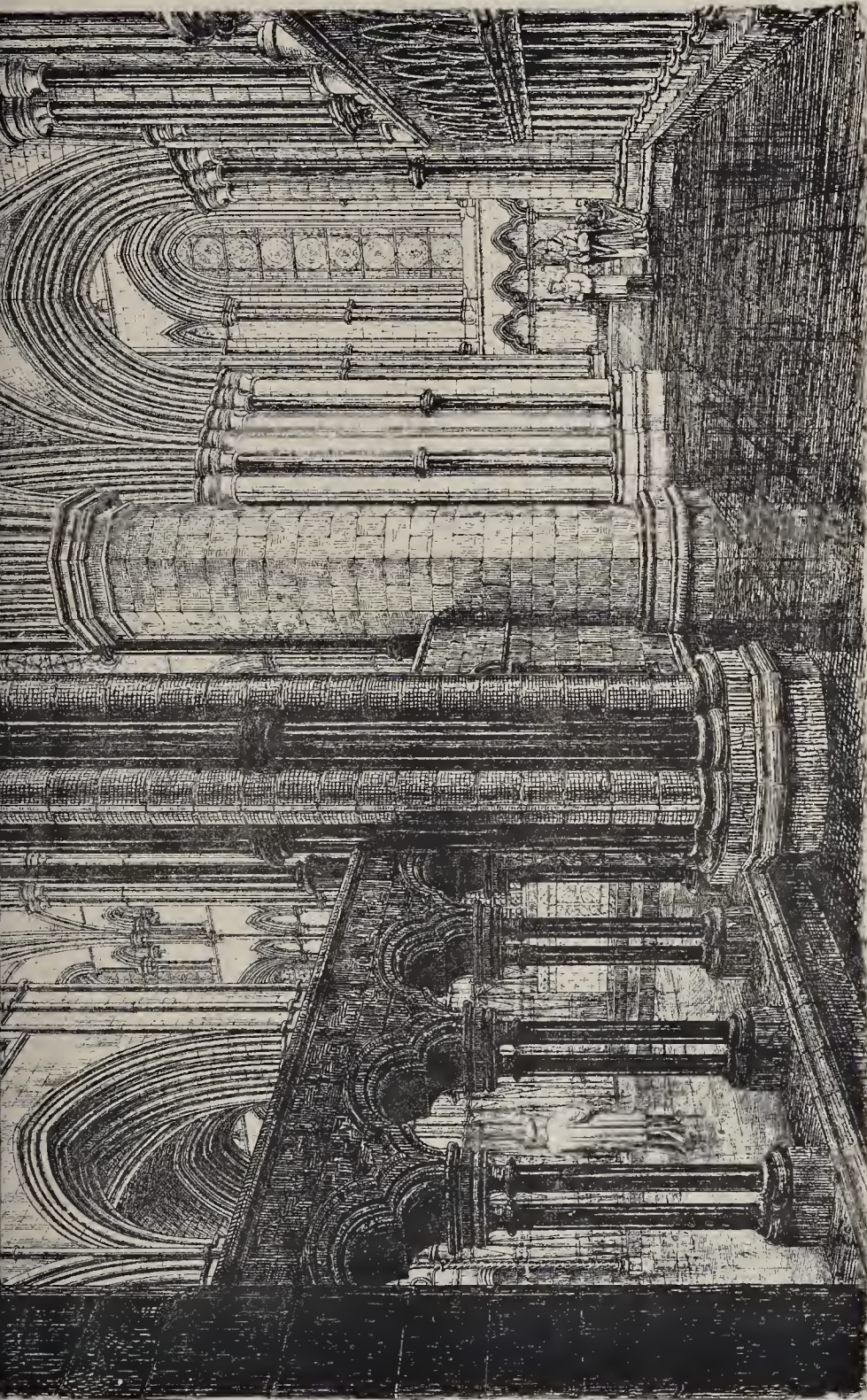


LADIES HOME, WEST HOVE,.—MESSRS. LAINSON AND SON, ARCHITECTS.



THE BUILDER, JANUARY 8, 1887.





C. F. Kell Photo-lith & Printer

INTERIOR OF THE CHURCH, FOUNTAINS ABBEY (RESTORED).—By Mr. J. A. REEVE

St. Holborn, London, E. C.







PHOTO. LITHO. BY G. & C. W. MORTON, LANE, CANBERRA, N.S.W.

ALL SAINTS CHURCH, PETERBORO.—DESIGN SUBMITTED BY MESSRS. WEATHERLEY AND JONES.



THE PUBLIC HEALTH ACT, 1875:  
SUGGESTED REMEDIES OF ITS DEFECTS.

At two recent district meetings of the Association of Municipal and Sanitary Engineers and Surveyors, Mr. William Spinks, Assoc.-M. Inst.C.E., has read a paper on the operation of the Public Health Act, 1875, with especial reference to the 150th section, with suggested remedies of its defects. After a few introductory observations, he said,—

No great originality is claimed for this paper. Lumley, Glen, Chambers, and the Reports of the Local Government Board have been laid under obligation, and the digests of cases arranged in a convenient order for reference, together with a short summary on the cases, in the hope that it will be found serviceable and handy to those who so often have need of their assistance in carrying out not the least important of the varied duties which fall to the lot of the municipal surveyor. It is now rather more than ten years since this Act came into operation, and of the 343 sections of which it consists, there is, perhaps, not one which is more frequently put into practice and applied by members of this Association than the 150th. That the draftsman who drew the Bill and the House of Commons which amended its text in committee were not immaculate nor exponents of clear expression is proved by the very large number of cases which have gone to the Courts, and by the debate which took place in the House of Commons on March 10th on the second reading of Mr. Dodd's Bill to amend this and the 152nd and 153rd sections. It has, therefore, occurred to the writer that if the operations of this section were brought before you and a discussion taken upon it, much valuable information might be obtained that would serve as a guide to each of us in its working, and for this purpose I have prepared the following observations.

The course of procedure adopted by the writer in all cases is to report to the Board the condition of a private street, and to obtain from them a resolution calling upon him to prepare plans, sections, notices, and estimates of the works he proposes to execute. Upon the plan the houses are all numbered, and the full names and addresses of the owners given, the various widths, &c., are figured on distinctly, the lines of sewers and cross drains strongly marked, and also the positions of the manholes and gullies. The longitudinal section is plotted with reference to Ordnance datum, and shows the size, depth, and rate of inclination of sewer, and the intended level of the street and its relation to existing floor-levels. The transverse section is plotted on a large scale, showing the details of the formation, with the sizes and depths of the various materials clearly given, together with the rates of crossfall both of the carriage-way and foot-way. This he considers sufficiently clear and distinct for any owner to work to, should he elect to carry out the work himself as he has power to do. The notice is then drawn. For minor streets, which are not thoroughfares or only residential streets and not main arteries of traffic, a local sett is used in paving; the foundation is of macadam on rock pitching. In streets of the first class, granite paving is laid, and all joints are asphalted. Having thus prepared the plans, sections, notices, and estimates, he lays them before the Board for approval, who sign them and order the notices to be served, and pending the expiration of the stated time the documents lie in his office for inspection by the parties interested. Failing the carrying out of the work by the owners, the matter is again brought before the Board, who direct application to be made to the Local Government Board for sanction to borrow the amounts stated in the estimates. After the public inquiry has been held and the formal sanctions received, a resolution is passed to advertise for tenders, and a contract is entered into in the usual way. Prior to the contractor entering the street, a notice is sent to the owners calling upon them to remove all old materials. Upon completion of the works they are measured up and the total cost arrived at, to which is added five per cent. for superintending and expenses out of pocket, and this sum is apportioned amongst the owners according to frontage. Before laying the apportionment for approval, a preliminary statement of the sums arrived at as the portion of each owner is sent out, with a request that they will call and examine the apportionment and point out

mistakes, if any there be. This is found to be an admirable plan, saving much annoyance in submitting a revised apportionment. The success of this system is proved by the fact that of the seventy apportionments made during the past two years, not one has been revised, and only one has been objected to under the 257th section, the reason given being that the work was "too good." No apportionment is laid for approval until every doubt is removed as to its accuracy, and then it is signed and ordered to be sent out to each of the owners, and the money to be recovered in the usual way, either summarily or by instalments spread over a term of years, as the case may be.

Having made a careful study of and inquiry into all the cases which have arisen from the operation of this section and the other sections correlative to it, the digests of which are appended hereto arranged in direct order, i.e., commencing with the first line of the section and proceeding to the end, the writer begs to offer a few remarks explanatory of the meanings of terms and words as settled by the Courts, and also directions as to the procedure to be observed, and for that purpose will give them under the following heads:—

- |                                        |                           |
|----------------------------------------|---------------------------|
| 1. Street.                             | 8. Service of Notice.     |
| 2. Repairable by inhabitants at large. | 9. Deposit of Plans.      |
| 3. Notice to Owners.                   | 10. Default of Owner.     |
| 4. Owner.                              | 11. Apportionment.        |
| 5. Premises.                           | 12. Recovery of Expenses. |
| 6. Partial Works.                      | 13. Disputee.             |
| 7. Sewer.                              |                           |

**Street.**—A "street," defined by section 4 of the Act, is "any road, lane, footway, square, court, alley, or passage, whether a thoroughfare or not," but it does not necessarily follow that it is a street within the ordinary acceptance of the term, which is a thoroughfare with houses on each side; the *prima facie* meaning of the word is simply confined to the roadway and footway. A bridge over a canal or railway is also a street, and a *cul-de-sac* may be a street. The surveyor having satisfied himself that the road he proposes to deal with is a street, must then inquire as to its dedication. A road may have been used by the public as a thoroughfare; but if there has been no express dedication by the owner, this user does not constitute it a street, and the fact of its being laid out is not a dedication. A surveyor cannot, of course, ascertain what covenants are stipulated upon in leases as to the laying out of streets, but he should take all reasonable precaution to ascertain that the road has been dedicated. Unless a street is declared to be a "highway," under section 152, the provisions of this section may be put in force as often as occasion requires.

**Repairable by the Inhabitants at Large.**—These words are used in contradistinction to "repairable by individuals *ratione tenuræ*." The cases that have been decided under this head have been applicable to roads where tolls have been charged by the owners. In the case of Taylor v. Oldham, the Master of the Rolls (Jessel) delivered a very interesting judgment as to the operation of the Act upon courts and alleys.

**Notice.**—Particular care is to be exercised in drawing the notice and describing the work required to be done; and if words are added in excess of what is prescribed, it has been decided that the notice is bad; but a notice which is *ultra vires* as to part, but good as to the residue, can be enforced in respect of that which is valid. In cases where some owners do the works, and one or more are in default, it is not necessary to serve them with a fresh notice before doing the work. With regard to the service of notices, they may be given to the owner or occupier, but the owners only are responsible for the expenses if recovered summarily; and service is held to be good if delivered to the person who is *de facto* in receipt of the rent, and service at the owner's place of business by delivering and reading to his clerk is a good service. No provision is made in the Act for an objection to notice. Whatever objections an owner may have cannot be raised until section 257 comes into operation.

**Owner.**—The word "owner" includes any person receiving the rent of the property in respect of which that word is used from the occupier of such property on his own account or as trustee or agent for any other person, or who would receive the same if such property were let to a tenant.

**Premises.**—This word by section 4 means "messuages,—buildings, lands, easements, and hereditaments of any tenure." Under this

definition many important and interesting cases have been decided, which are a useful guide to a surveyor. A railway or canal running parallel to and adjoining a street are liable, as also a railway crossing over a street; but where a road was carried over the railway it was decided that neither the railway underneath nor the slopes of the cutting could be said to abut on to the road, nor even the parapet of the bridge. There are many cases of premises, such as school-yards and courts, only having access to a street by means of a passage; in these it has been decided that the benefit of access to the street was the foundation for the liability; but an opinion has been expressed that where the passage is common the liability would not attach. From the cases of canals and railways before mentioned, it will be seen that they may have no direct or consequential benefit from the street, and the owner of a wall at the end of a *cul-de-sac* is similarly situated; but directly the street is declared a highway under section 152, they may break openings upon it and enjoy the full rights of light and way. Bridges over a stream, it appears, are premises abutting on to a street. In one case where a man held a strip of land 4 in. wide on which was the fence of the street, he was held to be the owner of premises abutting on to the street; and in another case, where a party was sued whose land was divided from the street by a wall which did not belong to him, he was held not to abut on to the street. It has also been held that the soil of private streets abutting on a new street was land abutting on such street,—but not the soil of public streets. These decisions were under the Metropolitan Management Acts; but it has yet to be decided under this Act how the apportionment is to be made for the intersection of cross streets.

**Partial Works.**—It appears that separate works can be carried out, but they must be apportioned upon the whole of the owners, it being invalid if divided up into sections, according to a ruling under the Metropolitan Management Acts; but in a case decided under this Act it was held that the apportionment on the particular owners affected was right.

**Sewers.**—The Act does not define how the sewer is to be designed and calculated, but probably the principle of the Fulham v. Godwin case would apply to a sewer laid in a street under this section, i.e., that the street must be regarded as isolated, and the sufficiency of a sewer determined with respect to the street itself and not to the requirements of the neighbourhood.

**Levels.**—Under 11 and 12 Vict., c. 63, s. 69, a Local Board had power only to require a street to be levelled with reference to any want of equality or want of uniformity in the street itself. They had no power to require the level of a street to be raised or lowered so as to bring it into uniformity with the adjacent streets. The late Lord Chief Justice Cockburn said:—"Under the words of the 69th section the Board has no power to require the appellant to raise the footpath to the level of the adjoining streets. The object was to make each street uniform, and it must be looked at as one isolated street so far as this question is concerned. If there are inequalities in it, there is power to make it level. It may be that it would be a convenience for the neighbourhood if this street was made of the same level as those near it, but there is no power to throw the expenses of doing so upon the owners."

**Deposit of Plans.**—It is necessary that these should be on view at all reasonable times while the notices run; but as the provision is directory only, and not a condition precedent to the recovery of expenses, any lax compliance with it will not prejudice the action in recovering the expenses.

**Procedure on Default of Owners.**—It must be noticed that the Urban Authority have a discretion as to whether they will execute the works or not; but they are not permitted arbitrarily to interfere, and must afford the owner all reasonable opportunity of doing it himself; but if they choose they can arrange with owners to waive the notice and do the work by agreement. In many cases owners often endorse an order on the back of the notices; but it must be borne in mind that this submission does not relieve them from any responsibility as to any wrongful procedure or position on their part. Before proceeding to make a contract, the surveyor should ascertain that all the preliminaries have been rightly

observed. Large sums of money have been lost owing to notices having been invalid, and the Authority are presumed to be in a position to find the money even if they fail in collecting it from the right parties. It is not necessary, however, for the surveyor, before making a contract, to submit an estimate as to future repairs, nor does the omission in any way prejudice the right to recover the amounts apportioned on the several owners.

**Apportionment.**—This is the last duty almost that the surveyor is called upon to perform, and he must take care that the charges on his form are for the particular works described in the notices served, i.e. that each street is treated as a street *per se*; it will not do to lump the costs of a block of streets together, and apportion them amongst the owners of all. An apportionment if requiring to be corrected should be laid again, but a correction by the surveyor after approval by the Authority does not invalidate it. In one case an apportionment had been signed by a surveyor who had ceased to hold office, and it was a nullity, and so treated.

It is usual to add to the total sum expended on the works a charge for superintendence and incidental works. There does not, however, appear to be any authority for this in the Act; but a metropolitan District Board of Works were allowed to recover the costs of obtaining names, advertising, and collecting, &c. A charge is also generally made for interest from demand; this also is not very decided as to who is to settle the amount.

By the time the apportionment is made, very likely blocks of property may have changed hands, and the surveyor must bear in mind that the expense are a charge upon the premises, and that the party upon whom the notice was served cannot be made to pay if he has ceased to own the property. The direction of the late Lord Chief Justice Cockburn, in the case of *Reg. v. Swindon Local Board*, is very clear upon this point. There is no limitation of time during which to remain effective, and successive owners are liable, until the charges are reimbursed with interest. Yet the owner is personally liable in so far that summary proceedings may be taken against him.

**Recovery of Expenses.**—This part of the section hardly comes under the surveyor's direction, and more properly is a duty to be performed by the legal adviser to the Authority. The action of section 257 comes in here, and by that it is stated that the owner has a right to appeal and dispute the apportionment for three months after its receipt, and if on the expiration of that time no complaint is made in writing, then the apportionment is binding, and a demand can be made and the money recovered. The ordinary method is to proceed (within six months from the time when the matter of complaint arises) before two justices, who are to decide only upon questions of fact, such as to whether the road is a street, or repairable by the inhabitants at large, as to the liability of the person sued, &c.; but they have no power to deal with or amend the figures, such being the duty of the Authority and of them only; nor have the justices any power of committal in default of distress, as the charge is on the premises, and if they are worthless, then the loss is to the Authority.

Under section 213 the Authority may recover the expenses by levying a rate upon the property in addition to all the other rates, and recover the same from the occupier, and in case the property is unoccupied, then from the owner. In the first instance the Authority must decide which course they will adopt, and it appears that the levying of a rate on the property is not a system to be commended, for the Local Government Board, in a case at Goolle, cancelled a decision of the Authority so ordering, and settled that the expenses should be recovered in a summary manner.

**Installments.**—In some districts the expenses are not recovered summarily, but sanction is obtained from the Local Government Board to borrow the money required, and spread the repayment over a number of years allowed by them, interest being charged not exceeding five per cent. This is an alternative permission to section 213. Of late years there has been a tendency to reduce the period of repayment very considerably, five years being the outside limit; whereas, formerly, loans have been sanctioned for thirty years, which is absurd, as no work can be guaranteed for that length of time, and if it is necessary to renew the work before the expiration, and the road should have become

a highway, the Local Government Board will refuse sanction to a second loan unless the first one is paid off. Therefore the works will have to be paid for out of revenue, or else abandoned altogether.

**Arbitration.**—If the Authority and the owner agree, the matter can be referred to arbitration under the provisions of the 179th section; but the only question to be considered is the amount to be borne by the defendant owner, and not the question as to expenses being reasonable or properly incurred by the Authority. If an arbitration is held which concerns the whole of the disputing frontagers in a street, the consent of each one to the reference must be obtained, because each has the power to appoint a separate arbitrator, and an award is not binding upon a frontager not a party to the arbitration.

**Appeal to the Local Government Board.**—By section 268 it is provided that if a frontager feels himself aggrieved by a decision of the Authority with respect to an apportionment, an owner may address an appeal to the Local Government Board, asking them to interfere and inquire into the whole matter, which they have power to do, and their decision is final and binding on all parties. An appeal cannot be made upon receiving notice to do the works, nor on receipt of notice of apportionment, but only after having received a demand from the Authority which may be taken to be their final decision.

Advantage is often taken of this power of appeal, and the Local Government Board have interfered in several cases, but sometimes, owing to informalities on the part of the appellants, they have had no power to adjudicate.

The writer has recently been engaged in a case where it was decided to question the particulars of an apportionment by appeal to the Local Government Board. All the proper procedure was duly observed, and much correspondence took place, but no formal demand had been made for the money. A notice to arbitrate was served by the Authority; and thereupon the owner, taking this as their final decision, addressed a memorial to the Local Government Board, but they decided it was not a decision at which an owner could feel aggrieved, and they declined to intervene. The next step of the Authority was at a meeting of its Finance Committee, when it was decided to summon the owner in the county court; the day after this meeting, a letter to this effect was sent to the owner's solicitors, but no action was taken until the committee's minutes were confirmed by the Authority, and within twenty-one days from that date a fresh memorial was addressed to the Local Government Board, who replied that it was not in time, and should have been sent within twenty-one days from the receipt of the letter giving the decision of the Finance Committee. This decision of the Local Government Board is of the utmost importance, as it has hitherto been considered that minutes of committees were not binding, nor were they decisions of an Authority until the recommendations contained in them had actually been read and confirmed.

This is not necessarily the only method of appeal against a decision of an Urban Authority. A case may be stated and the appeal carried to Quarter Sessions, but the other will be found to be the more satisfactory, and is more beneficial when the ground of complaint is insufficient to obtain a legal remedy, or where such legal remedy if obtained would not satisfy the equity of the matter.\*

**The Institution of Civil Engineers.**—We are asked to state that supplemental meetings for the reading and discussion of papers by students of the institution have been appointed for the following Friday evenings:—January 7th and 21st, and February 4th and 18th. The papers to be read on these evenings are respectively: "Experiments on Steam-engine Economy," by Edward C. de Fegundo; "The Use of Cast Steel in Locomotive Construction," by Alfred J. Hill; "Recent Researches in Friction" (Part II.), by John Goodman, and "Diving, the Apparatus used and Work carried out under Water," by Geo. A. Becks. The chair will be taken at 7.30 p.m. on each evening.

#### SHROPSHIRE COUNTY SURVEYORSHIP: REMINISCENCES OF TELFORD.

By the death of Mr. T. Groves, mentioned under the head of "Obituary" in another column, the office of County Surveyor of Shropshire has become vacant.

At the meeting of the Court of Quarter Sessions on Monday last, the Chairman, Mr. Alfred Salwey, said, with regard to the appointment of Mr. Groves's successor, that it was very important that no time should be lost, and therefore the Court proposed to fill the vacancy on the 15th of January. The office was an exceedingly important one, when they considered that there were eleven lock-ups to look after, the Shirehall and Judge's lodgings, and no fewer than 269 bridges. The applications and testimonials would be referred to the Finance Committee.

Mr. C. C. Walker said he had seen the advertisements respecting the county surveyorship, but although the probable salary was mentioned, it was not stated whether the candidate was to be permitted to engage in private practice. This seemed to be necessary to be stated, for the amount of salary named\* was too small to attract a first-rate man unless he had private practice, and, as it was not intended to prohibit him from undertaking this, it seemed desirable that it should be known. Before he sat down, perhaps the Court would permit him to state what might not be generally known, and what would probably be interesting. It was a curious thing that just one hundred years ago this very year the county magistrates of Shropshire made an appointment of the county surveyor that was destined to have great historical results in civil engineering, and to leave a mark in our national history. In the year 1787, an excellent young man, named Thomas Telford, who had been a working mason, and the fatherless child of a shepherd, came to Shrewsbury to superintend some alterations at the Castle for Mr. Pulteney, whose residence it was, who was then member for the borough. While there, the county surveyorship fell vacant, and the magistrates appointed Telford to the post. He lived in Shrewsbury, and did much work for the county. He built the county gaol. The henevolent John Howard came there, and by his advice the plans were altered to the approval of the magistrates, and the building made more healthful and humanising to the prisoners. The bust of Howard, which graces the front of the gaol, is in remembrance of this circumstance. Telford did all the usual county work. He built no fewer than forty-two bridges in the county, several of iron, —then a new material for bridges, —and all his work bears the stamp of his genius and ability. The iron bridge at Buildwas is his, and was the third bridge built of iron in England. The magistrates were so satisfied with the performance of his duties that several of them introduced him to make the Ellesmere Canal, and, from the experience which he gained, he made the finest bridges and canals, harbours and docks of that period throughout Great Britain, and so many excellent roads that he became the most eminent road-maker in the world. The Holyhead road, with the splendid iron suspension bridge over the sea at Menai Straits, the wonder of its day, a beautiful thing always, was the eventual outcome of the experience he gained while faithfully performing his duties as County Surveyor of Shropshire. Indeed, it is not too much to say that, by the confidence in iron for bridge construction inspired by Telford, the progress in civil engineering has been so advanced, and we see the result in those grand iron bridges and viaducts that are made and being made all over the world. There is no appointment that the county magistrates can look upon as made by their predecessors with more satisfaction than the appointment of Telford. Every Shropshire man should read his life. He became not only the first civil engineer of his day, but the first President of the eminent Institution of Civil Engineers, which he held till his death. This distinguished man always remembered what he owed to the magistrates of Shropshire for his introduction to public works. He received many decorations from foreign sovereigns in his long, laborious life, was a great benefactor to his race, and, moreover, to our country. An example to all, and revered by everybody, he now resides with the illustrious dead in Westminster Abbey.

\* The remainder in our next.

\* 250l. See advertisement in last week's *Builder*.

The Chairman said the Court could hardly expect a man to devote the whole of his time to county work for the salary offered; but, according to the conditions of the appointment, the surveyor could not be either directly or indirectly interested in any work by or with the county. That rule would be strictly upheld.

SEWAGE IRRIGATION FOR SMALL AREAS.

ASSOCIATION OF PUBLIC SANITARY INSPECTORS.  
 ON New Year's Day, Mr. Jas. Bateman, of Pewsey, Wilts, read a paper before this Association on the application of sewage to cultivation. Mr. Jerram, the Chairman of the Council, presided, and there was a fairly numerous attendance of members. Schemes for dealing with the drainage of large towns, said the lecturer, were numerous, but they were often absent in overgrown villages and small towns in England having a population of 2,000 or 3,000 persons, but not coming under the provisions of the Local Act. In such cases he believed the remedy must be sought in sewage irrigation. In assuming a population of between 2,000 and 3,000, where the water supply depended on wells or the private storage of rain-water, and situate within easy distance of a watercourse,—he had in mind several localities in Wiltshire where the conditions exactly applied,—the sewage would contain, not manufacturing refuse, but the drainage of closets, baths, sinks, washhouses, tanyards, slaughter-houses, brewhouses, and such refuse as was always left in market-places where horses, cattle, pigs, and other animals were offered for sale. Allowing for moderate rainfall, and a water consumption of twenty gallons per head of population, he calculated that the discharge of 105,000 gallons every twenty-four hours would have to be provided for, and allowing for a prospective increase of population, the sewers leading to the deposit tanks should have a sectional area of 18 in. by 27 in. In the working out of irrigation schemes in such districts, the most burdensome condition was the high standard of purity fixed for the resulting effluent by the Rivers Pollution Act, which required that no "liquid containing in suspension more than three parts by weight of dry mineral matter, or one part by weight of dry organic matter in 100,000 parts, shall be admitted to any stream; or which shall exhibit by daylight a distinct colour when a stratum of it 1 in. deep is placed in a white porcelain or earthenware vessel." This condition was absolute, and must be complied with, and where the soil was not on the one hand a too heavy clay or on the other a too porous or loose one, the condition could be fulfilled. A soil well adapted to the purpose, varying from a light to a stiffish loam, could almost always be found adjacent to a stream, and with proper under-draining and due discrimination in the application of the sewage to the land, highly satisfactory results might be reckoned upon. The public mind had been much prejudiced against irrigation schemes by the absence, in such schemes, of efficient subsoil drainage, the results in those cases being often the creation of a sewage marsh in winter, or in summer of a pestilential hot-bed. As had been pointed out by Sir Robt. Rawlinson, no hard-and-fast rule could be laid down. A system which answered admirably in one area might fail in another. Everything would depend upon good management. At Doncaster, some 600,000 gallons of sewage per day were distributed over an area of only from two to five acres, without swamping it, the weight pumped upon it reaching the enormous amount of 2,700 tons of sewage daily. On another point he agreed with Sir Robt. Rawlinson, "that tanks could not properly filter sewage." They only acted as storage places for subsequent mechanical or chemical treatment. The most important consideration was the expense to the ratepayers of all such schemes. Assuming the cost of a scheme like that he had outlined to be 3,000l., which, borrowed at three per cent. for thirty years, would involve for interest and repayment of principal a charge of 190l. for the first year (diminishing every year), a cess of 104d. per head of the population for the first year would suffice. This *per capita* plan the lecturer considered better than charging by assessment on rateable value. In conclusion, Mr. Bateman, maintained that while the welfare of the larger communities

was being well looked after, the smaller ones were being neglected. The operation of the Sanitary Acts was very slow in rural districts, and obstacles were often placed in the way of their administration; but it must commend itself to the mind of any one who studied the question that Nature had placed many of our towns in such a position that very little was required by man to reduce the standard of mortality below its present average, and the authorities that best endeavoured to carry out this great humanitarian principle were the authorities who might be said to be the pioneers of a better age.

In the discussion which followed, the Chairman, Mr. Middleweck, Mr. Dee, Mr. Clarke, and Mr. Easton took part, the general opinion being in favour of water-carriage and irrigation in the disposal of sewage in localities such as those dealt with in the paper, as against the pail or earth-closet system.

A cordial vote of thanks was accorded to Mr. Bateman.

The Chairman announced that the annual dinner of the Association would be held on the first Saturday in February.

ROYAL ACADEMY.

ADMISSIONS TO THE ARCHITECTURAL SCHOOL.

Upper School.

|               |                 |
|---------------|-----------------|
| Alford, W.    | Newberry, J. E. |
| Amblor, L.    | Schultz, W. R.  |
| Ayling, R. S. |                 |

Lower School.

|                  |                   |
|------------------|-------------------|
| Blomfield, A. C. | Lanchester, H. P. |
| Bryden, R.       | Oliver, J. P.     |
| Fletcher, B. F.  | Page, V. R.       |
| Gregg, H. A.     |                   |

Probationers.

|                |                 |
|----------------|-----------------|
| Baker, H.      | Matthewman, H.  |
| Collins, G. E. | Neal, H. G.     |
| Draper, E. E.  | Norton, C. H.   |
| Fatch, E. E.   | Poole, E. E.    |
| Giles, A. L.   | Powell, A. H.   |
| Grace, W.      | Pymell, A.      |
| Horton, W. F.  | Sampson, R. W.  |
| Inman, A. J.   | Taylor, W.      |
| Jaques, G. R.  | Thompson, A. H. |
| Martin, C.     | Verity, F. T.   |

THE NATIONAL AGRICULTURAL HALL, KENSINGTON:

THE STABLES OF "OLYMPIA."

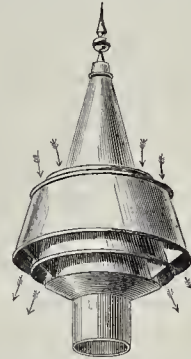
This immense building was opened on Boxing Day. It is not necessary here to describe the structure, inasmuch as we have on previous occasions done so very fully.\* The architect was, in the first instance, the late Mr. H. E. Coe, who was succeeded by Mr. James Edmeston. The ironwork of roof and columns was designed by Messrs. Max am Ende & A. T. Walmsley, and erected by Messrs. Handyside & Co., of Derby, and the glazing and zinc work of roofs and flats has been done by Messrs. T. & W. Helliwell, of Brighstone, on their patent systems. The general contractors were Messrs. Lucas Bros., of Kensington, whose contract amounted to upwards of 130,000l.

The stables for the large number of horses accommodated present some noteworthy features. The whole of the fittings were supplied by the St. Pancras Ironwork Company. It was necessary to have the divisions of the stalls readily removable, in order to make room at a future time for dog shows, &c., and they were also to be changeable into loose boxes, required for shows of thoroughbred and other valuable horses. At the same time the stall divisions had necessarily to be firm and strong. These requirements have, we are informed, been satisfactorily fulfilled without the aid of bolts and nuts, which, when left for some time, are apt to set fast. All the divisions and posts were made to one set of templates, and are interchangeable, and all the moving parts are formed in brass carefully turned. Accuracy of work was essential, as a difference of thickness hardly perceptible with ordinary callipers would throw the posts out of upright to a very evident extent. About 150 stalls in addition to loose box and other fittings were modelled, made specially and fixed complete at a moderate cost in the short space of six weeks, a feat requiring much resource and energy. Some of the stalls are made small on purpose for ponies, and in addition there is a series of

permanent loose boxes, and a large harness-room fitted with strong portable standards and ornamental japanned brackets to suit the numerous saddles and driving harness.

BOYLE'S PATENT VERTICAL CURRENT EXHAUST VENTILATOR.

This ventilator, which is made by Messrs. Robert Boyle & Son, Limited, of 64, Holborn Viaduct, is a modification of the latest improved form of Boyle's patent (1882) self-acting air-pump ventilator, and is intended to utilise a descending current of the external air to create an up-draught or exhaust, the wind passing downwards over the deflecting plates, which are placed horizontally instead of vertically, as in the ordinary form of the air-pump ventilator.



This form of ventilator, an illustration of which we here give, is intended to be fixed on the roofs of buildings which are surrounded or overtopped by higher buildings, when it is not found expedient to carry up a shaft to the top of the higher building.

OBITUARY.

Mr. T. Groves.—The death is announced of Mr. T. Groves, the County Surveyor of Shropshire. He was appointed to the office in 1866. As is mentioned in another column, the appointment was once held by the distinguished engineer, Thomas Telford.

Mr. James Horsford, formerly Borough Surveyor of Bedford, died on the 24th ult., in his 81st year.

Mr. M. Davis.—Mr. Maurice Davis, a well-known builder in the West of England, carrying on business at Langport, recently died very suddenly at Ashford, in Kent, where he had retired only a fortnight previously. He had been engaged in the restoration of upwards of seventy churches in Somerset, Dorset, and Devon, work for which (according to an architect who knew him for thirty years) he was peculiarly qualified, as he possessed a good knowledge of archæology.

M. Dirks.—The Brussels correspondent of the Times announces the death of M. Dirks, principal engineer of the Waterstaat, in Holland, and formerly a member of the Dutch Chamber. He was one of the first authorities in Europe on harbour and canal construction.

"Jubilee" Projects.—It would be interesting to see a tabulated list of all the suggestions which have been made for keeping the Queen's Jubilee. What may be called the Jubilee Year is already setting in with considerable intensity, not only in large cities, but in towns and even villages, and it is curious to note the variety of proposals which have been put forward, embracing well-nigh every conceivable project, from a system of complete drainage to a people's park, and from an almshouse to a public baths and washhouses. At some enterprising towns they are not content with one or even two projects. At Bridge-water, for instance, the scheme includes a park, some public baths, a chain of office for the mayor, and a statue of Admiral Robert Blake. At Brighton, Alderman Abbey suggests a plan which will transform the Western Lawn of the Pavilion into a winter garden by roofing it in at a considerable height with glass. At another town it is positively proposed to celebrate the auspicious occasion by the exceedingly prosaic plan of laying down a wooden pavement.—*Sussex Daily News.*

\* See *Builder* for Oct. 3, 1885, and for May 29, 1886.

## A CONTRACTOR'S CLAIM.

WOOD V. THE TENDRING UNION SANITARY AUTHORITY.

On December 16th last, Mr. Justice Wills and Mr. Justice Grantham gave what may prove to be the final decision in this case. They decided that the Guardians of the Poor of the Tendring Union were wrong in law as well as in morality in endeavouring to deprive Mr. Wood, the contractor for the Clacton-on-Sea sewerage, of the money earned by him and agreed to be paid to him for the construction of the sewers.

The legal advisers of the Tendring Union at once decided to appeal against this decision, and instructed their counsel to apply to the Court to stay execution under the judgment until the appeal would be heard. This, however, the Court declined to do, pointing out that in their opinion the case was perfectly clear, and that there was no ground for appeal.

Still the defendants were not satisfied, and on the 21st ult. counsel were again instructed to make application to stay execution. Again they were unsuccessful, and Mr. Justice Wills informed them that the case was one containing nothing to move judicial sympathy in favour of the defendants. There was only 168*l.* worth of delay, and they claimed to forfeit 1,000*l.*

Mr. Justice Grantham concurred, and the application of the Authority was dismissed with costs.

Their counsel were then instructed forthwith to appeal to the Court of Appeal against their decision; but that Court, without hearing Mr. Wood's counsel, also dismissed the appeal with costs.

Mr. Finlay, Q.C., and Mr. Edwin Jones appeared for the Tendring Union (instructed by Mr. Oldman, London agent for Mr. R. J. Daniel, of Manningtree); and Mr. Phillbrick, Q.C., and Mr. J. F. Bottomley Firth for Mr. Wood (instructed by Mr. Wm. Tanner, of Chelmsford).

## LIVERPOOL CATHEDRAL COMPETITION.

Sir,—Mr. Ellis, while thinking it advisable during my absence to reply to certain remarks, which called forth a rejoinder in your journal, was evidently quite unaware of my letter to the editor of the *Builder*, quoted in last week's issue [p. 5].

The explanation is simple, and is, that the representative of another journal first called at my office, and, with my permission, made his selection of those drawings he preferred to publish, and that without my expressing any wish on the subject, or influencing him in any way whatever in his choice.

I imagine he chose what he thought best, and after his selection was made (to which I had no manner of objection, seeing that I also consider the alternative plan B my best general arrangement) the letter quoted was written to the *Builder* to ensure the illustrations appearing in the various papers agreeing with each other. You were, therefore, correct from your point of view in saying I had selected the drawings you published.

That I did not mind this alternative arrangement being published goes without saying, for it requires no vindication on my part.

By plan A, I had absolutely complied with the clause in the instructions to which reference has been made, viz., "to provide for the erection of a cathedral church on such a scale as the site will admit."

And in submitting plan B I maintain that I was warranted by the intention, as it seemed to me, of the continuation of the same clause of the instructions, which has hitherto been unmentioned publicly, viz., "having regard to convenient approaches and accesses, the proximity of St. George's Hall, and other buildings," in making a suggestion in which I endeavoured to the best of my ability to duly consider how the present approaches and accesses could be improved, to which point this clause called our special attention, and this is the reason of the introduction of the flight of steps at the west end, the principal variation in the plan.

The extra bay suggested in this plan I do not consider a necessity, and it is so stated in my report, and no other drawings show it, either in elevation or section, nor does it make any difference whatever to the general tenour of the design, as is clear from the largest perspective, which shows the plan A exactly fitting the site, and with no alteration to the approaches.\*

Mr. Christian says in his report,—“The plan B, No. 2, which I take to be legitimate

\* The print published of this large general view is copied from the only lithograph I had done, it being an expensive process, and was taken with a slip over the foreground to show the alternative arrangement of the high-level approach.

as a suggestion, shows a somewhat ambitious scheme for combining with the erection of the cathedral a much-needed municipal improvement, in the formation of a high-level road from Dale-street, past the cathedral and the important buildings to the northward of the site, and leading onwards to St. George's Hall and the London and North-Western Railway Station. In this plan the cathedral is shown as elongated by one bay of the nave, placing it that much nearer to St. George's Hall, and at the western end by projecting a large flight of steps into the old Haymarket, occupying the space, at present but little used, at the side of the main roadway of traffic. By this plan the level of William Brown-street would be lifted, and fine space given in front of the public buildings; but the descent to the main arteries of communication on the lower level would have to be diverted, as to the possibilities of which I am unable to judge." And this, with the exception of stating further on in the report, "that he is by no means certain that the steps shown in the large perspective drawing, and which, under the present circumstances of the site, could not be had, would not be better omitted," is the sole reference he makes to this alternative plan; it is, therefore, certain he did not base his report on it.

WM. EMERSON.

January 4, 1887.

## SANITARY INSTITUTE OF GREAT BRITAIN EXAMINATIONS.

Sir,—Most notable amongst existing sanitary examinations is that held by the Sanitary Institute of Great Britain for Local Surveyors and Inspectors of Nuisances, concerning which, with your permission, I wish to make a few brief remarks.

The constitution of the Examining Board in connexion with this Institute is sufficient indication of the high-class nature of the examination, and a perusal of the actual questions of past examinations will dispel any doubts as to its practical and useful nature. Whilst, therefore, fully acknowledging its value, as also the obligations which the profession, and especially the younger members thereof, owe to the Sanitary Institute, I nevertheless desire to point to an important defect, not in the nature and scope of the examination, but in the mode of rewarding successful candidates.

To all such, a certificate of "competency to perform the duties of a local (sanitary) surveyor" is awarded, the result of which is that any young man, in his teens or otherwise, who possesses, as evidenced solely by his answers to a given number of questions, a fair knowledge of municipal law and of sanitary engineering, as extracted from books, is declared by a semi-official body of great repute to be capable, in their opinion, of performing all the duties of a local surveyor, notwithstanding the absence of proof, or may be with proof to the contrary, of even a day's experience in the actual work of a surveyor's office.

Possibly though "competent" he may be unable to use a level or theodolite, make a survey or get out a drawing, may never have seen a sewer laid, nor appreciate the importance of "grip" in mortar. Concerning also the multitude of important questions daily arising in a Sanitary Surveyor's practice, which are not, nor well could be, included in the scope of an examination, but for the solution of which a Sanitary Authority looks to its chief surveyor, a certificated "local surveyor" may have no knowledge.

In view of this possible absence of necessary information under the existing arrangements, it would obviously appear, as a remedy thereto, that the awarding of certificates drawn up in such comprehensive terms, and intended to serve as an inducement to Sanitary Authorities in their choice of a surveyor, should only be consequent upon the fulfilment of certain other conditions by the candidates, viz.:—That they shall have had a certain number of years (say five) previous experience in the office of a general engineer and surveyor, or, better still, of a municipal or local surveyor, the absence of such experience, though not necessarily preventing the candidate's sitting for examination, to preclude the granting of a certificate until after the expiration of the period of probation.

The value and prestige of the examination would thus be greatly enhanced, the reputation of the Sanitary Institute as an examining body greatly increased, and the confidence of Local

Authorities in "diplomas" much strengthened, since the condition imposed would prevent young and inexperienced fledglings hawking their certificates from place to place in their efforts to obtain an appointment, the which, in the absence of practical experience, despite guaranteed "competency," a Sanitary Authority, if well advised, refuses to confer.

J. A. A.

## THE NEW AMERICAN CHURCH, PARIS.

Sir,—In your last excellent edition of the *Builder*, with its accompanying drawings, representing, amongst others, the above building, you observe that the church has been much admired; and its chaste appearance affords little room, certainly, for criticism. Architecturally, there is one feature apparently noteworthy, namely, the alternation of size in the nave columns. So far as can be discerned by the drawings, no constructional reason demands the variation to the extent shown; the small columns carry almost as much as the large ones, assuming that the weight of the roof and vaulting is equally distributed on each.

Of course, taking the small columns as representing the true requirement of the building, it is obvious that artistic reasons, *par excellence*, may have determined the size of the large ones. Artistically, is the combination a happy one? Do not the large columns give an appearance of weakness to the small ones? Some time since interest became excited regarding this building, consequent on the reported defection of several of the columns when fully weighted.

The late Mr. G. E. Street, as is known, with somewhat rare discrimination, dwelt much on the need of economic construction;—in other words, he studied *durability* as well as erection, a matter nearly ignored in many modern erections,—it is somewhat strange, therefore, to hear of weakness in his work.

Mr. A. E. Street, having placed the design under public notice, would benefit your readers generally by stating the result of his experience in this matter, especially if he gave, in general terms, the principle upon which the weight is distributed on the nave columns, and their proportionate strength; also the influences traced as causative of the defection therein. Remedial measures, in a case like this, are costly, and future mishaps may be avoided by a clear enunciation of the difficulties laboured under at the Avenue de l'Alma.—Yours truly,

DAVID WALKER.

Cowes, Isle of Wight, January 4th, 1887.

## GREAT NORTHERN HOSPITAL.

Sir,—Being one of many other architects interested in hospital buildings, and a non-competitor, I availed myself of the opportunity to examine the drawings submitted in a limited competition for this new building at the time they were open to public inspection.

In comparing the plan as published in the *Builder* of Dec. 25 with the competitive design, it appears evident that the principle of circular *versus* rectangular wards has in the modified plan been almost entirely ignored.

I was informed at the time they were on view that it was purely a question of principle which induced the governors to award to Messrs. Young & Hall the first prize. Why, therefore, the abandonment of this most important point? In the original plan three circular wards were shown, in the modified and adopted one only one circular ward is to be erected when funds are available for the purpose.

I hardly think this course of procedure is quite fair to the other competitors.

ARTH. ARDRON.

## "FRED." AND "ALF."\*

Sir,—I am much obliged for your notice of my new book, "Ornamental Interiors," but should like to correct the impression given in your review that I have treated the names of contributors somewhat flippantly.

In the few cases where such contractions as "Fred." and "Alf." occur, the names are given exactly as these gentlemen sign themselves in their business communications, and I fancy it would be discourteous to express or even to contrast their signatures. The owner of a name has often a good reason for a peculiarity of signature which is not apparent to one outside his family circle.

I have found by experience that it is hazardous to attempt to expand contracted names. "Fred." may refer to "Alfred" and not to "Frederick";

\* Vide "Books" review in last issue.

"Alf." may be "Alfric" and not "Alfred." Once I described a correspondent who signed "Hy," as "Henry"; he wrote to implore me to print a correction, as he was christened "Harry," and would not be recognised under the name I had given him.  
J. MOYR SMITH.

**DANGEROUS PLASTER CEILINGS.**

SIR,—My evidence in the case reported in the *Builder* of the 1st inst. [p. 63] appears to have been misunderstood in one particular. I stated that the specimen which I exhibited weighed 9½ oz.; not that this was the weight per superficial foot. I calculated that a foot of such plaster would weigh 7 lb. at least, and that a piece measuring a superficial yard (which was less than was stated in evidence to have fallen) would weigh upwards of half a hundredweight.

THOS. BLASHILL,

District Surveyor of West Hampstead,  
3, Blackburn road, West Hampstead,  
January 5th, 1887.

**Books.**

*Specifications for a Frame or Brick Building, costing from \$1,000 to \$10,000.* Copyright, New York: Palliser, Palliser, & Co. London: Trübner & Co. 1886.

THE law-stationers' shop-windows have familiarised us with a certain class of eviscerated legal instruments,—wills of anonymous testators who demise unspecified properties to unnamed recipients; forms in which the only really interesting matter is, like *Viola's history*, "a blank." American enterprise has adopted the hint and applied it to architecture instead of,—or rather perhaps as well as,—to law. A sample "Specifications for a — to be erected for — at —, — architect" (published by Palliser, Palliser, & Co., New York), is before us, and is a somewhat curious document. It will be observed that the nature of the building even is not disclosed,—whether a town house, a country house, or indeed whether it is a dwelling-house of any kind. It is simply a "Frame or Brick Building." The desire to be comprehensive enough to suit many customers has naturally resulted in vagueness, and the document in question fails in the first requisite of a specification, inasmuch as it is not specific. Under some headings, indeed, the work is described in considerable detail; but under such as "iron work," "cut stone work," and a multitude of others not a word is said. It is too full for the purpose of a mere *aide-memoire* for the professional architect, and too fragmentary and incomplete to serve as a guide to the amateur.

The order of the trades is not our order,—the slater, for instance, coming after the painter, a sequence which it is difficult to harmonise with any rational system of building. General conditions precede each trade, and would appear to point to the Scottish plan of letting each trade separately. There are, as may be supposed, many novel phrases, all terse and expressive, although not many novel processes, and some variations on the traditional nomenclature; a gas-fitter, for instance, appearing as a gas-piper, and bringing a spiece of bumour into a literature which seldom errs in that direction.

On the whole, we should be inclined to think that this document has not been framed by a professional architect,—who would surely have had something to say under the forty-four (or more) headings which are followed by blanks,—but by a "literary ignoramus" who has had access to a collection of chancery materials the supply of which, for some trades, has run short.

The whole is neatly bound in grey covers, which are used as the medium of advertisements for building materials and appliances; and although this specification will not supersede the necessity for the services of an architect, any more than similar legal forms have effected the lawyers' employment, it may prove useful to builders in outlying districts where architects are not at hand.

*Hints on Woodcarving, for Beginners.* By ELEANOR ROWE; with a Preface by T. H. POLLEN.

THIS little book, by the Manager of the School of Art Wood Carving at the City and Guilds Institute, and apparently issued by the said school, is a short and very practical treatise, commencing with information as to the tools used in woodcarving and the methods of using them, with a passing sarcasm

on "glass paper and files," and a recommendation (in which we entirely concur) to aim at a sharp and steady cut from the first. Six lessons are given for the amateur to start with, illustrated by large cuts, with descriptions of the method of going to work to produce the various modellings. The designs given serve the practical purpose. They might, however, have been a little more artistic, and not quite so commonplace.

*Sculpture: Renaissance and Modern.* By LEADER SCOTT. London: Sampson Low & Co. 1886.

THIS is one of the series of "Illustrated Handbooks of Art History" of which we have noticed some previous issues on other branches of art. It gives a concise sketch of sculpture from the thirteenth century to the present day; a good deal of attention being bestowed on the early Florentine sculptors, in treating of whom the author recognises fully the eminently sculptural genius of Donatello, as opposed to the pictorial treatment of the art by Ghiberti. In the illustrations of the subject of the Sacrifice of Isaac, as treated by Brunellesco and Ghiberti, we observe the titles have been transposed, and the design of Ghiberti is assigned to Brunellesco, and vice versa. The book may be recommended as a useful compendium of its subject, marked by good critical taste, though somewhat dry in style. It is, however, a very good shilling's-worth of information and illustration.

*The Industrial Self-Instructor and Technical Journal: containing Instruction in the Leading Branches of Technical Science and Industrial Arts and Processes.* Vol. II. London and New York: Ward, Lock, & Co.

THIS is one of those omnium gatherum books which are supposed to be "useful presents for boys," and which contain a little information about an immense number of heterogeneous subjects. We can hardly see that much good is done by this type of publication, except so far as that a young reader's interest in some subject may be so far stimulated that he may wish for more and fuller information. The practical portions of the book seem to be the best; the artistic suggestions and examples are very bad.

**RECENT PATENTS.**

**ABSTRACTS OF SPECIFICATIONS.**

1,243, Bricks, Tiles, and Furnace Linings. A. Fould and P. Geneau.

This invention consists in using two substances chemically antagonistic to each other, but fused by means of a third substance introduced. These materials are dried and baked as in ordinary brick-making. The chief claim is the use of special "agglomerants" whereby refractory substances are brought into a plastic condition and moulded. The said substances will afterwards resist great heat.

1,282, Securing Door Knobs, &c. J. B. O'Callaghan.

According to this invention a small nut turns on the spindle being moved thence by working a bradawl or similar tool in a hole made to receive it. This nut draws up the knob to its proper position on the spindle.

1,349, Gas-fittings. H. Harper.

This invention consists of a sliding lever so arranged that when lifted it releases the globe, and when pulled downwards in a perpendicular direction the globe is held fast.

1,372, Domestic Stoves. J. S. Watson and H. S. Morwood.

This invention relates more particularly to grates and fireplaces of a portable character, and consists in the construction of a canopied dog-grate and hot-air stove combined of a portable or semi-portable character, which may be used as a domestic fire-place for heating and ventilating.

1,711, Economy of Fuel, &c. R. W. Hewett. By this invention a bellows or fan exhauster is so fixed that when worked a vacuum is created, and hot air or gases caused to pass through the fuel.

15,830, Apparatus for Teaching Drawing. J. H. Russell.

This invention consists essentially in the combination, by means of suitable ties and connexions in metal, of diagrams in metal or rigid material, representing plans, elevations, and sections of a similarly-made model in outline of the solid object from which the said plans, elevations, and sections are taken. Wires are sometimes used, or different lines of colour to denote the different parts as combined one with another.

1,803, Lining, &c., in Painting. T. Heighway and J. Smithies.

This invention consists in arranging movable templates, not unlike parallel rulers, which thus allow of any thickness of line, which is generally stencilled in the ordinary way. The framework can be utilised for holding ordinary work in lieu of pins.

10,829, Scoria Paving Blocks. C. J. Dobbs.

To prevent the slipperiness usually experienced with blocks made of furnace-slag, they are cast in larger moulds and broken to pieces by a blow, when the fractured surface is used as the wearing part and the slippery skin which forms on the mould is turned inwards.

**NEW APPLICATIONS FOR PATENTS.**

Dec. 24.—16,896, J. Fagan, Cisterns for Water-closets.—16,911, J. Hunter, Sign-boards.—16,920, H. Bright, Water-meters.—16,922, E. Clarke, Brick-ettes.—16,926, E. Bronson, Compounds for Coating and Finishing Walls.

Dec. 25.—16,945, C. Swindell, Stove Grates, and Fireplaces.—16,959, W. Stevens, Ventilating and Flushing Water-closets.—16,997, A. Deslandes, Automatic Door Curtain-raiser and Draught-preventer.—17,013, J. Alston, Flushing Cisterns for Water-closets, &c.—17,016, O. Flagstad, Window Construction.

Dec. 29.—17,019, G. Henley, Building Hollow Walls.—17,065, J. Tall, Facing for Concrete Structures, &c.

Dec. 30.—17,098, W. Sonnett, Manufacture of Portland Cement.

**PROVISIONAL SPECIFICATIONS ACCEPTED.**

10,055, A. Andrews, Window and Door Fasteners.—11,453, W. Fox, Joiners' Braces.—14,448, H. Johnson, Lock-bolt for Doors and Windows.—14,602, E. Hedgman and F. Villiers-Stead, Automatic Self-replacing Indicators for Electric Bells.—14,872, T. Fawcett, Machinery for Pressing Bricks, Tiles, &c.—15,170, M. Crofton, Ventilator and Man-hole for Buildings.—15,184, G. Stierlin, Fanlights, Windows, Ventilators, &c.—15,962, S. and S. R. Chatwood, Locks.—16,171, S. Hazeland, Machinery for Planing Wood.—16,312, W. Illingworth, Joiner's Adjustable Bench Stop.

**COMPLETE SPECIFICATIONS ACCEPTED.**

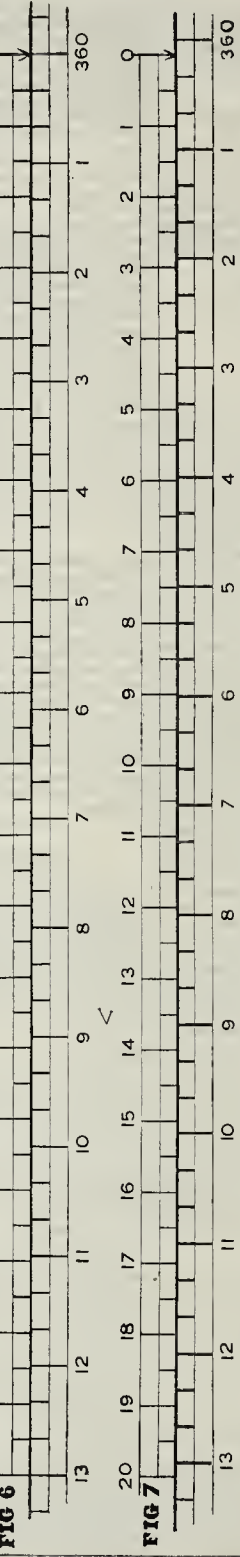
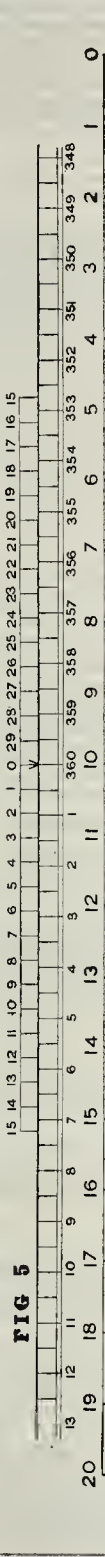
*Open to Opposition for Two Months.*

1,126, C. Alison, Cements or Plasters.—2,419, J. Hicken, Fixing Door-handles, &c., to Spindles.—3,195, F. Harrison, Barrel Bolts for Doors, &c.—3,988, H. Dempewolf, Smoke-consuming Fireplaces.—4,103, R. Elliott, Apparatus for Setting the Teeth of Saws.—4,288, J. Walker and H. Worsley, Sash, Casement, and Door Fasteners.—12,109, R. Price, Electrical Drop Indicator.

**Society of Arts.**—The following are included in the arrangements made for the meetings of this Society for the present session. *Ordinary Meetings* (Wednesday evenings, at eight o'clock):—January 19, "Cameo Cutting as an Occupation," by J. B. Marsh; February 2, "Electric Locomotion," by A. Reckenzann; February 16, "Handicraft Training," by Henry H. Cunynghame. Amongst the papers for which dates will be hereafter announced are:—"Miners' Safety Lamps," by Edward H. Living; "Machinery and Appliances used on the Stage," by Percy Fitzgerald; "Irish Industries," by the Rev. Canon Bagot; "Progress in Telegraphy," by William Henry Prece, F.R.S.; "Railway Brakes," by William P. Marshall; "The Living Organisms of the Air: the effect of Place and Climate on their Prevalence," by Dr. Percy Frankland. *Indian Section* (Friday evenings, at eight o'clock):—February 11, "The Economical Condition of India," by Dr. Watt, C.I.E.; March 4, "Our Trade Routes to the East," by Major-General Sir F. J. Goldsmid, K.C.S.I., C.B.; April 29, "Village Communities in India," by J. F. Hewitt. *Applied Art Section* (Tuesday evenings, at eight o'clock):—Feb. 1, opening address on "The Present Condition of Applied Art in England, and the Education of the Art Workman," by T. Armstrong, Director of the Art Division, Science and Art Department; February 22, "Wrought Ironwork," by J. Starkie Gardner, F.G.S.; March 15, "The Application of Oems to the Art of the Goldsmith," by Alfred Phillips; April 26, "Ornamental Glass," by J. Hungerford Pollen; May 24, "The Importance of the Applied Arts and their Relation to Common Life," by Walter Crane.

**Professional Partnership.**—Mr. T. Thornton Oreen, surveyor, Poultry, announces that he has taken into partnership Mr. P. Pieteresen, who has for some years past been associated with him as principal assistant. The style of the firm will be "T. Thornton Green & Pieteresen."

—THE VERNIER—





The Student's Column.

FIELD WORK AND INSTRUMENTS.—II.

Surveying Instruments.

II.—THE VERNIER.

**B**EFORE proceeding to describe instruments which measure fractional proportions of given lengths, it is necessary clearly to understand the principal of a vernier.

The vernier scale is made to slide evenly along the graduated limb of an instrument, and is constructed of a total length consisting of a number of divisions of the primary scale, less by one than the number of smaller divisions into which those primary divisions are to be subdivided. By its use, distances or amounts of deviation, can be minutely measured with a degree of accuracy unattainable with the application of a single scale closely subdivided, as in the latter case the strokes indicating the divisions would come so near together that it would be difficult to distinguish one from the other, even when read through a powerful lens. The principle may be thus stated: If a line be divided into  $m$  number of equal parts on one side, and into  $(m + 1)$  number of equal parts on the other side, the length occupied by the difference between each of these divisions will be equal to the length of the line divided by the product of the number of parts taken on each side, or mathematically expressed by the fraction

$\frac{1}{m(m+1)}$ ; thus in figure 1, the line AB being divided into three and four equal parts, the difference between these parts equals  $\frac{1}{3 \times 4}$  or one-twelfth ( $m=3, m+1=4$  and  $\frac{1}{m(m+1)} = \frac{1}{12}$ ).

This will be evident upon reference to the foot-scale shown under the line AB. If the line AB be supposed to be 12 in. long, the difference between one-third and one-fourth is one-twelfth, or 1 in., the difference between two-thirds and two-fourths is two-twelfths, or 2 in.; and the difference between three-fourths and three-fourths is one-fourth, or 3 in. Applying this principle to fig. 2, we obtain by dividing the line CD into nine and ten equal parts respectively, a length between these divisions equal to  $\frac{1}{90}$  of the whole line.

Now if the upper line of divisions be supposed to represent the vernier, and the zero point indicated by the arrow in fig. 3 be moved forward so that the line at 5 upon the upper scale coincides with a line or stroke upon the lower scale, then the arrow will have travelled  $\frac{5}{90}$  of the whole length of CD along its edge from the zero upon the lower scale of divisions, or half way from the zero towards the next division upon the primary scale.

The limbs so graduated may be either straight or circular. In circular instruments which record angles, the primary scale is graduated into degrees, each degree of the circle being sub-divided into two or three equal parts, denoting 30 or 20 minutes respectively, while the introduction of a vernier will enable this scale or division to be read to minutes or such parts of minutes as may be required. For instance, let us suppose, as shown in fig. 4, that we have to deal with an instrument in which the primary scale is divided into degrees, and half-degrees, and that we desire to construct a vernier which shall enable us to read to minutes. One minute being a thirtieth part of each sub-division of the primary scale, we must take 29 divisions on this scale, and divide it into 30 equal parts upon the vernier. Thus, if  $m+1=30, m=29$ , and the product  $\frac{1}{m(m+1)} = \frac{1}{29 \times 30} = \frac{1}{870}$  of the whole length of 29 divisions so taken; but as each of these divisions is equal to half a degree, we have  $\frac{1}{870} \times \frac{29}{2} = \frac{1}{60}$  of a degree as the result of the division obtained by the vernier: hence the vernier will read to minutes. It will be observed, in figs. 4 to 8, that the numbering upon both the primary and the vernier scales reads from right to left. This is because the two scales in circular instruments are placed upon a circle situated at or near the outer edge, and the instrument is worked round

with the sun from the centre of that circle. Circular protractors and theodolites are thus constructed, but in the box sextant, as will be seen by our next article, the numbering reads from left to right.

Fig. 5 shows the same vernier as fig. 4, but with the zero point in the centre. This arrangement is adopted by some makers in the manufacture of their circular protractors, which we shall hereafter describe. The divisions are the same as in fig. 4, but the right-hand half of the vernier, numbered 15 to 0, is placed upon the left-hand side of the half numbered 30 to 15. To understand this better, we may compare it to a foot rule or split-divided scale, in which the inches are marked 6 to 12, and then 1 to 6, instead of 1 to 12, as is usually done. In Figure 6 the primary scale consists of degrees and thirds of a degree, and a vernier is constructed reading to 30 seconds: thus a length of 39 divisions on the primary scale is divided into 40 equal parts upon the vernier: 30 seconds being one-fortieth part of a sub-division on the primary scale, each of which sub-divisions equals 20 minutes. Hence  $m+1=40,$

$m=39$ , and  $\frac{1}{m(m+1)} = \frac{1}{39 \times 40} = \frac{1}{1560}$  of the whole length of 39 divisions, equal to 13 degrees, or  $780$  minutes, hence  $(\frac{1}{39} - \frac{1}{40}) = \frac{1}{1560} \times \frac{1}{1} = \frac{1}{1560}$  minute.

In order to read the minutes correctly upon the vernier, every alternate division only is numbered, the intermediate divisions, which are made shorter, for sake of clearness, indicating half-minutes. In our diagram the curved graduated limbs are shown developed into horizontal or straight members. This curved lines, however, in practice, are omitted by the best makers, and the strokes indicating the divisions are carefully cut and numbered upon the circular plates at the works by a machine, so fixed as to reduce them from a large pattern, upon which the figures and lines have been accurately set out.

Fig. 7 indicates the same primary scale of divisions and the same vernier as in fig. 6; but in fig. 7 the arrow at the zero point has travelled forward a certain proportion of the full sub-division of one-third of a degree on the primary scale. Now, the vernier enables us to see that this amount equals 8 minutes, according to the principle illustrated in fig. 3. In reading off the graduated limb of the instrument, we must first look to the arrow at zero on the vernier, and having read the number on the primary graduated scale of divisions next this arrow, which appears upon the zero side of the primary scale, we next look along the movable vernier, and add the number of divisions indicated by the stroke which most nearly coincides with a division on the primary graduated limb. We are not concerned as to what division upon the graduated limb is so cut, our object being only to arrive at the fractional proportion of the division upon the graduated limb [at which the arrow on the vernier stands, this fractional amount being indicated by the number on the vernier which coincides with a stroke on the primary scale. When a coincidence is observed, as in fig. 6, simultaneously at the zero and the last stroke on the vernier, it indicates zero to be added, and the division on the graduated limb which coincides with the arrow marked at zero upon the vernier indicates exactly the amount. Fig. 8 illustrates a vernier reading to 20 seconds, 59 divisions on the primary scale are divided into 60 divisions upon the vernier, and the result gives  $(\frac{1}{59} - \frac{1}{60}) = \frac{1}{3540}$  of a length of  $19\frac{2}{3}$  degrees, or  $\frac{1}{3540} \times \frac{59}{3} = \frac{1}{60}$  of each sub-division or 20 seconds. Hence upon the vernier scale, for sake of clearness in reading, every third stroke only is marked. Other verniers can be similarly constructed, but figs. 4 to 8 illustrate those most generally adopted.

**Flour Mill, Silloth.**—In the paragraph which appeared in our last (pp. 63-64) relating to this building, mention was made of the adjoining North British Railway Co.'s warehouse (or granary). We are asked to state that the whole of the constructional ironwork for the granary was supplied and erected by Messrs. Gardner, Anderson, & Clarke, with the exception of the concrete floors and window sashes.

MEETINGS.

MONDAY, JANUARY 10.

Royal Academy.—Mr. J. E. Hodgson, R.A., on "Art a Universal Language." III. 8 p.m.  
The Surveyors' Institution.—Continued discussion on "The True Question." 8 p.m.  
Inventors' Institute.—Mr. S. J. Mackie, C.E., on "The Origin and Objects of the Inventors' Institute." 8 p.m.  
Liverpool Architectural Society.—Mr. F. M. Evanson on "Public Hydraulic Power for Lifts and Warehouse Machinery." 7 p.m.  
Leeds and Yorkshire Architectural Society.—Major J. Whitacre-Allen on "Drawing: its Importance in Education." 8 p.m.  
Society of Antiquaries of Scotland (Edinburgh).—3 p.m.

TUESDAY, JANUARY 11.

Institution of Civil Engineers.—Further discussion on Professor Kennedy's paper on "The Use and Equipment of Engineering Laboratories." 8 p.m.  
Society of Biblical Archaeology.—The Rev. C. J. Ball on "The Inscribed Stones from Hamath." 8 p.m.  
Manchester Architectural Association.—Mr. W. H. Littlewood, A.R.I.B.A., on "Recollections of an Italian Tour." 7.30 p.m.

WEDNESDAY, JANUARY 12.

York Architectural Association.—The Rev. E. M. Cole, M.A., on "The Stratigraphical Geology of Yorkshire, with reference to Building Materials." 7.45 p.m.

THURSDAY, JANUARY 13.

Royal Academy.—Mr. J. E. Hodgson, R.A., on "Art a Universal Language." IV. 8 p.m.  
Society of Telegraph-Engineers and Electricians.—8 p.m.

Miscellaneous.

**The Engineering Trades.**—Messrs. Matheson & Grant's "Engineering Trades' Report" for the half-year ending Dec. 31st, says that the year just closed has been one of the worst ever experienced in the engineering trades, but in several branches a slight improvement has set in which bids fair to continue, and the prospects for the coming spring are brighter than they have been for the last two years. The revival of railway enterprise in the United States has given great impetus to the iron and steel trades of that country, and though free exchange with Great Britain is restricted by their fiscal system, the intimate connexion between the two countries has always led to a corresponding improvement here. Coal has been cheaper than ever during the last year. The continued fall in the prices of pig-iron during the first half of 1886 was arrested by the natural remedy of a reduction in the output, and prices advanced in consequence. The prices of rolled iron have fluctuated during the last six months, and are now slightly higher than in the summer. They would be still higher but for the competition of steel, not only in shipbuilding, but in boilers, bridges, and other structures. At many of the leading rolling-mills Siemens and other steel-making plant has been established to meet the altered demand, and at some of the works favourably situated for suitable ore and fuel the puddling furnaces and other appliances for making wrought iron are likely to be abandoned altogether. Steel, which in the spring and summer of 1886 fell even more rapidly than iron, has during the last few months recovered from 5s. to 10s. per ton. Owing to the collapse of the English and Continental rail-makers' combination, prices of heavy steel rails fell as low as 3l. 12s. fid. per ton, but the price now is from 4l. to 4l. 5s. Although this recovery is assisted by the considerable manufacture of ship and bridge steel, the immediate cause has been the revival of the American demand. In regard to iron and steel structures, a very large tonnage of bridge work has been made during the past year, most of it for export. International competition depends more than ever on cheap transport. A revision of railway rates to the ports, a simplifying of dock dues, and the utilisation of canals, are immediate remedies which would help British trades, while ocean freights as low as those from Antwerp and Germany, which at present favour Continental manufacturers, are necessary if the export of engineering material is to be maintained and extended.

**Discovery of an Old Viking Ship in Norway.**—The remains of an old Norse Viking ship were discovered in Norway last autumn. The ship was found in an old tumulus on the farm Gjunarstorp, in Southern Norway. Its length is 26 ft., but the vessel, though of oak, is not in a very good state of preservation. Wool has been used for caulking. In the tumulus were also found eighteen semi-globular pieces of amber, apparently used for playing with, and seventeen conical stones. It is believed that the vessel dates from the tenth century. There are several other tumuli in this part of Norway.

**The Wood Market.**—Messrs. James Smith & Co.'s (Liverpool) Wood Circular and Prices Current for the 3rd inst. says:—"The wood market shows more than the usual falling off in the consumption at this season of the year. This has been caused by the stormy weather and hard frost (suspending building operations), the hardening of the Money Market, complication on the Continent, and the unsettled state of our Government at home. This state of things has tended to deter buyers from increasing their stocks until the year is fairly advanced, when business may be more settled. Another stoppage in our trade this week has not tended to strengthen confidence, and goes to show the weakness of our trade, caused by the last few years' unsatisfactory business. On the other hand, the stocks are light, and sellers show more firmness, but, our markets being so sensitive, it is doubtful if this can be maintained should the supplies be at an excessive. Railway traffic returns continue to show an increase, which is a favourable feature."—Messrs. Foy, Morgan, & Co.'s "Annual Wood Report, 1886," says:—"The year just elapsed has been another in the cycle of bad years, from which the wood trade, in common with so many other interests, has suffered severely. Profits have been all round on the usual vanishing scale, and competition has been as keen as ever. Importers have, as a rule, done little more than get their money back, and market buyers have secured but a meagre return for their labours. The cause of this dulness is undoubtedly to be found in the general commercial depression which has enveloped all European countries, and almost every interest. The building trade has been in a deplorable state, as evidenced by the unremunerative prices at which contracts are eagerly taken, and in the depressed value of building land. Although all the principal wood-producing districts have diminished their supply to this country, and notwithstanding the fact that the dock stock is moderate, there seems no immediate prospect of any revival in business, and the deliveries from the docks, smaller by 20 per cent. than the average of the last four years, betoken that the supply is fully equal to any demand that can reasonably be anticipated. Auctions have not been so heavy as in the preceding years, the market having been obviously too weak to bear the pressure of large forced sale."

**The Roman Baths at Bath.**—At a meeting of the Bath Town Council on Tuesday last, one of the items on the agenda had reference to some communications received by the Mayor from the Society of Antiquaries and Mr. C. Roach Smith on the subject of the Roman Baths. Alderman Wilkinson moved that the consideration of this matter be postponed till their next meeting. His reason for making the request was that the Baths Committee considered it very desirable that an unbiased opinion should be obtained after a thorough inspection by an independent architect as to the construction and stability of the work now being carried out in York-street and Stall-street, and also as to the best arrangement of the basement with regard to the Roman remains on the site of the two houses lately removed. They therefore requested the Town Clerk to write to Sir James McGarel Hogge, Chairman of the Metropolitan Board of Works, to ask him to name an architect to undertake this duty. Sir James recommended Mr. Waterhouse. Negotiations were entered into with him, and he arranged to be here on the 3rd. In accordance with that arrangement he commenced his inspection on Monday, and his report would be presented in due course. Under those circumstances, the Committee asked that the report of Mr. Waterhouse should be considered in conjunction with the others. He therefore moved that the matter be postponed.—This was agreed to.

**The "Black and White" Buildings of Cheshire.**—At the last meeting of the Chester Archaeological and Historic Society, Mr. Alfred Rimmer read an interesting paper on "The Black and White Half-Timber Architecture of England, with Special Reference to Chester and its Neighbourhood." In his concluding remarks he recommended, for the purposes of timbering, the black walnut of America, a wood which, he said, deserved to be better known in this country. "By getting it ready cut and mortised from the United States they would be able to erect timbered houses very cheaply, and perhaps see a revival of this beautiful, irregular, and picturesque style in England."

**New Public Washhouses in St. Marylebone.** in connexion with the St. Marylebone Baths, in the Marylebone-road, were opened on the 25th ult. There have been washhouses there for many years, but they were in many respects inconvenient, and the Commissioners lately resolved to pull them down and erect new ones, fitted with every modern convenience. The work was entrusted to Mr. J. Waldram, C.E., of Craven-street, Charing-cross, who has designed the new buildings and superintended their construction. In the basement is a new main room, where the various mains, also new, are painted of different colours, according to their uses, the manipulation of them being thus rendered more easy and certain. Also in the basement are four boilers, for supplying water and steam; a new engine of six horse-power nominal, for driving the machinery, and furnaces to heat the drying closets. Over the basement is a fireproof roof, on which rests the floor of the laundry, which is paved with slates, and adequately supplied with drainage, so that it cannot be sloppy. The laundry is of the same size as before, but the roof, now of iron and glass, has been carried to a height of 30 ft. Here are the washing boxes, sixty in number, each box having one division to serve the purpose of a copper for boiling the clothes, and another for washing them, with taps for hot and cold water and steam. Formerly the wringing machines were worked by hand, but now there are three steam wringers, working at a speed of a thousand revolutions a minute. The drying closets are twice as numerous as before. There is also an ironing stove. For the use of all these appliances,—for everything, in short, except soap and soda,—the washers pay three-halfpence an hour, and a fortnight's wash of a working man's household is commonly done in two hours.

**Explosions of Kitchen Boilers.**—An inquest was held on Tuesday by Dr. Diplock, at Acton, touching the death of Fanny Prichard, housekeeper at No. 1, Oakfield House, Avenue-gardens, Mill Hill Park, who was killed instantaneously on Sunday afternoon by the explosion of the kitchen boiler. Harriet Prichard, sister of the deceased, and engaged as cook in the same house, stated that previous to lighting the fire on Sunday at twelve o'clock, they had no fire on that day. James Hedges, builder, who was called to the house shortly after the explosion, gave it as his opinion that there had been no fire on for some time. The water in the supply-pipes was frozen, and a fire being lit in the kitchen for a few hours on Sunday would cause the water in the boiler to boil away. The supply pipes being frozen would leave the boiler dry, and after a time the boiler would get red hot, and the heat from it would be conducted up the pipes until it reached the ice, which would melt and run suddenly into the boiler. The boiler being, as it were, sealed, with no escape for the steam, an explosion would result. A jurymen (Mr. Halls, a builder) stated that there was a valve sold for placing on kitchen boilers which prevented explosions, and should be used in every case. The jury returned a verdict of "Death from the accidental exploding of a kitchen boiler," the Coroner remarking that during his nineteen years' experience as a coroner he had had before no similar case. That day he had two; the other case was that of a boy at Shepherd's Bush, who had been killed by the explosion of a kitchen boiler.—*Times*.

**Birmingham Architectural Association.** The fourth ordinary meeting of the current session was held at Queen's College on Tuesday evening, January 4th; the Vice-President (Mr. John Cotton) was in the chair. Messrs. W. H. Bidlake, M.A. (Cantab.) and E. J. Hickin were elected members of the Association. A paper was read by Mr. T. Camm on "Art in Glass in Relation to Architecture." The lecture was illustrated with some very fine drawings and examples of various periods of glass. A vote of thanks, proposed by Mr. W. Henman and supported by Mr. Victor Scruton (hon. secretary) and the Chairman, was unanimously accorded to the author for his interesting paper. After a response from Mr. Camm the meeting terminated.

**Reddish.**—A two-light window in the chancel of St. Mary's Church, Reddish, near Stockport, has lately been filled, to the memory of members of the present rector's family. The subject is the Resurrection, and the artists entrusted with the work were Messrs. Mayer & Co.

**New Buildings in Eastcheap.**—Amongst the several new buildings which have just been erected in Eastcheap, consequent upon the widening of that thoroughfare in connexion with the Inner Circle Completion Railway, is a large and prominent structure, not far from the junction with Gracechurch-street, and which is now ready for occupation. The building has been erected with a view to its utilisation for the tea and foreign fruit trades, two mercantile industries which have their centres in this part of the City. The building has a frontage of 100 ft. in length, and is 85 ft. high, containing six stories, and occupying a ground area of 10,000 ft. The ground floor portion of the frontage is relieved with polished red Aberdeen granite pilasters and columns, surmounted by capitals containing carving in stone emblematic of the fruits produced by various countries. The elevation of the upper floors is in six bays, divided by fluted pilasters, and again sub-divided by moulded and fluted multifoil windows. Above the ground-floor a deep carved frieze runs across the frontage, enriched by a profusion of carving. The interior of the building has been elaborately fitted and decorated. A large corridor 10 ft. in width, on the ground-floor, connects Eastcheap on the north with George-lane on the south, whilst on the floors above the east and west sides are also connected by corridors. In addition to the staircases access to the upper floors is also obtained by two hydraulic lifts running from the basement to the top of the building. They are worked from the mains of the Hydraulic Power Company, and fitted with Messrs. Waygood's patent safety check. A large amount of ironwork has been used in the construction of the building, some of the stanchions and girders weighing forty tons each. Mr. Delissa Joseph is the architect, and the general contractors Messrs. Perry & Co., of the Treadgar Works, Bow; Mr. Richardson being clerk of the works. The mosaic flooring has been supplied by Messrs. Diaspek & Co. The stoves and mantels are by Messrs. Chambers, Monery, & Co., and the carving by Mr. Gilbert Seale.

**Monument to the Emperor William.** In view of the nineteenth anniversary of the birth of the Emperor William of Germany, which will take place on the 22nd of March next, the Berliners are already making preparations for celebrating this event, but how the design is to be carried out is not yet settled. One committee has been organised which proposes to erect a huge obelisk at one of the most prominent points in the city in honour of the monogenarian Emperor. It was at first suggested that the structure should be an imitation of one of the ancient Egyptian obelisks of which we still possess several samples, and should even be ornamented with hieroglyphics, but it was subsequently decided that if this project is carried out the obelisk shall be of an entirely new design. A majority of the population of the German capital, however, appears to be opposed to this scheme. It is contended that Berlin is not by any means rich in monuments, and that the idea of an obelisk is quite unsuitable. Why not, it is asked, erect a pyramid or even a Greek temple? What may be the ultimate form of the monument will, however, have to be decided upon very soon, as the date for laying the foundation-stone will be the Emperor's birthday.

**Churches Burned Down.**—On Sunday morning last, the Church of St. John the Evangelist, at Hammoor, which is a suburb of Sheffield, was destroyed by fire. The church was opened nine years ago to meet the needs of the increasing population at the west end of Sheffield.—The Roman Catholic Church of St. Thomas of Canterbury at St. Leonard's was completely destroyed by fire on Tuesday morning.

**Results of Auction Sales in 1886.**—From official particulars contained in the *East Exchange Registers*, we learn that the total amount of the sales at the Auction Mart for the year ending 25th of December last was 4,120,044. The totals for the three previous years were as follow:—1883, 5,147,655; 1884, 5,976,931; 1885, 4,453,878.

**The Last of the Colonial and Indian Exhibition.**—It will be seen by an advertisement in this week's *Builder* that Messrs. Horns, Son, & Eversfield will, on Wednesday, January 19, and following days, hold an important sale of materials at South Kensington "Old London" and the Indian Palace will soon be things of the past.

**The Plumbers' Company.**—At the Quarterly Court held on the 29th ult., beyond the formal business, special Christmas gratuities were made to each of the pensioners on the company's pension list, and in addition the Master of the Company (Alderman Stuart Knill) presented the widow of each freeman with an annual grant of ten shillings payable to poor widows out of the City cash and in his gift as Alderman. A valuable piece of plate was presented to the late Master of the Company (Mr. George Shaw, C.C.) upon his retirement from three successive years' Mastership, in recognition by the Company of his able and zealous services in promoting the better education and registration of plumbers. It was reported that upwards of 250 plumbers (masters and journeymen) had been passed during the quarter by the Registration Committee (of which Mr. Shaw is chairman) as having qualified themselves for enrolment upon the company's register by giving satisfactory evidence of experience, or passing a practical examination.

**The Jubilee and Sanitary Improvement.** Mr. Mark H. Judge, as a member of the Paddington Victoria Jubilee Committee, has given notice that he will propose the following resolution:—"That in the opinion of this Committee the dust-collecting and other trades which are carried on in connexion with the canal basin, between Warwick-crescent and Praeger-street, besides being a continual menace to the health of the parish, are, during the summer months, a serious danger to the inmates of St. Mary's Hospital, and a source of annoyance to the Great Western Railway Terminus, which is often visited by Her Majesty the Queen and the Ministers of the Crown; that the Committee therefore considers that no better memorial of the Victorian Jubilee could be devised in Paddington than for the Vestry to purchase the canal basin and adjacent property, in order that this long-standing nuisance may be abolished and the site profitably utilised for residential and other purposes."

**Innholders' Hall.**—The new hall of the Innholders' Company, which has been erected upon the site of the old one in Little College-street (formerly Elbow-lane), was opened last month. The old hall is believed to have been the joint work of Wren and Mr. Jarman, the then City Architect, and was erected soon after the Great Fire in 1666. In some way not made quite clear in the account published in the Citizen, the building was allowed to get into a very dilapidated and even dangerous condition, and in November, 1882, the architect of the new hall, Mr. J. Douglass Mathews, was requested to make a survey of the old buildings, and some temporary repairs were made, but in December, 1884, other defects occurred that made it necessary for something of an extensive nature to be done, especially to the roofs and walls. The Court being extremely reluctant to destroy the traditions and old associations by entirely removing the buildings, considered the best means to be adopted to repair it; but this being found in a great measure impracticable, adopted the recommendation of the architect to preserve the old Court-room and the Livery Hall, as being the special portion of interest, and take down and rebuild the remainder of the premises. The works were commenced in the Autumn of last year. They comprise the re-building of the front portion and re-roofing the Livery Hall. The old doorway has been carefully reproduced in moulded brick, and the old door and frame, with canopy and arms, fixed. The entrance-hall, which is panellied in oak, has an angle fire-place, and an ornamental oak screen to the staircase. On the right is the old Court-room, which is unaltered, except that in re-building an extra width has been obtained. The paint from the wainscoting has been removed, and the oak is again visible, whilst the ceiling has been repaired where defective, and effectively decorated. A new panolled ceiling has been placed in the Livery Hall, which is entered from the entrance-hall by a new doorway, and has been re-roofed. The works have been carried out by Messrs. Brass & Son, builders, of Old-street; the cooking apparatus by Messrs. Waller & Son, of Fish-street-hill; the gas-fittings by Messrs. Strode, of St. Paul's-church-yard; and the stained-glass by Messrs. James & Co., of Kentish Town. The whole has been executed from the designs and under the immediate superintendence of the architect, Mr. J. Douglass Mathews, of Dowgate-hill.

**The Late Mr. Colin Minton Campbell.**—On Saturday afternoon the Duchess of Sutherland unveiled a bronze statue of the late Mr. Colin Minton Campbell, head of the firm of Mintons, and late M.P. for North Staffordshire, at Stoke-upon-Trent. The Marquis of Lorne said the Duchess wished him to express the very great pleasure she had had in being present on the occasion, and being able to greet that most admirable, most excellent likeness of the late Mr. Minton Campbell. He was glad to see that statue as a memorial of the great success which English manufacture had always achieved in the ceramic art, a success which each exhibition in every succeeding decade had emphasised more and more. In whatever branches foreign nations had been able to get the better of us, certainly in the ceramic art they had never got the better of Stoke-upon-Trent. [Mr. J. C. Horsley, writing to the Times in reference to this utterance, says that the Marquis of Lorne was "presumably in happy ignorance of the fact that the very firm (Mintons) he was so eloquently applauding has been for years past and is now entirely in the hands of foreigners as far as the art of ceramic work is concerned, it being in this respect under the sole direction of a Frenchman, who controls everything in the shape of design, which is carried out by French modellers and French painters to the exclusion of English artists, save in very subordinate positions."]

**Trade Memoranda.**—Mr. Frederick Higgs, builder, of Station Works, Loughborough Junction, announces that he has taken into partnership Mr. Henry F. Higgs (younger son of the late Mr. Wm. Higgs, of Crown Works, South Lameth). The style of the firm will be "F. & H. F. Higgs."—Messrs. J. Wontner Smith, Son, & Co., hot-water engineers, of Finchbury-pavement, announce that Mr. George Gray, jun., who has assisted in the management of the business since the death of Mr. Joseph Wontner Smith, sen., has now become a partner, and that in future the style of the firm will be "J. Wontner Smith, Gray, & Co."

**PRICES CURRENT OF MATERIALS.**

| TIMBER.                      | £. | s. | d. | £. | s. | d. |
|------------------------------|----|----|----|----|----|----|
| Greenheart, B.G. ....ton     | 6  | 10 | 0  | 7  | 0  | 0  |
| Teak, B.I. ....load          | 9  | 0  | 0  | 14 | 0  | 0  |
| Sesquios, U.S. ....foot cube | 0  | 2  | 4  | 0  | 2  | 7  |
| Asi, Canada load             | 3  | 0  | 0  | 4  | 10 | 0  |
| Birch " "                    | 2  | 5  | 0  | 3  | 10 | 0  |
| Elm " "                      | 3  | 10 | 0  | 4  | 10 | 0  |
| Fir, Danisic, &c. ....       | 1  | 10 | 0  | 4  | 0  | 0  |
| Oak " "                      | 2  | 10 | 0  | 4  | 10 | 0  |
| Canada " "                   | 3  | 0  | 0  | 6  | 0  | 0  |
| Pine, Canada red " "         | 2  | 0  | 0  | 3  | 10 | 0  |
| " yellow " "                 | 2  | 5  | 0  | 4  | 0  | 0  |
| Lath, Danisic, fathom        | 3  | 0  | 0  | 5  | 0  | 0  |
| St. Petersburg " "           | 4  | 0  | 0  | 5  | 10 | 0  |

**TIMBER (continued).**

|                                                  | £. | s. | d. | £. | s. | d. |
|--------------------------------------------------|----|----|----|----|----|----|
| Wainscot, Riga .....log                          | 2  | 15 | 0  | 4  | 0  | 0  |
| " Odessa, crown.....log                          | 3  | 5  | 0  | 3  | 7  | 6  |
| Deals, Finland, 2nd and 1st...atd.100            | 7  | 0  | 0  | 6  | 0  | 0  |
| " 4th and 3rd.....                               | 6  | 0  | 0  | 6  | 10 | 0  |
| " 5th and 4th.....                               | 5  | 10 | 0  | 7  | 0  | 0  |
| Riga " " 1st yellow .....                        | 8  | 10 | 0  | 14 | 0  | 0  |
| " 2nd " " .....                                  | 7  | 0  | 0  | 6  | 0  | 0  |
| " white " " .....                                | 7  | 0  | 0  | 10 | 0  | 0  |
| Swedish " " .....                                | 6  | 0  | 0  | 15 | 0  | 0  |
| White Sea " " .....                              | 7  | 0  | 0  | 17 | 0  | 0  |
| Canada, Pine, 1st " " .....                      | 11 | 0  | 0  | 29 | 0  | 0  |
| " 3rd, &c. ....                                  | 6  | 0  | 0  | 6  | 0  | 0  |
| " Spruce, 1st " " .....                          | 6  | 0  | 0  | 11 | 0  | 0  |
| " 3rd and 2nd.....                               | 5  | 0  | 0  | 7  | 10 | 0  |
| New Brunswick, &c. ....                          | 5  | 0  | 0  | 7  | 0  | 0  |
| Battens, all kinds.....                          | 4  | 0  | 0  | 12 | 0  | 0  |
| Flooring Boards, sq. 1 in., Prepared, first..... | 0  | 9  | 0  | 0  | 13 | 0  |
| " Second.....                                    | 0  | 7  | 6  | 0  | 8  | 6  |
| Other qualities.....                             | 0  | 5  | 0  | 0  | 7  | 0  |
| Cedar, Cuba.....foot                             | 0  | 3  | 0  | 0  | 0  | 3  |
| Honduras, &c. ....                               | 0  | 0  | 0  | 2  | 0  | 3  |
| Mahogany, Cuba.....                              | 0  | 4  | 0  | 0  | 7  | 0  |
| St. Domingo, cargo average.....                  | 0  | 4  | 0  | 0  | 7  | 0  |
| Mexican " " .....                                | 0  | 0  | 3  | 0  | 4  | 4  |
| Tobacco " " .....                                | 0  | 4  | 0  | 0  | 6  | 0  |
| Honduras " " .....                               | 0  | 4  | 0  | 0  | 6  | 0  |
| Maple, Bird's-eye.....ton                        | 0  | 6  | 0  | 0  | 8  | 0  |
| Rose, Rio " " .....                              | 7  | 0  | 0  | 10 | 0  | 0  |
| Box, Turkey.....foot                             | 5  | 0  | 0  | 17 | 0  | 0  |
| Satin, St. Domingo.....                          | 0  | 6  | 0  | 0  | 10 | 0  |
| Porto Rico.....                                  | 0  | 7  | 0  | 1  | 0  | 0  |
| Walnut, Italian.....                             | 0  | 4  | 0  | 0  | 5  | 0  |

**METALS.**

|                                   | £.  | s. | d. | £. | s. | d. |
|-----------------------------------|-----|----|----|----|----|----|
| IRON—Bar, Welsh, in London...ton  | 4   | 7  | 6  | 4  | 15 | 0  |
| " in Wales.....                   | 4   | 2  | 6  | 4  | 7  | 6  |
| " Staffordshire, London.....      | 5   | 10 | 0  | 6  | 0  | 0  |
| " Sheets, single, in London.....  | 6   | 15 | 0  | 6  | 10 | 0  |
| " Hoops " " .....                 | 6   | 0  | 0  | 7  | 0  | 0  |
| " Nail-roads " " .....            | 5   | 15 | 0  | 6  | 10 | 0  |
| COPPER—                           |     |    |    |    |    |    |
| " British, cake and ingot.....ton | 43  | 10 | 0  | 43 | 0  | 0  |
| " Best selected.....              | 43  | 0  | 0  | 43 | 10 | 0  |
| " Sheets, strong.....             | 50  | 0  | 0  | 61 | 0  | 0  |
| " Chili, bars.....                | 38  | 10 | 0  | 37 | 16 | 6  |
| YELLOW METAL.....lb.              | 0   | 4  | 0  | 4  | 0  | 4  |
| LEAD—                             |     |    |    |    |    |    |
| " Pig, Spanish.....ton            | 13  | 2  | 6  | 12 | 13 | 9  |
| " English, common brand.....      | 13  | 2  | 6  | 0  | 0  | 0  |
| " Sheet, English.....             | 13  | 15 | 0  | 13 | 17 | 6  |
| SPERM—                            |     |    |    |    |    |    |
| " Slesia, special.....ton         | 14  | 5  | 0  | 14 | 7  | 6  |
| " Ordinary brand.....             | 14  | 2  | 6  | 14 | 5  | 0  |
| TIN—                              |     |    |    |    |    |    |
| " Straits.....ton                 | 99  | 15 | 0  | 0  | 0  | 0  |
| " Australian.....                 | 100 | 0  | 0  | 0  | 0  | 0  |
| " English ingots.....             | 104 | 0  | 0  | 0  | 0  | 0  |

**OILS.**

|                               | £. | s. | d. | £. | s. | d. |
|-------------------------------|----|----|----|----|----|----|
| Linseed.....ton               | 29 | 5  | 0  | 20 | 10 | 0  |
| Cocunut, Cochin.....          | 37 | 10 | 0  | 0  | 0  | 0  |
| Ceylon.....                   | 26 | 10 | 0  | 0  | 0  | 0  |
| Palm, Lagos.....              | 23 | 0  | 0  | 23 | 10 | 0  |
| Rapeseed, English pale.....   | 22 | 5  | 0  | 22 | 10 | 0  |
| " do. ....                    | 21 | 0  | 0  | 0  | 0  | 0  |
| Cottonseed, refined.....      | 18 | 10 | 0  | 19 | 10 | 0  |
| Tallow and Oleine.....        | 25 | 0  | 0  | 45 | 0  | 0  |
| Lubricating, U.S. ....        | 6  | 0  | 0  | 19 | 0  | 0  |
| " do. .... refined.....       | 6  | 0  | 0  | 13 | 0  | 0  |
| TURPENTINE—                   |    |    |    |    |    |    |
| " American, in casks.....cwt. | 1  | 7  | 0  | 0  | 0  | 0  |
| TAR—                          |    |    |    |    |    |    |
| " Stockholm.....barrel        | 0  | 15 | 0  | 0  | 15 | 6  |
| " Archangel.....              | 0  | 11 | 6  | 0  | 12 | 0  |

**COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.**

*Exposits of Advertisements in this Number.*

**COMPETITIONS.**

| Nature of Work.                  | By whom required.      | Premium.                   | Designs to be delivered. | Page. |
|----------------------------------|------------------------|----------------------------|--------------------------|-------|
| Proposed Cemetery Buildings..... | Fareham Local Board..  | Not stated.....            | Feb. 3rd                 | i.    |
| Exhibition Buildings.....        | Glasgow Int. Ex., 1888 | 150 gs., 100 gs., & 50 gs. | March 1st                | ii.   |
| Asylum Buildings.....            | Borough of Maidstone   | Not stated.....            | do.                      | ii.   |

**CONTRACTS.**

| Nature of Work, or Materials.          | By whom required.      | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|----------------------------------------|------------------------|-----------------------------------|--------------------------|-------|
| Pipe-Laying.....                       | St. Helen's Corporatn  | D. M. F. Gaskin.....              | Jan. 11th                | ii.   |
| Removal of Dust, &c. ....              | Crown Est. Paving Com. | Official.....                     | Jan. 12th                | ii.   |
| Additions to Hotel, Geaton, Devon..... | The Proprietors.....   | F. Eggar.....                     | Jan. 17th                | ii.   |
| Works and Materials.....               | Wandsworth Bd. of Wks  | Official.....                     | Jan. 18th                | ii.   |
| Construction of Two Iron Rooms.....    | Com. of H.M. Works...  | do.                               | Jan. 19th                | ii.   |
| Works and Materials.....               | St. Marylebone Vestry  | Owen Lewis.....                   | Jan. 20th                | ii.   |
| Breezes, Ashes, and Dusting.....       | do.                    | do.                               | do.                      | xiii. |
| Horses and Slop Carts.....             | do.                    | do.                               | do.                      | xiii. |
| Waterson Streets and Road.....         | do.                    | do.                               | do.                      | xiii. |
| Broken Stone, &c., for Paving.....     | do.                    | do.                               | do.                      | xiii. |
| Clinker Brick Paving.....              | Beckenham Local Bd.    | G. B. Carlton.....                | Jan. 24th                | ii.   |
| Stoneware Pipe Sewers.....             | do.                    | do.                               | do.                      | ii.   |
| Dwelling-House, Stables, &c. ....      | Tottenham Local Board  | Do Pape.....                      | Jan. 25th                | ii.   |
| Construction of Reservoir.....         | Northwich Local Board  | H. Bancroft.....                  | Feb. 1st                 | ii.   |
| Pupil Teachers' Centre.....            | Schl. Board for London | Official.....                     | Not stated...            | ii.   |

**PUBLIC APPOINTMENTS.**

| Nature of Appointment.  | By whom Advertised.     | Salary.         | Applications to be in. | Page. |
|-------------------------|-------------------------|-----------------|------------------------|-------|
| Assistant Engineer..... | Civil Service Com. .... | Not stated..... | Jan. 18th              | xvi.  |

TENDERS.

**BARNET.**—For the erection of a pair of semi-detached villa-residences, Potter's-road, New Barnet.—  
 F. J. Wheeler, North Finchley ..... £1,608 0 0  
 D. Green, Gracechurch-street ..... 1,094 0 0  
 J. Haynes, New Barnet ..... 1,060 0 0  
 E. Vidman, Oldwell ..... 915 0 0  
 A. B. Flew & Co., West Kensington ..... 910 0 0  
 S. Woodhall, Whetstone ..... 898 0 0  
 Henley & Co., Upper Norwood ..... 868 0 0  
 F. Valler, Wood Green ..... 830 0 0  
 J. Elkwood, New Barnet ..... 817 0 0  
 J. Scarborough, Bowes Park ..... 795 0 0  
 J. F. Grooms, New North-road ..... 765 0 0  
 W. J. Cude, Archway-road ..... 759 0 0  
 W. Pavey, Winchmore Hill ..... 730 0 0  
 Harrison & Crab, Enfield\* ..... 629 0 0  
 \* Accepted.

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 Crake ..... 1,240 0 0  
 Hunt ..... 1,239 0 0  
 Brisley & Co. .... 1,210 0 0  
 Alexander ..... 1,197 0 0  
 Bentley ..... 1,067 0 0  
 David Brown & Co. .... 1,047 0 0

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 J. G. Stephens, Exeter ..... 959 0 0  
 Inledon & Perkins, Culloampton ..... 921 14 0  
 Turner & Skinner, Houlton ..... 824 0 0  
 Goff & Perkins, Culloampton\* ..... 830 0 0  
 Goff & Ireland, Kenilworth ..... 805 0 0  
 Grainger, Clushington ..... 712 0 0  
 \* Accepted.

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 J. Russell ..... 7,874 0 0 ..... 475 0 0  
 C. Wren ..... 7,280 0 0 ..... 806 0 0  
 J. Ferriess ..... 7,038 0 0 ..... 324 19 7  
 J. Hayward ..... 6,981 16 2 ..... 459 0 0  
 Cornwall & Son ..... 6,575 0 0 ..... 286 11 4  
 Stevens & Patenden ..... 6,547 17 4 ..... 295 15 0  
 J. Martin ..... 6,545 5 0 ..... 287 10 0  
 Newman & Hart ..... 6,451 0 10 ..... 312 0 0  
 Dore & Son ..... 6,354 0 0 ..... 288 0 0  
 G. Hatfield .....

**KENSINGTON.**—For the erection of the Queen's Club, West Kensington. Mr. W. C. Marshall, architect. Quantities by Mr. E. J. Paine:—  
 Colls & Sons ..... £14,761 0 0  
 Patman & Fotheringham ..... 14,507 0 0  
 Rider & Sons ..... 14,328 0 0  
 Nightingale ..... 14,175 0 0  
 Bywaters ..... 13,852 0 0  
 Brass & Son ..... 13,869 0 0  
 Perry & Co. .... 13,500 0 0  
 Peck Bros. (accepted) ..... 13,530 0 0

**LONDON.**—For alterations at the Millford Haven public-house, 214, Caledonian-road. Mr. R. A. Lewcock, architect, Bishopsgate-street, Within:—  
 General Contractor.  
 T. Walker ..... £370 0 0  
 J. Heath ..... 125 0 0  
 J. Steadman ..... 91 0 0

**LONDON.**—For alterations at the Ploagh farm, 201, Horton-street. Mr. R. A. Lewcock, architect:—  
 S. Goodall ..... £173 0 0  
 J. Walker ..... 398 0 0  
 C. Hatchfield\* ..... 398 0 0  
 Finch ..... 391 12 0  
 Birch & Co. .... 359 0 0  
 J. Ivory ..... 344 10 0  
 Steel Bros. .... 330 0 0  
 Jackson & Todd ..... 329 0 0  
 Spencer & Co. .... 325 0 0

Steadman ..... £20 0 0  
 Unger ..... 19 17 0  
 Christian ..... 18 7 0

**LONDON.**—For improvements at 331, Edgware-road, W. Mr. R. A. Lewcock, architect:—  
 Batchelder ..... £203 15 0  
 Pringle ..... 167 0 0  
 Belloni ..... 129 10 0  
 Dainton ..... 128 0 0

**LONDON.**—For new coffee-tavern, Victoria Dock, E. Edward J. Thomas, A.R.I.B.A., architect, Mark-lane. Quantities supplied:—  
 Shepherd ..... £2,724 0 0  
 Madisson ..... 2,715 0 0  
 J. H. Thorns, Leeds ..... 2,575 0 0  
 Holland ..... 2,349 0 0  
 Elkington ..... 2,280 0 0  
 Patman & Fotheringham ..... 2,130 0 0  
 Priority ..... 2,070 0 0

**SUNDERLAND.**—For the erection of the new Municipal Buildings, Mr. Brighton Eynon, architect, Ipswich. Quantities by Mr. G. D. Irwin, Sunderland:—  
 G. Grimwood & Sons, Sudbury ..... £27,690 0 0  
 W. Scott, Sunderland ..... 25,383 0 0  
 J. H. Thorns, Leeds ..... 24,967 10 0  
 W. Thornton & Sons, Liverpool ..... 24,435 0 0  
 C. Jackson, Newcastle ..... 24,433 12 0  
 J. Elliot, North Shields ..... 24,265 0 0  
 T. P. Shatto, Sunderland ..... 24,191 10 0  
 J. W. Beadland, Bradford ..... 23,967 0 0  
 S. Warburton, Manchester ..... 23,900 0 0  
 E. H. & G. Allison, Sunderland\* ..... 23,870 0 0  
 \* Accepted.

[Architect's estimate, 25,000].  
 \* \* The above tenders are exclusive of the heating and ventilation, which it is estimated will not exceed 1,100.

**TIVERTON.**—For the erection of four houses on the St. Aubyn's Estate, Tiverton, for Mr. W. Helling Lloyd. Messrs. Wilkinson & Warren, architects and surveyors, Exeter:—  
 Pyle & Grater Bros., Tiverton ..... £3,940 0 0  
 Barrons, Tiverton ..... 3,600 0 0  
 Scadding & Son, Exeter ..... 3,200 0 0  
 J. G. Stephens, Exeter (accepted) ..... 3,175 0 0  
 Manning & Collard, Tiverton ..... 2,858 0 0

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# The Builder.

Vol. LII. No. 253

SATURDAY, JANUARY 15, 1887.

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### The Trade Guilds of Europe.



IN a previous article we sketched the progress of the rise and organisation of trade guilds in past times.\* Turning to the more modern aspect of the subject, we find that the status of trade

guilds in Germany was fixed by the passing of an Act for regulating trade and industry, in 1871. By that Act trade guilds were deprived of many privileges, and reduced to the position of voluntary associations. Guilds and guild statutes were allowed to exist, but it was at the option of any one to enter or withdraw from such societies at pleasure. The duty of inspection and supervision was transferred to the Government authorities, who also were to decide all questions as to duties and rights of members. All persons belonging to a trade might form a guild under similar conditions. The relations between persons in industries or trades and their apprentices, assistants, and journeymen was to be a matter of contract, and the old system of workmen's books, books delivered to the workmen by the police, and intended to control their entering and leaving the service of employers, was abolished. In 1878 another change was made. The workmen's books were restored, and the guilds, though not made compulsory, had some of their old privileges restored. Power was given to create industrial schools, to make rules for advancing industrial and technical instruction, to establish a system of examination, for testing the capacity of apprentices, journeymen, and masters, and to appoint tribunals of arbitration, whose decision should be final. In 1884 another Act was passed, prohibiting masters who did not belong to a guild from taking apprentices. This Act, though much wished for, has not given entire satisfaction to the tradesmen, especially in Bavaria. On the whole, a new era seems dawning for the guilds, with some signs of its being a successful one.

The tailors' guild of Berlin, though not one of the trades with which we are specially concerned, may be conveniently cited as typical of the general formation and regulation of the guilds. Statutes enact that as apprentices only such young persons shall be taken as have the requisite elementary school education, and are neither mentally nor physically unable to learn the trade. The master has, either himself or through a competent representative

expressly appointed for the purpose, to superintend the training of the apprentice and instruct him in everything pertaining to the trade. The Stettin guild rules require every apprentice before being admitted a journeyman to pass an examination before a committee of the guild. If he fails to pass the examination the committee can order him to serve from three to twelve months longer as an apprentice. If the committee are of opinion that the apprentice's deficiency of knowledge has been caused by the fault of the master, they may allow the apprentice to pass the further time required with another master, while his former master has to pay him the customary wages of a journeyman. The time served by apprentices varies from one to four years,—the average is generally three years. As a rule, it is only the art trades, such as jewellers, modellers, and ornamental painters, that require four years. Some guilds have trade schools, *Fachsschulen*, but they suffer from the competition of the *Fortbildungungen Schulen*, attendance upon which in some cities is compulsory, and in other cases are insufficiently sustained by the guilds themselves.

Great stress is laid upon the systematic training of the apprentices for their respective trades, and upon the proficiency of the journeymen. People both in official and private circles do their best to raise the condition, education, and well-being of the productive classes, and to enable workmen to compete successfully with foreign competition; yet the feeling between employer and employed is described to be that of desperate enemies, especially in manufacturing districts. The hours of labour vary in different parts of the empire from sixty to seventy-two hours a week. Wages also fluctuate, some trades being better paid in certain districts than others.

In Austria, owing to causes somewhat similar to those in Germany, some craft-guilds have been re-founded. Membership of them is compulsory upon all carrying on the particular trades in connexion with them. They exercise a certain trade control as far as the test system of proficiency, which is compulsory, has been re-established. In all other respects every one can carry on whatever trade he pleases. The relations between employer and employed are excellent.

In France no bodies resembling the ancient corporations exist. What organisations exist are more of a social than a business nature. In 1884 an Act was passed for the purpose of allowing the formation of working men's guilds. It gives little more power than formerly to form associations which shall have the exclusive object of studying and protecting industrial interests.

With the exception of the building and

mechanical trades, labour is unorganised. In Marseilles the question of wages is largely controlled by the 50,000 Italian workmen who live there. They work for less wages than the French, and no strike can be successful while these Italians stand aloof. Women are employed in almost every calling, from agriculture to street cleaning. Saving is one of the leading principles of the workpeople, and all are taught the economy of helping to swell the general family fund. In the production of machinery France is becoming eminent, and the advance in wages is marked,—the amount being equal to that of England, and in special cases superior. The hours of labour are from 60 to 84 a week, the average being 70.

In Switzerland, the old corporations have long disappeared in the character of active industrial organisations. Those which exist are kept up for social purposes, or for the management of the property which they have inherited. So far as apprenticeship is concerned, there are no regulations or restrictions of any kind. A person desiring to learn a trade can do so wherever he can find any one to teach him, and whosoever can may give him instruction. There are, however, efforts made in various places to afford apprentices facilities for acquiring the technical knowledge necessary for perfecting themselves in their respective occupations. Among the tradespeople generally there is a strong feeling of the necessity of cultivating and developing the thorough practical and theoretical knowledge required for practising the various trades successfully. The subject of technical education is left entirely to the State. The feeling between employers and employed is pleasant. In some cantons the organisation of labour is generally based upon the idea of permanency, and workmen are usually engaged by the year. There is a Swiss general trades-union. Among its objects are:—Obligatory examination in all trades of apprentices; laws governing apprenticeship; laws and regulations in general more protective than at present, but not so as to introduce the old system of the compulsory guilds. The hours of labour are seventy a week.

In Italy, none of the ancient guilds survive. There are no laws or regulations governing apprenticeship. Much attention has been paid to technical instruction since the acquisition of Venetia. All the so-called special schools then existing have been remodelled into a general plan of instruction for the entire kingdom. They seem to have partly failed in their object, and to have been more frequented by the well-to-do middle-class than by those for whom they were intended. "It is difficult to foresee the time when their usefulness will find its full scope. The facts

\* See *Builder*, March 8, 1868, p. 361.

so far seem to confirm the supposition that the Italian genius and temperament are not favourable to systematic industry, the masses being impatient of the constraint, while the rural population regard the occupation as demoralising and unwholesome. Millowners generally complain that the want of training, both for foremen and operatives, is a heavy disadvantage in conducting their establishments, only compensated by the extremely low price of labour. When it is remembered that even where these establishments have existed from father to son on the same spot, they have not succeeded in forming a body of capable hands, the fact certainly adds force to the presumption of inaptitude." But perhaps the view of technical instruction on the employers' part may be to blame. In Venetia the technical institutes and trade schools are gaining in number, but "are far from serving the purpose intended, or receiving the adhesion and confidence of the population. They are still regarded as impractical or unnecessary by the mass of labourers wedded to their antiquated routine, and whose numbers are recruited from the swarming hordes of untutored and half-savage children, tempted to the workshop where they are employed for a few centimes a day to do odds and ends of work, and pick up what notions of the trade they can gather. And such is the natural aptitude and intelligence of the race, that where the occupation interests and attracts, and particularly in all those more or less elegant fabrics which appeal to the artistic instinct, they need no other training to become accomplished workmen."

In the peculiar and characteristic Venetian industry of glass-making all public teaching of its practice has been tacitly proscribed. Each establishment is jealous of its imagined monopoly, and the processes employed are guarded as trade secrets. As, however, all the processes of the manufacture are extremely simple and depend almost entirely on dexterity, tact, and taste, it may be doubted whether systematic instruction could add greatly to the skill acquired by practice in the workshop, or replace the aptitude implanted by nature.

The relations between employer and employed are good. Much fault is found in the neighbouring countries, especially in Germany, at the importation of Italian labourers whenever any large contract is to be executed. These labourers are supplied to any number by contract agents, and they arrive on the ground with something like the mobility and precision of troops. Their work is promptly and thoroughly executed. The hours of work are at Turin sixty a week.

In Holland there are no guilds and no restrictions upon trade or its exercise. With regard to the absence of all laws or regulations relating to apprenticeship, the want of system is extremely unsatisfactory. A change in this respect is urgently called for, and is likely to take place soon. The feeling between employers and employed is satisfactory and improving. Trade organisations are numerous. One of the principal is the Grand Dutch Trades Union, which aims at the amalgamation of all trades. Among its objects are: ten hours to constitute a day's labour, the limitation of the work of children, and general advancement of the interests of labour through co-operation. In general trades the hours of labour are sixty a week, though in some they reach seventy-two.

In Belgium there are no corporations, civil or religious. There are no laws or regulations governing apprenticeship. Trade-unions are numerous. Many factories are carried on in partly paternal principles: invalids receive medical attendance free of charge during illness, and are allowed half their wages. Food is supplied to the operatives at wholesale prices. A pension for life is paid after a certain number of years' service. Houses are also provided at low rents. The hours of labour are sixty-nine a week.

In Denmark guilds of journeymen exist, but only as benefit societies. The relations between employer and apprentice are in no way controlled by law or regulations, but are a matter of agreement between the two parties. On the

side of both there is a desire for some readjustment of the relations between them. Technical schools for the advancement and instruction of the working classes are numerous. They are nearly all held in the evening, and are mainly supported by the State. The hours of labour in Copenhagen are sixty a week.

In Russia guilds exist, but only nominally. Of their rules, which are very numerous, hardly any are carried out. Bob in Poland and Russia apprentices are required to pass an examination before becoming journeymen. The Russian peasants are strongly imbued with a tendency to unite in associative societies having a community of interests. One of the most interesting examples is the Russian "Artes," or associative labour society. These societies are established on communistic principles, and are liable for any loss caused by their individual members, and permeate all branches of trade. The labour conditions of Russia are peculiar to that empire. Although serfdom is abolished, the feudal relationship still exists to an extent which makes comparison difficult. The system of boarding and lodging employes in the factories prevails. Some attention is paid in the large towns to technical education, but in the villages the only instruction available is a certain amount which it is the duty of the village priest to impart, but over which there is no control. Wages in St. Petersburg are regulated more by individual bargaining than by any fixed rate, and are of such a discrepant character that they cannot be included in the general average. The hours of labour average seventy-two a week.

In Turkey there are trade guilds existing, but they are chiefly co-operative societies for mutual benefit. Of their nature that of the *hamels* (porters) furnishes an example. Each quarter of Constantinople has its own porters, all being under one chief or head, who is recognised by the Government and who buys his place. The chief pays to the Government the taxes of all the members, who can only work in their assigned quarters. The total earnings of each day are divided *pro rata*, and in cases of disability or illness they relieve each other. There are no labour organisations. The hours of work are from daylight to one hour before sunset. The wages in Constantinople are about the same, perhaps on the whole a little higher, than in other large cities of Europe. In villages distant from the capital and rural districts they are extremely low. The great cost of internal communication, and

the absence of highways, railways, and waterways, have had the effect of localising industries, hence each community has conditions of trade peculiar to itself. In Turkey, everything being accomplished by hand, manual labour is in great demand.

In Spain what guilds remain are only for purposes of assistance and benevolence. There are no laws or regulations governing apprenticeship, nor are there any schools in which trades are taught. Generally boys enter a factory or workshop, and gradually develop into workmen, the time depending upon the capacity of the individual and the difficulty of the pursuit.

In Portugal there are trade companies existing, but as voluntary associations. Wages are very low around Lisbon; general trades run from 2s. 6d. to 3s. 4d. a day; in exceptional cases they reach 6s. 3d., and sometimes are as low as 2s. 1d. The hours of labour are from sunrise to sunset.

In the United Kingdom guilds survive in a few places, but under changed conditions. Their importance as an aid or protection to trade has long disappeared, and they now only exist for benevolent and social purposes. The goldsmiths' guild of Edinburgh retains a few of its ancient features. Every member must have served an apprenticeship of seven years in the trade, and must either have served two years additional under a master or have been in business a similar time on his own account. By the term of his indentures the apprentice is bound to the guild and not to the master whom he is to serve.

The greatest stimulus to technical education has been given by the City and Guilds of London Institute, which not only carries on schools of its own, but subsidises other institutions that have a similar object. It extends its assistance to all the principal industrial centres of Great Britain. Instruction of the better class is its main object, and it in no way interferes with the relation between employer and employed.

The labour organisations, especially in the North of England, are both numerous and powerful, hardly any trade being without its union, and few workmen who do not belong to a benefit or protective society.

The subjoined table, showing the advance or decrease in the wages of the principal building trades in most of the European states from 1879 to 1885, compiled from recently-published statistics, may be of interest in connexion with the subject:—

Table showing Comparative Average Weekly Wages in 1879 and 1885:—

| Occupations.     | Germany. |       | France. |       | Belgium. |       | Italy. |       | Denmark. |       | Switzerland. |       | England. |       |
|------------------|----------|-------|---------|-------|----------|-------|--------|-------|----------|-------|--------------|-------|----------|-------|
|                  | 1879.    | 1885. | 1879.   | 1885. | 1879.    | 1885. | 1879.  | 1885. | 1879.    | 1885. | 1879.        | 1885. | 1879.    | 1885. |
| Bricklayers ..   | 14 5     | 17 7  | 16 8    | 24 0  | 25 0     | 19 0  | 14 5   | 17 6  | 18 7     | 29 2  | 23 0         | 21 9  | 32 10    | 31 6  |
| Carpenters ...   | 17 5     | 17 2  | 22 7    | 25 10 | 22 6     | 17 0  | 17 5   | 16 8  | 17 9     | 29 2  | 19 2         | 19 9  | 34 5     | 31 11 |
| Gasfitters ..... | 16 6     | 17 0  | 22 7    | 25 4  | 22 6     | 20 10 | 16 8   | 14 2  | 17 9     | 24 7  | 19 2         | 21 0  | 30 3     | 31 11 |
| Masons .....     | 16 6     | 19 6  | 20 10   | 22 3  | 25 0     | 21 9  | 16 8   | 15 0  | 18 7     | 22 4  | 20 0         | 22 0  | 34 0     | 32 3  |
| Plasterers ..... | 18 2     | 18 6  | 20 10   | 26 5  | 22 6     | 19 5  | 18 2   | 21 0  | 18 7     | 29 1  | 19 2         | 21 0  | 33 9     | 32 6  |
| Plumbers .....   | 16 3     | 17 9  | 22 11   | 27 5  | 25 0     | 22 9  | 16 3   | 15 0  | 17 9     | 28 9  | 19 2         | 21 7  | 32 4     | 32 11 |
| Slaters .....    | 16 3     | 17 6  | 22 11   | 28 7  | 25 0     | 20 9  | 16 3   | 17 6  | 17 9     | 28 9  | 19 2         | 21 2  | 32 11    | 29 9  |
| Tinsmiths .....  | 15 6     | 14 10 | 18 4    | 22 9  | 2 0      | 18 4  | 16 3   | 27 6  | 16 3     | 27 11 | 18 9         | 18 5  | 30 5     | 27 4  |

VANDYCK AT THE GROSVENOR GALLERY.



All foreign artists the two who exercised the most important influence upon English art were Holbein and Vandyck. Holbein's influence was less permanent, because the demand for portraits was relatively small in the times of Henry VIII. and Elizabeth, and so no considerable school of artists could be maintained. Holbein was not forced by circumstances to surround himself with a great number of assistants. In the time of Charles I. there were many more people who desired to have themselves portrayed,—so many, in fact, that Vandyck alone was utterly unable to supply the demands made upon him. He had to call in the aid of numerous assistants in order to complete, with their help, the various orders thrust upon him. Of ten pictures sold out of his studio scarcely one was even mainly his handiwork, and many he hardly touched. His assistants were, therefore,

obliged to imitate his style, and carry out in that the works which he would sell as his own. Thus Vandyck impressed his style upon a whole group of men in his employ, and that style, having once become popular, soon became national. In this way Vandyck became the father of the true English school of painting, and his traditions were more or less closely adhered to, generation after generation, by Sir Peter Lely, Sir Godfrey Kneller, Richardson, Hudson, and the rest, till in due time the school of Reynolds and Gainsborough arose to carry them to fresh developments.

Thus, an exhibition of the works of Vandyck, and especially of those painted during his residence in England, is of peculiar interest to all students of English art; and from such an exhibition the works painted by assistants in the master's studio ought by no means to be excluded. The collection now brought together at the Grosvenor Gallery satisfies all our requirements. It contains a sufficient number of typical works of the artist's earlier period to enable us to trace the growth

of his style. It contains several very fine specimens of the best works done by the master himself in England; and it completes and supplements them by a tolerably large number of those school pictures whose origin and influence we have explained.

It is but natural that some of the pictures exhibited should have crept in on false pretences. We will mention only a few of the most conspicuous imposters. The finest of them is Mr. Holford's "Portrait of a Spanish Officer" (68), which has only recently been attributed to Vandyck, and which certainly cannot be by him. It is painted in the style of Caravaggio, though probably not by that master either. Neither can the "Portrait of a Lady" (6) have been painted by a pupil formed in the school of Rubens and newly arrived in Italy. Mr. Claude Phillips ascribes it to Justus Suttermans, and the ascription is well worth consideration. The "Sir Anthony Vandyck on Horseback" (70) should not have been included in this or any other exhibition of admirable works of art. The "Sir William Killigrew" (119) does not depict that personage at all. It is a painting by Dobson, which once belonged to Horace Walpole. He relates that when found by the man from whom he bought it the left side and bottom of the canvas were ruined, and the name, "John Milton," was on the back. The inscription, now clearly legible upon it, was painted in by some forger between the time of the Strawberry Hill sale and the purchase of the picture by the Duke of Newcastle.

The catalogue is carefully composed, but contains much information with which a visitor could dispense, and lacks much which he might well expect to find in it. The following, amongst other corrections, require to be made in it. No. 24 is not George, but William Villiers, Viscount Grandison, father of the famous Barbara Villiers. Endymion Porter (31) was not a knight; the gentleman depicted in No. 32 holds a pear in his hand, and is not in the character of Paris; the Countess of Southampton (42, 123, and 148) is not represented as "Fortune," but as "Juno." Nos. 52 and 75 both portray Charles Louis, Elector Palatine, son of Frederick V. No. 95 should bear the name of Edward Sackville, fourth Earl of Dorset, and No. 101 that of Frances Leigh, second wife of Thomas, Earl of Southampton, Lord High Treasurer of Charles I. The "Portrait of a Lady" (106) used to be known in the family as the portrait of "Viscountess Boyle of Kenelmekey," daughter of the first Earl of Denbigh. The Queen's picture (109) represents not Sir William, but Thomas Killigrew, and No. 119 does not represent a Killigrew at all. Count Gondomar is not seen in No. 116, but some other fine Spanish gentleman. It should be stated that the St. Martin (134) is a study for the famous Saventhem picture, and the St. Sebastian (136), a study for the well-known picture now in the old Pinakothek at Munich. No. 140 represents Margaret Smith, afterwards Lady Herbert.

The visitor to the Grosvenor Gallery will scarcely expect us to supply him with a guide to the collection. It will be enough if we point to a few of the most representative works exhibited, briefly indicating the period of the artist's development to which they belong. Vandyck was born at Antwerp in 1599. In 1609 he was a pupil of Hendrick van Balen of Antwerp. In his fifteenth year he entered the studio of Rubens. In 1618 he attained the rank of master in his craft. The "Betrayal of Christ" (125) is an excellent specimen of his style when he was working under the immediate influence of Rubens. It is ugly, no doubt, but it shows great vigour, and is rich in such as yet unrealised possibility. In 1621 Vandyck determined to visit Italy; before doing so he painted the famous picture of "St. Martin" at Saventhem, near Brussels, the study (134) for which has been mentioned. He then visited Venice, where the works of Titian and Tintoret must have produced a profound impression upon him. This is plainly shown in the picture of "Armida and Rinaldo" (19); study for it, 73, where the Venetian style is found in conjunction with clear reminiscences

of Rubens. The very Titianesque head of Armida reappears upon the shoulders of St. Catherine in the Madonna picture (51), but the type of the Virgin is there borrowed, perhaps, from Parmegino. Rome and Genoa were the Italian cities in which Vandyck resided for the longest time. His two visits to the latter city may almost be regarded as settlements there. The pictures painted for Genoese patrons are amongst the finest of the artist's works. The present collection contains some fine examples of the period, the best being, perhaps, the Marchesa Balhi (77), and the charming group of her three children (29); the Marchesa de Brignolè-Sala and her son (18), Lord Cowper's fine full-length portrait of a gentleman (26), and Don Livio Odesalchi (37). About 1626 or 1627, Vandyck returned to Antwerp, and his second Flemish period commenced. It was then that he painted the picture of Snijders and his Wife (23), and the other portrait of the same lady (79). The original replica of the "Christ taken down from the Cross" (144),—the large version of which is in the Antwerp Gallery (No. 403 there),—dates from the same period. If the portrait of a lady (106) be Viscountess Boyle, of Kenelmekey, it must, at any rate, belong to this period.

Early in 1632 Vandyck arrived, for the second time, in England,—the country which was henceforward to be his home. He made a few visits to his native land afterwards, probably during one of which he painted the noble portrait of the Abbé Scaglia (54),—a picture scarcely inferior to any that ever came from his brush.

Vandyck's portraits of Charles I., Henrietta Maria, and their children, are very suspiciously numerous. Doubtless the majority of them were sold by the painter on the clear understanding that they were only produced under his supervision and from his designs. None of the portraits of Charles I. here shown possess any valid claims to originality. The best is a half-length of the king and queen (25), upon part of which the master may have worked. The half-length in armour (39) is a good replica of a well-known type. The full-length with the Marquis of Hamilton (63) is a late copy of the Louvre picture, and No. 99 bears the same relation to the Windsor canvas. With Henrietta Maria we are more fortunate, the full-length of her with Sir Jeffrey Hudson, the dwarf of "Peveril of the Peak," being one of Vandyck's finest English pictures. The Queen's picture (41) is a worthy example of the attractive group of paintings which depict the royal children, though it is doubtless surpassed by the bewitching picture in the Turin Gallery.

It was fitting that the artist should employ all his skill upon the likeness (8) of the cultured patron to whom he owed so much, the Earl of Arundel, father of English amateurs of art. With respect to the replica of this picture, now on view at the "Old Masters," it may be observed that that picture has been very ill-treated by restorers. Originally it must have been fine, but besides being flayed and re-painted in parts, it has had great strips of canvas added above, below, and down the right side, and on the lower strip hideous legs have been painted, thus making both figures into full-lengths. Vandyck was no less lavish of pains when painting his own portrait (1) where he holds the chain which the king had given him and points to the sunflower, speaking symbol of the man who would sun himself in the smiles of royal favour. One of the signs of that favour, or, at any rate, interest, was the wife provided by the king for the artist. Her portrait (114) be painted with similar care and completeness of surroundings. It is a pity that Lord Fitzwilliam's fine portrait of Stafford is not included in the collection. Its place is but poorly supplied by two canvases (43 and 46), upon neither of which is the master's handiwork apparent. The larger of the two bears a striking portrait nevertheless. Three full-length groups, each of two expensively-dressed youths, will attract the attention of every visitor. Two of them (47 and 105) represent the same pair. Lord John

and Lord Bernard Stuart. The third (112; 120 is a poor copy of it) shows the pucious forms of the Earl of Bristol and the Duke of Bedford. All three are painted in Vandyck's most gorgeous manner. Much less striking, but far more interesting for the sake of the personality displayed, is the portrait of Lord Falkland (87). The smiling face and lambent eyes will not fail to rivet the attention when once it has been directed to the picture. The group of Killigrew and Carew (109) possesses something of the same quiet charm, but is painted with more care and elaboration. It is, perhaps, with its quiet reserve and low tones, the finest picture in this most interesting exhibition.

NOTES.

**T**HE American iron and steel trade has been exceptionally active during the past year, whilst the prospect for the present year is even more favourable. The production of pig-iron for 1886 is estimated at 5,600,000 tons against 4,044,526 tons in 1885; of Bessemer steel ingots, 2,000,000 tons against 1,519,430 tons; of Bessemer steel rails, 1,500,000 tons against 959,471 tons; of open-hearth steel, 200,000 tons against 133,375 tons in 1885. Notwithstanding the increase in the output, prices have advanced but slightly. Anthracite Foundry pig-iron No. 1 was worth, at Philadelphia, 18'50 dols. per ton on January 1, and 20'50 dols. on December 23, 1886; grey fore pig-iron No. 1, at Pittsburgh, 16 dols. and 20 dols. respectively. Best refined bar iron sold at Philadelphia at the beginning of the year at 40'32 dols., and at its close at 44'80 dols. Steel rails at Eastern mills rose from 34'50 dols. to 37 dols. During 1886, over 7,000 miles of new railways were constructed in the United States, compared with 3,131 miles in 1885. This large increase has contributed greatly to the improvement in the American iron trade. Close upon 800,000 tons of steel rails have already been ordered for delivery in the present year, this being about half the producing capacity of American rail mills.

**T**HE meeting for the promotion of the scheme of the Imperial Institute was, no doubt, a success, in spite of the irrepressible mover of amendments who was finally invited out by the police; but no attempt was made to settle the question of site, although the subject was alluded to in the course of the proceedings. We are very strongly of opinion that Kensington will not do, either from the point of view of sentiment or practical suitability, and we hope an effort will be made,—even a national effort, if necessary (for is it not a national interest?),—to raise the funds for securing a site in the neighbourhood of the Houses of Parliament and public offices. Unless this is done, the Imperial and Colonial Institute will not be the great success which it ought to be, and which we hope to see it.

**T**HE Town Council of Glasgow intend to oppose the Clyde, Cart, and Kelvin Main Sewerage Bill, which is a straightforward measure, intended to remedy the present intolerable state of those waters. The Bill proposes the constitution and incorporation of a joint Board, which shall be the governing body of the united district, to consist of fifteen *ex officio* and twenty-five executive members, the latter to be elected by the Town Councils of Glasgow and Paisley, the Police Commissioners of Govan, and the local authorities of various parishes named in the schedule. The purposes for which the district is to be formed are the purchase of land and property, the erection of buildings, machinery, and plant, construction of main drains, and the purifying of the sewage so that it may be discharged into any stream, river, or water-course, without breach of the Rivers Pollution Prevention Act, or any other provisions of the law. It does not, however, seem that the promoters of the Bill have taken the proper preliminary step of obtaining a professional report as to how so important and unprecedented a result is to be obtained.



THE Tottenham Local Board have contrived to fit things together very successfully in their application for a loan to enable them to employ labour in improving the roads in the parish. It seems that these roads, taken over a good many years since, are in a very bad state, and that the parish cannot afford to repair them out of the current rates. The present is a good time to get the work done cheaply, and it is work that requires to be done. We have the strongest opinion against the well-meant but pernicious and delusive system of creating work for bands that are out of employ; but this seems to be a case in which a clear-sighted economy has been combined with beneficent intentions. Mr. Ritchie, M.P., who received a deputation from the Tottenham Board on the subject, promised that an inspector should see the roads in question, with a view to the authorisation of a loan.

PRINCE TORLONIA, by draining a lake formed in the crater of an extinct volcano, in the Apennines, transformed an insalubrious belt of swamp and marsh into good productive land, at the same time carrying out a work that was commenced in the reign of the Roman Emperor Claudius. Sir F. de Lesseps, who is one of the honorary members of the Institution of Civil Engineers, has contributed to the Transactions of that Institution some particulars of a work carried out in Tunis for a like purpose, although the means adopted are exactly the reverse of those pursued by Prince Torlonia in the case of Lake Fucino. It appears that Colonel Roudaire has spent many years in Tunis, levelling, boring, and making experiments of various kinds, and has satisfied himself that the four "shots," Tedjedj, Djerid, Rbarsa, and Melrir, situated 77 ft. 6 in. below sea level, could by means of a canal be formed into an inland sea. This would influence the climate and fertility of the surrounding country to a considerable degree, the area being 3,164 square miles, which is about forty-times that of Lake Geneva. Owing to the expense that would be involved in carrying out this scheme another method has been devised. From the discovery of Roman aqueducts formerly employed in irrigation, the idea was suggested of rendering the country fit for cultivation by sinking artesian wells, which would supply the necessary water. The water-rents obtained were to be in part devoted to the construction of the canal. The first well was started in 1855. At a depth of 295 ft. water was found, which rose to a height of 15 ft. The flow for the first year averaged about 1,760 gallons per minute, and is now 19,800 gallons per minute. "The banks of the river Melab," says Sir Ferdinand, "which, fifteen months ago, were deserts, are now populated, and very shortly the canal is to be commenced." Marshal Bugeaud has said that the civilisation of the French African possessions would come from below,—that is, would depend on the subterranean water-supply.

IN the current number of the *Fortnightly Review* Sir Lowthian Bell goes into the subject of "The Iron and Steel Trade," mainly with the object of comparing the state of the trade in America with our own, and estimating the probability or possibility of America generally outbidding us in all the markets of the world. The article contains much interesting information and suggestion, which would be more readable and appear more to the point had it been arranged in a more connected, logical, and argumentative form. As it is, it is not always easy to see what the writer is specially driving at in the facts which he adduces, or what is the connexion between the observations of one paragraph and the statistics of the next. The general conclusion we are brought to at last, however, is that while America possesses a sufficiency of the raw material in the shape of ore (the limits of which are, in fact, not fully known yet) and a splendid stock of fuel, the fuel is too far from the ore, and consequently from the smelting furnaces, and the latter too far from the sea-coast, for America to be able permanently to undersell us in the pro-

duction of iron. "We hope here be truths." It should seem that in some lights the size of a country may be a drawback to its business working; and Sir Lowthian's conclusion is practically the same as that arrived at by an eminent English comedian who was asked, when on a tour in the States, if he was not impressed with the size of the country, and replied that he had noticed it took a very long time to get from one town to another, "but he did not see the advantage of it."

THE recent case of *in re Carus-Wilson v. Green* helps to make clearer the difference between a mere valuer and an arbitrator. In this case timber on land was to be paid for at a valuation; each party was to appoint a valuer; the two persons before they began to act were to appoint an umpire, so that if they disagreed he should give a decision. The disagreement came about, and the umpire made a valuation, and the question then arose if this was an award so as to come within the cognisance of the High Court. The Court of Appeal, as well as the Divisional Court, held that it was not an award by an arbitrator. The reason of the decision is thus shortly given by Lord Esber:—"The umpire 'was merely substituted for the valuers to do what they could not do, viz., fix the price of the timber.' This is a simple and clear *ratio decidendi*, and it is well that it should be borne in mind, for it will often be applicable in the business practice of most persons."

THE Proceedings of the Institution of Civil Engineers contain some particulars of an American pumping dredger, which has recently been at work at Coney Island, near New York. A strongly-built barge has a heavy framework, 25 ft. high, erected on it. This is closed in, and contains two platforms, on the lower of which the boilers and machinery are placed. Round the top of this framework an outside overhanging road is placed, upon which a truck runs, having a dredging pulsometer steam pump suspended from it. An iron suction-pipe is fastened to the lower end of the pump, at the bottom of which is a digger, consisting of about eleven vertical prongs, which surround and protrude below a horizontal circular strainer. The digger, bearing the weight of the pump, which is about two tons, has an oscillating movement imparted to it by the pump, and thus loosens the material on which it rests. An iron discharge-pipe extends upwards from the discharge of the pump, and delivers the dredged material into a central hopper at the top of the framework in the barge. From thence it is conveyed ashore by means of a trough supported on a floating staging. Owing to the elevation, the material can be deposited 1,000 ft. from the barge. In actual work, this dredger has raised an average of 50 per cent. of solid material out of the total volume lifted, and under favourable circumstances it has a capacity of 10 cubic yards per minute. Illustrations and a fuller description of the Badger Dredger may be found in the *American Mechanist* of February 6, 1886.

A NEW type of steam excavator has been designed for use in the work of constructing the Panama Canal. The ordinary chain of huckets is used, but the supports are placed some distance back from the edge of the cutting. It will excavate over a range of 26 ft. 3 in. deep, 14 ft. 9 in. wide, and any required length, without changing the road. The material is carried away to a distance of 180 ft., to be deposited by means of a transporter worked by travelling hands. There are two platforms one above the other. The lower is carried on twelve pairs of wheels, 14 ft. 9 in. centres, which run on rails. The upper platform is traversed across the lower one upon sixteen rollers. For propelling the machine, and traversing the upper platform, there is a 15-horse-power engine placed on the lower platform. The excavating machinery consists of a chain of twenty-three buckets, each having a capacity of about 10½ cubic feet. The motive power for excavation is supplied by a 100-horse-power engine. To work the

machine the upper platform is carried to the inside edge of the lower platform, and the buckets are set to work. When they have reached their limit of depth, i.e., 26 ft. 3 in., the platform is gradually moved back as the excavation goes on working at a speed of twenty-three buckets per minute, 438 cubic yards per hour could be removed.

SOME particulars are given in a recently published volume (vol. iii, fourth series), *Nouvelles Annales de la Construction*, of the Seine quay walls that have lately been constructed at Rouen, in a manner somewhat unusual, if not entirely novel. The bed of the river Seine, at the spot where these walls are constructed, is 22 ft. below the required quay-level. It is composed of a layer of silty sand, resting on chalk, the latter being 25 ft. below the bed of the river. Four rows of wooden piles were driven down through the sand until they reached the chalk. These piles slope forward towards the front, and on them a wall, 18 ft. high, has been built. Up to a height of 5 ft. 6 in. this wall is composed of concrete, and is 11 ft. wide. The rest is built of rubble masonry, and is 6 ft. 6 in. at the bottom. In order to keep the thrust that would be exerted by the filling off the wall, a platform was constructed on piles, and on this rested a layer of rubble stone, the whole extending back far enough for the natural slope of the filling. The wall is faced with brickwork, and cost about 24s. per foot run. The characteristic feature of this method of construction is its low cost. A somewhat similar plan was followed in constructing quay-walls on the Hudson, and so long ago as 1837 sloping piles were used for extending forward the foundations of quay-walls on the Clyde.

THE Municipal Council of Paris appears to have solved the difficulty of providing public conveniences for both sexes in a satisfactory manner, and, although what has succeeded in Paris might not be successful in London, on account of the differences in the habits of the inhabitants of the two capitals, the requirements of the two peoples are practically the same, and it may serve a useful purpose to put on record the manner in which this public want has been supplied in Paris. The concession to erect what the French call *châlets de nécessité* has been granted to a company for a period of thirty years, the company providing the châlets, and undertaking to keep them in repair, and paying a sum of 800l. a year to the municipality by way of rent. At the expiration of the concession, the whole of the buildings erected by the company are to become the property of the city, the fittings and furniture being taken at a valuation. The company have erected 101 châlets, eighty-four with ten compartments, and seventeen with four compartments. The cost of the larger of these buildings is about 560l. each, and of the smaller type about 360l. each, and the total capital expended is about 53,000l., the greater part of which will revert to the municipality at the expiration of the concession. The cost of maintenance of the buildings, irrespective of the fittings, is about 600l. a year. The amount authorised to be charged for the use of the châlets varies from 2d. to 1d., but the sums actually charged by the company do not exceed three-halfpence, and in some instances are as low as one halfpenny. The success of the enterprise appears to be greatly due to the low tariff of charges fixed by the company. Each châlet is placed in the charge of a woman, who is required to keep it in order, and is enjoined to use the greatest civility towards the public. The buildings are under the control of a superintendent, assisted by an inspector, and there are three collectors for the receipts, which are checked by a mechanical apparatus placed over the doors of the several compartments.

IN a recent number\* we indicated the particular houses which are appropriated for an extension of the Adelphi Theatre in the Strand. One of these is the Nell Gwynne Tavern in Bull

\* See *Builder*, November 27, 1886, p. 763.



Inn (or rather Bullen) court. That sign has hitherto commemorated the associations of Nell Gwynne with this quarter of the town. Yet it is in the neighbouring Exchange-court that we should look for the traditional abode, or, rather, dairy-house, of her who was uppermost in the thoughts of the dying king. We mean the old Thatched House Tavern on the eastern side of Exchange-court, which has just been taken over to serve as additional premises to the barracks of the Corps of Commissionaires. We are thus reminded of the popular tale which would attribute to Nell Gwynne the foundation of Chelsea Hospital for old or disabled soldiers. Few of our readers, perhaps, are familiar with the several alleys that open into the northern side of this end of the Strand. But they will repay a visit if it be only by the glimpses they afford of the rear premises of many old houses whose main Strand fronts are for the most part considerably modernised. Standing at the top of the steps of Lumley-court, for instance, and looking down across the Strand beyond, it is difficult to realise that, as we are told, our field of view has arisen in course of ages above the morasses that bordered the vast lagoon which here formed the estuary of the Thames.

**I**MPORTANT Roman remains have been discovered at Lescar (Basses Pyrénées). It is conjectured that the explorers have lighted on the site of the Roman town Beneharnum, which was destroyed by the Goths as they passed onwards to the invasion of Spain. The foundations of a fortified camp have been laid bare, and on a hill at a short distance, connected with the camp by a road, the plan of an extensive palace, with large baths, can be made out. All the rooms so far excavated are paved with mosaics. From the coins so far found, it is supposed that the palace is of the time of the emperor Gordian III. Between the hills or valleys and table lands on which the palace and the camp lie in all probability the town of Beneharnum stood.

**W**E are glad to learn that the students' drawings sent in to the Institute of Architects this year form so large and remarkable a collection that it has been decided to have a public exhibition of them, as will be seen from a notice in our advertisement columns, from Friday, 14th, at noon, to Saturday, the 22nd, at 4 p.m. As the Royal Academy students' drawings are thrown open to public inspection every year, there seems no reason why the Institute drawings should not be; and we venture to predict, even before seeing the collection, that a comparison of the drawings with those of the Architectural Section of the Royal Academy will suffice to indicate how secondary is the position occupied by that body as a school of architectural drawing and design.

**T**HE Trustees of the Alexander Thomson Memorial are offering a prize of 60*l.* for the purpose of encouraging the study of Classic architecture. It will be awarded for the best set of measured drawings from any Classic building, sent in on the 15th day of December, 1887. The conditions in detail are to be obtained from Mr. John Shields, the Secretary to the Trustees, 122, Wellington-street, Glasgow. We observe that no definition of the words "Classic building" is given in the conditions; it is not even mentioned whether it is intended to include Renaissance or modern Classic; probably not, but this should at least be made clear. We should prefer to see the prize given for the best design based on Greek detail and style, and adapted to some building for a modern purpose.

**L**AST year (on May 15th, 1886) we gave an account of the recent restorations by Señor Pablo Vera, at the Alcázar, Toledo, which has, after many vicissitudes, been converted into a training school for officers of the Spanish infantry. Last Sunday night the whole building, with the exception of one wing, was burned down by a fire, the extinc-

tion of which was rendered very difficult on account of a severe frost which stopped the supply of water. We understand that the fire broke out in the new library, where, as we pointed out in the above-mentioned note, all the fittings, including the bookcases, were of pitch-pine or some similar dangerously resinous wood. This is the third time the building has seriously suffered from fire,—in 1710 by the Austrian troops and in 1810 by the French.

**S**OME notice should be called to the works which the South-Western Railway Company are carrying out at the various stations on their loop line to Richmond, Barnes, Putney, and Mortlake. These were fairly pretty country stations, of red brick with black lozenges, mullioned windows, and Tudor chimney-stacks, &c., all quietly and nicely designed. They have now been "translated," and are the ugliest stations near the metropolis,—that at Mortlake being an especially abominable "contraption" of iron, wood, and zinc. We ought to improve in railway architecture as we have done in other branches of the art. The South-Western Railway are retrograding. Have they an official salaried architect? and is that the reason? or is it mere parsimony and callousness? In any case it is deplorable.

**T**HE Royal Academy have raised Mr. Marcus Stone to the full dignity of R.A., and created Mr. Gilbert, the sculptor, an Associate. No one will contest the claims of the latter artist to the honour, considered on his own merits; but we are inclined to ask, with some emphasis, why one or two older men who have done admirable work are to be continually passed over for younger aspirants, and by what arrangement it is that the author of "Cleopatra" and the "Spartan Dancing Girl" and "Summer" is left on one side? The appointment of Mr. Stone to the position of full R.A. will be a popular one, we surmise, with the general public, rather than with those who take art seriously. His pictures are pretty and attractive, but can much more be said for them? And when we think of some of the names that are still left in the list of Associates, or even outside altogether, the discrepancy between cause and effect seems the more marked.

**T**HE inquiry in regard to the proposed site for the Sutton Cemetery has resulted in the refusal of the Local Government Board, on receiving the report of their Inspector, Mr. Harrison, to sanction the use of the site for a cemetery. It appears this is the third site which has been refused in Sutton, and while sympathising with the Sutton local authorities in the difficulty and disappointment which must result from these unsuccessful attempts to find themselves a burial-ground, we cannot see, on the evidence given, how the Local Government Board could possibly have found otherwise. It was pretty clearly shown that the water-supply of the district, which is a chalk one, must come more or less by percolation through the proposed site of the cemetery, and though some courageous attempts were made to prove that water does not percolate through chalk, the received creed on that subject cannot be said to have been weakened. The conclusion is that chalk, under modern sanitary regulations, is an excellent formation to live on, but a bad one to die on; and for the present the only recommendation to be given to the good people of Sutton, who cannot get a burial-ground, is that which Jane Eyre gave when asked what naughty children must do to escape a certain place:—"They must keep in good health, and not die."

**Corporation of West Ham.**—The Town Council of this new municipality (which adjoins the eastern boundary of the metropolis) have appointed Mr. Lewis Angell, M. Inst. C.E., to the office of Borough Engineer and Surveyor, at a salary of 1,200*l.* per annum, with privilege of consulting practice, arbitrations, and evidence. Mr. Angell previously held a similar position under the West Ham Local Board during the past twenty years.

THREE DECORATIVE DESIGNERS.

HERBST, DE BLOND, AND GENTSCH.

To the books of designs "propre aux orfèvres," which we have already noticed, we now add to one which, although it must be ranked as inferior to those of Bourguet and Bourdon,\* is yet very remarkable for the originality and grace of the drawings it contains. It is "A Book of Several Ornaments fit for Jeweler, made by J. B. Herbst, 1708." Its author's name in full was Johann Bartholome Herbst, and his book would be specially interesting, if for no other reason, because it is one of the few of the class which seem to have been published in England. Paul van Somer is another foreigner who has sought a reputation in a similar way in this country, but his book, which was "sold in Newport-street," contains only some very uninteresting and weak borders for panels, and must be passed over. Herbst's designs may be divided into three classes: first, a great number of settings for jewels, rather heavy and of no special merit; secondly, some calligraphic flourishes; thirdly, a series of panels, suggestions in all probability for the chasing of silver cuff or pounce boxes, of peculiar charm, and of which we give two as specimens. It is necessary to speak of the calligraphic flourishes first because they undoubtedly influenced his more serious work. This calligraphic work has exercised a considerable fascination over more than one artist. We gave, as our readers will remember, in our issue of Dec. 19, 1885, a specimen of a quaint series of such designs which came from the pen of Albert Dürer. The fascination of this work may possibly not extend beyond the deviser of it, but for him there can be few exercises so interesting and useful. It must promote freedom of drawing and steadiness of line: being the mere skeletons of design, as it were, the eye can detect at once the slightest flaw; it teaches the art of clustering the main and subordinate lines at the point of spring, or *point d'appui*, of the design; and to execute it accurately and with precision demands a knowledge of the whole of the fundamental principles of decorative work. We confess, however, that when the style is used not for study but for absolute design, the result is the reverse of pleasing, and we must rank Herbst's devices of skeleton flowers done up in bunches with streaming ribbons with those of a similar nature produced by Coquin and referred to in our last article.

Turning to his more serious designs, their first characteristic may possibly appear to some as a blemish; it is a certain fineness and uniform thinness of line. But if we are right in our conjecture that silver-chasing was what Herbst had in his mind, this objection should be removed. It must not be forgotten that, although we talk of these engravings as designs, they are, in reality, in many cases drawings of the effect to be produced when the design itself shall have been executed in wood or metal. If it is intended to be embossed, the shadows caused by the raised surfaces must necessarily be introduced, and thus very often the thick lines produce a more effective drawing than one of a bit of chasing on which there will obviously be no shadows. Their second feature is the intensely floral nature of the designs. The first impression, indeed, is that the leaves and flowers are realistic and not conventional; but a closer inspection of them reveals at once that they are decorative and not imitative work. The broad undulating petals of the flower which figures in both figs. 1 and 2 seem to mark the poppy or the single peony as the fount of inspiration; in these two little designs it appears in no less than five different positions, now bending forward to the beholder, and now turning from him, and each of them with a peculiar charm of its own. The leaves are as clearly conventionalised as those of the acanthus, and the whole is so evenly covered that no one part is more prominent than another by reason of excess or lack of work upon it. Lastly, we would draw especial attention to the number of centres of design which the little oblong panel contains: there are no less than four, one above and one below the central flower, and one on either side of it. We are not sure but that this characteristic is not the one which makes many of Herbst's designs so charming: it is certainly one that is very rare. When the tangential principle of flowing lines is mastered, it is possible to cover closely any given space with

\* See "Two Old Parisian Jewellers," pp. 6, 74, ante.

flowing curves all springing from one centre: one of the chief pleasures of well-wrought design is the ease with which the eye travels along the numerous branches of the curves, and at length finds rest in the point from which all spring. This sensation of pleasure is enhanced when these centres are multiplied, and when, as in fig. 1, no one is made more prominent than another, and no one subordinated to another. Each centre has its own mission to perform, sending out sprays of foliage to cover a certain part of the space, but each covers approximately the same amount of space, and all four spaces are so closely interwoven one with another that an effect of symmetry, uniformity, and homogeneity is given to the whole. This same multiplicity of centres is to be noticed in the long narrow design sketched in fig. 3, and in less degree in the short one, fig. 4. Herbst's work very much resembles in spirit some of the best examples of Hindoo design.

From Herbst we pass to a designer of rare skill, but of less striking originality than Herbst, Michel Le Blond, who was born at Frankfurt in 1580. His best work was almost exclusively drawn for the gold and silversmiths, the most noteworthy among the pieces which are preserved in the British Museum collection being several series of elaborately-designed handles for knives, forks, and spoons. From these we have selected four examples (figs. 5, 6, 8) and one design of a kindred nature (fig. 7), as to the express object of which we are, however, unable even to offer a conjecture. These examples show the artist at his best and afford good illustrations of the three styles of ornament which he chiefly adopted. The two in fig. 5 are a very pure form of Renaissance, differing, however, from Bourdon's style in not a few particulars. In the first place, although the volutions of the main scroll are fine, the entire design is not so massive in construction, and the detail is slightly flimsy. One of the most apparent reasons for this is, we think, that where pure lines are used they are not of equal thickness throughout but are drawn of gradually increasing and diminishing thickness, like curves coming from a quill pen. Such lines constitute a more important feature in the general effect of the design than the corresponding curves in Bourdon's frieze, say in fig. 9 on p. 75, *ante*; and this because they do not lend themselves to branches, but are perforce left to themselves. There is consequently less scope for the origination of subordinate branches and detail, the foliage is necessarily confined to, and can only spring from, the ends of these "quill-pen" curves. The animal forms tolerated by the style of the ornament follow as a matter of course, and so we have the birds slung as usual among the branches. But although less massive than Bourdon's work, Le Blond's has a peculiar graceful charm of its own. The quill-pen line introduces some very pleasing varieties in some of the well-known conventional forms. Note more especially the bird close to the bird's head in the centre of the large handle in fig. 4: its under limb stretches away to four or five times the length of the upper one, and, besides forming a perch for the bird, allows the little seeds to be introduced with charming effect. The little spoon-handle in fig. 5 is in the same style, but from another series with a more elaborate outline. The handle (fig. 6) is a simpler example in the same style. From this first style the transition to the second is marked only by one peculiarity, but it is of sufficient importance in principle to demand separate attention. There is a great deal of it to be found all through Le Blond's work, but fig. 7 is one of the most striking illustrations of it. The general structure of the design resembles that of the examples already noticed, the volutions of the quill-pen lines being, however, much more elaborate; but the curve complications are so numerous and intricate as to leave no space for bird, beast, or little fish. The noticeable feature is the introduction of a species of perspective by means of the dotted lines. Our criticism of this new feature, which, so far as we are aware, has never been used before or since Le Blond's invention of it, must be considerably influenced by the object for which the designs were made. If we may make the assumption that the drawing is intended to be a representative one of a piece of complicated metal work composed of interlacing curves, not worked out in the flat, but in which the curves do actually go behind and before each other, then the dotted

lines sufficiently accurately express the effect which would be produced. But if the intention of the designer was, as there is very little doubt it was, merely to ornament a flat surface, and if the drawing is meant to be a piece of decorative and not of representative art, then we are compelled to confess that he has fallen into the grievous error of making things seem that which they are not: in the special instance, of giving to a flat surface the similitude of a deeply embossed one. Michel Le Blond may be pardoned this fault for the general excellence of his work; but we may well pause for a moment to emphasise how great the error is, for it is in these modern days a too prevalent one. In the first place, it breaks through that essential line of partition separating representative from decorative art, on the existence of which we have so much insisted. From this almost every other canon of the art flows naturally. One of these canons is that in the effect produced the existence of the surface decorated must never be obliterated. If it is obliterated, the whole art and purpose of the ornament is destroyed. In both representative and decorative art there must, of course, be a surface

of the chief charms of this pure line form of ornament.

It is with some feelings of sadness that we come to the designer of the iron gate-handle, fig. 9; it is some compensation in studying the work of an age long past, though we know but little of their lives, to know the workers at least by name. To the writer of these articles the names Bourguet, Bourdon, Herbst, and Le Blond have become, through long study of the work, something more than mere names. Their own creations have in their turn made of the shadow that is left of them a substance, an actual person who lived and moved and had his being some time since, and with the workings of whose brain we can have actual and practical intercourse. But now we come to one of whom we cannot speak by name, who in a catalogue can only be described as "Designer Unknown," or thus with a dash "\_\_\_\_\_" not to be distinguished from others similarly described or dashed, save by the appalling title of the "Designer of the Iron Door-handle," or knocker, as the reader wills. In the British Museum Collection there are six of these handles, all of the greatest merit, and they are too evidently but the slender remains of a book, or



Fig. 1.



Fig. 3.



Fig. 10.



Fig. 4.



Fig. 11.

on which the work has to be executed, in the former, by so much as its existence makes itself felt through the presentment which is limned upon it, by so much does it mar the effect intended to be produced; but in the latter its existence is the very *raison d'être* of the ornament which is wrought upon it. Obliterate the surface, and the design ceases to have any meaning; feebly alter its character, by artificial means change its appearance, the design then has a double meaning, one of which at least is beyond the capabilities of the art to fully express. The third style in which Le Blond worked is a curious thin-lined arabesque. It is a style which was much in vogue in the seventeenth and eighteenth centuries among both French and German decorators. The ornament is cut in very thin lines on a black ground, and is at first sight most unattractive to the eye. The designs were probably, however, intended for enamels, and, executed in colours of a less violent contrast than black and white, their heaviness would become apparent at once. We have in fig. 8, translated one of the handles ornamented in this style, the black lines in our sketch representing the white ones in the original engraving; it is a very fine specimen of intricacy and clearness combined, which is one

of the choicest work. The floriated arabesque chasing is twined round the plain part of the handle, gradually increasing in proportion with the gradual swell of the handle itself towards the centre. The centre-piece itself is a masterpiece of design; we can easily imagine the lion's head standing out in bold relief on a species of escutcheon to which the two snakes act as supporters, they themselves binding the wreath of acanthus leaves on to the simple iron bar. Iron-smiths are busy to-day turning out charming work for the beautifying of our houses; here are six models of the finest beauty, well worthy of the skill of the most capable of their craftsmen.

From the unknown we now go further into the past to introduce to our readers the work of a man who is, at least, known to us by name,—Andreas Gentsch, who flourished at Augshurg about 1616. The two designs, figs. 10, 11, are the only two in the collection which can be attributed with any certainty to him, on account of the monogram, A.G., which, in the little oblong panel he has placed in the tiny escutcheon in the centre, and in the circular one he has woven into his design, after the manner of the German masters, with whose work we are already familiar.



THE COMPLEMENT OF ARCHITECTURAL INSTRUCTION.\*

SINCE I last addressed the Architectural Association, the Examination in Architecture, once voluntary, has become, for those intending to take architectural status, compulsory. Not only that, but there is a large sprinkling of the members of the Institute, Fellows and Associates, who have passed an examination of a much more general and searching character than was then open, viz: that for the certificate of competency for the office of District Surveyor.

The consequence has been that those now entering the profession have set before them at once an object, and means to obtain that object. The Institute is only an examining body. The Architectural Association furnishes the younger members with means for comparing their knowledge together, furnishes that emulation in learning which is the real stimulus to exertion.

This emulation in learning opens up to us the great pleasure which learning confers. It is also the opening up of the great conflict which is to come to us all,—the conflict between the younger and older members for employment.

In this conflict two preparations are needed: the learning which can be taught; the experience which can be gained.

Learning can be taught by preparation for an examination; experience can only be gained by the persistent study, the mastering of each fresh detail of business, which comes before us while we lie under the responsibility of mastering it.

This learning is like the coral growing at the proper depth in the sea. This experience is like the comminuted fragments which cluster round the base of the coral, and which time and chemical action convert with the coral into a hard stone. One part may be calcite, another aragonite; the two may seem alike, but fire and frost will find out the difference, and fire or frost will come to test the student's stock sooner or later.

I have been asked to write you a paper, and I feel honoured by the invitation; and lest I should be thought to take unduly the standing of one who has a right to discuss design in building from having had the special practice of an architect, let me at once say that it is as an onlooker at the profession that I come before you, as one who has devoted the best years of his life to what by many is considered drudgery, but which I shall continue to believe is a legitimate part of an architect's business, one also which, I must admit, requires all the interests which can be found in the subsidiary charms of architecture to enable those who follow that branch to retain in its practice the professional aspect rather than the mere curriculum of business. Such labours, though they do not enable one to point to any building as the fruit of their exercise, at least have this recommendation to you, that they bring such a worker into acquaintance with a great variety of the aspects of the profession which you are now entering. Therefore, without more ado, I address you as fellow students in a calling which I trust each one of us will leave, so far as our own influence is concerned, not less honourable than we found it.

In these times there must come many thoughts to all thinking men as to the progress of our profession. There are many coming into it. There are older ones who had not your education, but who have collected much experience. There are younger men who have better education than your elders, but who are yet collecting their experience. Their coral construction stands up above the general surface of the surrounding material, construction of which they are liable from time to time to have such points as have been their glory fed upon by the bottom-browsing fishes of the profession, knocked off and carried to form the support of other individuals, less adventurous as regards personal growth.

It is as regards this struggle for existence and your personal preparation, as to your taking part in it and obtaining enjoyment from it, on which I would address you.

You have to study human character, the materials at your command, the forces of nature, and the constitution of society; with all these you will have to deal by your personal

\* A paper read at the meeting of the Architectural Association on the 7th inst., by Mr. Thos. M. Rickman, F.S.A. (Past-President).

With regard to his monogram, he shared the pleasure with Altdorfer and Aldegrever, of possessing a capital A in his name, and the consequent pride of being able to model his monogram on the well-known one of Albrecht Dürer. The solitary criticism on Gentsch's work which we have found in the books is that he produced designs of great inferiority to those of Aldegrever. We profess ourselves quite unable to find the least resemblance between the work of the two artists; and if comparison must be made between them, it is certainly not unfavourable to Gentsch. But "comparisons are odious" and we do not intend to make them, but to leave the work of each to stand on its own merit. This article has, however, stretched beyond the limits we had assigned to it, and we therefore leave the more detailed criticism of these two charming panels to a subsequent article, in which we shall deal with a series of designs, all, unfortunately, without signatures, but which may all be grouped as the product of a school of which Andreas Gentsch was, without doubt, a very prominent master. We close this article with a sketch of a charming little floreated arabesque panel, fig. 12, by Friedrich Brentel, who flourished about 1608.

and of whose work, alas! we have come across no other example.

**Architectural Lectures.**—The evening lectures on the Science of Construction and American Survey Practice, delivered by Mr. Gribble at Exeter Hall, are to be renewed on the 20th inst. These lectures have drawn, we understand, a considerable and increasing attendance, which has encouraged the Committee of Exeter Hall to continue them at their present very moderate entrance fee.

Fig. 13.—Small Circular Panel for Chasing. Designed by Michel le Blond.

character and by your knowledge. In the fight for business you will seldom think of history. Language you must use as a tool, your physical strength you must first exercise, then husband; after that will come a time when it will be remembered only.

Whether any one of you will attain to the first rank or not depends, first on your parentage, then on yourselves. If your parents have restrained themselves and you from self-indulgence and unnecessary expenditure, then you may draw on their resources and your own during the ten years after your articles are over. This will enable you to mix with those from whom you may gain and to bring up yourselves, your pupils, and your own children in the habits of self-restraint, and of economising your and their resources in every way.

Your future position depends on what you have made yourselves to be. You must learn to respect yourselves, to become such persons as those in whom you yourselves would have confidence. Few persons are guided by strict reason, more in number are guided by the influence of others. Is a person likely to have formed sound opinions? Then listen to what he tells you. It is your duty to select your own guides, and mainly by your own personal character, for the formation of which you are each responsible, will you stand or fall.

Such is the object of each of you; what are the incentives you have? What are the pleasures by the way to be obtained? That you may be led on in your professional course, that you may hand down what you have received to your pupils, and, if you have that happiness, to your children.

The threads of your study are very various; you may pursue, each of you, a separate course, and for each it will be found to be a life's labour. You have, if walking alone, the fatigue of travelling on a straight and tedious road with an end at an unlimited distance; but combine your pursuits and each throws light on the other's course, the mass of life-threads does not become entangled, but each point of crossing of different sets of ideas is a mark by which you may recognise progress, a step which you can register, a pleasure which you can enjoy, a cross light which brings into relief the modelling of that particular district of science and art which you take to be your individual study.

What are these cross lights of the profession? Those matters which will continue to interest you without the use of a telescope, things of which we are all bound to know something, and an architect more than others. Let me jot some of them down otherwise as they occur to me.

Our old churches when carefully cleaned and repaired, are their chantry to be used? Is such a building most suitable for the services of the Church of England?

Are old City gates to be retained when they block up the entrances of our ancient towns? Are they not in the way? Are the entrances established for several generations for access to the profession likely to last better? In either case must not the entrance for those who succeed us be where it has been, perhaps with more extensive use, but with unaltered purpose?

Can we learn anything by the lines taken by old Roman roads through this country and by their succession to the British roads, and their expression by Medieval routes and their successors? Do the roads we pass recall to our minds the pack-horses, the wagons, the coaches, the steam and varied traffic of successive periods?

What has the present low price of building work to do with the appreciation of gold or the difference in comparative value of gold and silver?

Are we to take materials or labour as the basis for monetary value? Is not the value of materials that of labour, plus or minus the influence of local circumstances such as may affect production?

Are we to view capital, our own or our clients', as the unexpended surplus of our fathers, for which we are trustee, or as our own savings? Is there any other view of it which we should be justified in adopting, without the expectation of coming to grief?

Is the proprietorship of land more than the duty of giving tenants quiet possession? To what extent does continued use of land confer on the tenant a right of continuance in occupation?

The law of England, written and unwritten, as regards tenancy; the customs of England as

regards connexion of landlord and tenant; if they are being dissolved, is it our duty to support them, or ought we to assist in their dissolution?

Can we recognise the special qualities in stones, from finding some weathering down in the centre, leaving the joints projecting and others weathering in the joints and leaving the centre part projecting?

If when we are leveling, we use the walt on a tree trunk as a bench-mark, does it convey to our mind any idea of its nature and of the story of the virus or domestication of an insect?

Have we any hopes of finding a carver who will stop off his carving to etch the fossil in a stone or adapt his carving thereto?

Do we treat of drawing division lines in our profession, let us remember the Roman wall; what does it now keep out? The foss round an old earthwork, what does it now protect? The Tyne, the Tweed (shall we say the Tay and the Forth?), what do they now separate? Do we not now look on both sides of its crumbling remains to know anything of the history and purpose of the old wall? are not the bridges over the ancient chasms ties where before was a recognisable boundary?

Are the present recognised divisions of the profession, such as the separation of the duties of architect and surveyor, likely to last any better than that magnificent device of disciplined force against barbarism or the obstacles of nature which now we have learned to subjugate?

Such are among the questions which will interest you, and on which you will take varied views as you proceed in professional practice; and each question, as you learn its bearings, will tend to send you back to your business avocations with a fresh view of your duties.

Let us now consider some of the principles which are likely to influence you, unawares perhaps, as you proceed. I treat not of your every-day dealings with the business men of many varieties whom you will encounter, but of those opportunities which may influence your character and give you the power to make friends among those whose opinions you will value, and will enable you to take steps upon the ladder,—the ladder of advancement to upper stories to which you are called, not the treadmill to which you are condemned.

I have said history will be seldom in your remembrance: you must think of something else when you are designing. Buildings make the record of history,—your buildings can be fixed to your own time, as you cannot avoid using the inventions and practices of your day. Your footings will stand on concrete, if your floors are not laid on or made of that material; your bricks will have frogs; your paving may be machine worked, your stone facing likewise; your rough timber will be cut with a circular saw, and be of trade sizes; your joinery machine-made; a scrap of cast iron or rolled iron joist will tell its tale, as well as the nails and screws and bolts you may use; a scrap of trade ironmongery or plumb's brass work will tell its date; your lead will be milled, your pipes drawn, your glass made in the French manner, or, if thick, will be cast; and your paint will carry with it elements of its own destruction. Mætic, Medina, Roman, and Portland cement and terra cotta of all sorts will, so long as they last, date themselves.

Other interests you may find,—in ancient earthworks, which tell of the state of attack and defence in the old times, and of the situations desirable for defence; in the outlines of parishes on the hill sides, which help you to study and perhaps to fix the date when those districts were settled; in the outline of enclosures which tell of the conversion of common field to closes, while the outline of hedge-tops of ancient cultivation, and the division of land tells of common husbandry. In the study of groups of churches you will become acquainted with the handiwork of a mason of old days, and the locality of such combinations of fine buildings will introduce you to the causes of the local opinion whence came the necessary expenditure to produce them; in the mixing of a plinth or of a string course you will obtain a hint of the history of a building; in the alteration of form in a corresponding moulding used in works of successive periods you will see a likeness to the variations which have occurred in words in our language. All these and many others are matters which we can learn by experience only to value.

For examination it is necessary to receive accurate instruction. The information must be given lesson by lesson and put together in your minds,—you must learn the several matters in the form in which they appear to the minds of others; you must pass your mind through their rollers, you must be moulded to their cutting edges: your information must be built up.

And here let me note how much it is to be learned by, and how much of the best practice of our art has come from, the special difficulties under which each building is executed. It is not for all works that an original design is obtainable. In two of Professor Cockrell's best works, the continuation of Fitzwilliam Museum, and the completion of St. George's Hall, Liverpool, in each case the design was another's.

In two of Sir Charles Barry's most interesting works,—Frothingham Hall and Harewood House,—the old building was comparatively unaltered. Much of Sir Gilbert Scott's labour was expended on restorations, and whatever excellence they have must be derived from the appreciation of the original design. Sir James Pennethorne's completion of Somerset House displayed its originality in the acceptance of a previous design. In Mr. Waterhouse's two largest domestic works, the plan of Eaton Hall remains to a great extent; the outer walls with their time marks still enclose the new building at Heythorp.

After examination you will have to grapple with the selection of materials suitable for your client's purposes, and, if you are up to the age, the style you adopt will be adapted to the inventions of the time. You will learn whether to select bricks for their fire or their acquired colour and tone. Brickwork is a material which will sooner of any toll of your knowledge by its weathering; your success or otherwise in the colouring of brickwork will depend more than anything upon having a similar finished surface on all your bricks though they are of different colour. Your stone must be used as needed: it will, so long as it lasts, tell, by the size of the pieces used, the liberality or otherwise of your client and of your own views. The use of the rolling-mill for preparing wrought iron is the key to the practical support of weights; for some time past each iron has been used horizontally; probably, in the coming time, it will be used vertically. The advantages of large sheets of glass and the cheapness of other metals will also affect your compositions.

The work which you are engaged upon before Examination and before commencing practice is to that of the practising architect as syntax is to prosody. When you come to look on your own work in execution,—when you have learned to make a building which will sustain itself, which will contain with convenience its proper occupants,—after that you will find out that there are such things as false quantities in architecture. This sense is an acquired one. Every section of moulding has a date of its own besides having a meaning, every breach of the known periods and collocation of details is an offence to the educated eye, every mixture of motives in a design is an offence to the knowledge of those whose eye can criticise, every jarring contrast of colour is an offence to those who have a sense of colour: in each case the offence has the same effect as the dropping of an aspirate, or the misplacement of an accent or an emphasis, or as a false quantity in verse. Your training for these sensations, which you will specially feel in your own works, is what you have to look forward to; your practice without breach of such artistic etiquette is only the work of an experienced, as it is the severest test of the executed works of a true architect.

And as regards colour, let me allude to two of its aspects. It affects us first as a sense of the material used and also, by refraction and reflection of light, as a sense of surface; surface only is paint or shine polish, other meaning is the material itself; these, if you have an architectural mind, you will discriminate and learn to see. Without the preservation of the polish, few materials retain their original colour, for weather and time attack all,—a warning to us all that colour is only a momentary beauty, put on by the plant in the flower and the fruit; shown in the granite at its fracture, existing only in the shell at its seasonal development, and by all other things which are admired, visible only at the moment of their supreme beauty. True colour is the mark of perfection and of evanescence. It is to be used by architects, either by emphasising contrast or adopting

harmonious arrangements; in contrast meant to give pleasure to the active mind, in harmony to give rest to the jaded senses.

After examination you will have a stock of fixed impressions to which you can add; you will occasionally do this by meeting some one whose mastery of his subject at once impresses you, some one under whose instruction you will willingly sit, but the principal source for increasing your power of scrutiny and your stock of impressions will be the careful examination of whatever fresh points of practice or of art may come before you. You will then begin to put yourself in the place of the man who did the things you look at. How did he do it? will you ask yourselves. What made him do it? For what purpose did he do it? By this you will learn to change the order of your learning from synthesis to analysis.

The pleasure of the first is in feeling the capacity of reception. The second pleasure is that of exercising the mind. The use of all your learning is in its application, and each must learn it for himself. Thus the practice, the science, and the art of architecture grows into one; each of them basits pleasure, but the practice is confined, the science is limited, the art is disappointing.

Another and more excellent thing is analogy.

If a mathematician wishes to make the line of his diagram represent a force of which he is treating, he must put arrows thereon to signify direction, accustomed forms of growth take the place of these arrows in natural objects, but how does the architect represent his forces? William of Wykeham, when he changed the aspect of the old bays of Winchester Cathedral, which had been Norman, builded up of stones, and which he left one whole design springing from the ground, marked his lines in a manner that emphasised the direction of them in a manner which still tells its story, and though he added material, he left the effect of lightness. I commend this change specially to your consideration as involving the *modus operandi* of a great architect. And in the same view let me ask you to consider how it was that that great architect when he had before him repeated in Winchester Cathedral, as it then was, the beauties of the perspective view of the central portion of a Norman moulded arch, and had also such specimens as are there seen of the graceful meeting of the mouldings at the upper third of a pointed arch, wherein each side is struck from a single curve, and of elaborate Decorated characteristics, should have preferred for his own use a four-centred arch. In such an arch, only the stiffest portions of the curve are contrasted at the apex, and neither the gradation nor the contrast of the earlier work is seen.

Was it the fashion of the day which guided him? or was there in this form some hearty which he recognised and which we ought also to appreciate? or, on the contrary, was it in this manner that the progress towards decadence in style was manifested in this country? Are we to contrast or to compare with this the progress marked in the French Flamboyant in the treatment of the junction of the pier and the arches which it carries, a combination of those members which in the earlier and purer style of French architecture has been so completely severed? Such are some of the questions which your later experience may practically treat.

Ancient buildings are true representatives of the permanent portions of the art, science, and resources of the times whence they come down. The successive changes of style which they exhibit are the direct representatives of the ability and of the motives of those who made them. To the architect their succession goes beyond that mere superficial notion, it conveys to his mind the evolution of an idea. A series of evolutions produce from decadence a fresh spring of life, when some new purpose was in the hands of mankind to carry out.

Imitation with purpose may be seen in the tracery of a bird's nest; geometry, and the true result of the doctrine of chance, without formality, in the surface of a coral, and in the smallest specks of lime through which life has passed or which formed part of a living being, and which the deep-sea dredgings of the Challenger have shown us.

If our study of architecture leads us to find out how means should be used by the ingenuity of mankind for their own purposes, we should not confine our attention to buildings, but we should consider also, beside the mineral, the

other two kingdoms of nature, vegetation and animal form; and for ingenuity of contrivance, perhaps the greatest pleasure which an architect may have in his building, none that he can attain to can match the folding up of flowers before they burst; we should notice them also in their unfolding, which we may sometimes watch and see,—we should take note of shells in their origin and in their growth, and all of these objects of nature in their unlimited variety of form and in their varied colours. The bending of the stems of plants will attract our attention under the increasing weight of the flower and fruit, and the outward form, when once we have learned its mode of growth, will tell of the unseen tap roots and the spreading bases of the trees. Beside their botanical interest, these all tell of means to an end. The mineral kingdom, in its details, the result of past forces, whose order, whose interferences, whose nature microolithology teaches; the vegetable kingdom of present active forces, whose organism chemistry and physiology are now dealing with, and which repay in interest a hundredfold every hour spent upon them by an observer with an open eye; the animal kingdom in the forms veiling and maintaining the powers of action, the septa, the centres of action and of radiation, the internal and external skeletons, the teeth, the vertebrae, the limbs, the bones of the extremities, the object of each illustrated by their relations and position, needing but the muscles to exhibit their action: all point to a future use. Forces which have been exerted, forces which are in action, forces which are in hand.

These are some of the analogies which the architect, who has to use the materials of nature for the purposes of mankind, has at his door for his professional uses as well as for his own interest and instruction. Interest and instruction which will give him pleasure in life and make the science the art and the practice more than a business, will make it an avocation worthy of his highest powers.

One more illustration: the chick, when it has been incubated, has for its first business in life to break its shell,—need I say that nowadays the architectural pupil, like the humbler being to whom I have dared to liken him, has a large store of materials ready to his hand? So soon as he has assimilated these he must break his bonds and commence solving the enigma of life, how to get on, whether as the chick which assails that symmetrical work of art, the eggshell, from the inside; or, like the great navigator who found a way to make his egg stand by breaking it from the outside. In any event each of you has to find an opportunity first of all of breaking his bonds of pupillage and then of finding some one who will have confidence in his abilities. First of all he must have confidence in his own.

The instruction we have received has been didactic. The course we have to pursue is still the gathering of information, but it is to be accumulated upon a nucleus which has been already formed.

The basic system of mineralogy is a step for us on the ladder; the new chemistry and the structure of molecules; the last botany; the arrangement of the parts of flowers and fruits; comparative anatomy, and the number of the bones of a living creature. Every study we may take to is another opportunity for analogies to help us,—another opportunity for us to study the architecture impressed on every object which is the subject of natural science. Let us be thankful for them, and learn to make use of them, not that from new views we are to receive lessons contrary to those which our fathers have taught us, but for us to obtain additions to our stock of knowledge, and to the ideas we possess, and to our powers of application, through which alone we can employ the teaching we have received, and the further experience of our lives.

We may work a long time at collecting facts, but in the course of time we begin to see the reason of things, and then, instead of mere facts, we have the knowledge of a truth, and then we are initiated into a new mode of learning, the learning of a man who has to practise, not that of a man who is getting up a subject.

Thus we shall learn to judge building, as designed now by an architect who practises in a style to which he bends materials, and again by another architect who sees in materials the means of accentuating a style, and shows in his constructive details the principles inherent in

that style. This and that man each displays a mastership in art, not one which we are to follow, but from which we are to learn.

And need I dwell upon the pleasures that such knowledge and such an aspect of our art afford? Such list contains the delight at finding out the purpose of the varied parts of a flower; in noting the adaptation of the various processes of a bone; in tracing the history of a shell either in the individual life of its occupant, or in its deviations from ancestral forms; the tracing of the strata on a ground surface of rock; the recognition of outline of a *roche moutonnée* and of the drift which slopes up to it in one or in another direction; acquaintance with the mode of weathering of rocks, which brings out the different character of the strata, or the different components of the material, which tells us of the history of the cooling of the earth's crust, in gneiss, in granite, in trap, or in basalt. Observations of the interpenetration of a crystal, and its almost geometrical instinct, and its mineralogical character. In meteorology as affecting temperature, winds, vegetation, soil, water, and the amenities of life. Many of these may be of use in determining the materials or the aspect of our houses, but for the purposes of our present view, they have a greater value, as they show us that life has another object than earning five per cent., and that ours is a profession which should make us, above all men, persons of individual character, thinking individuals who study cause and effect, not men who are content with the next and immediate consequence of our actions.

[Of the discussion which followed, we give a report on another page.]

CHELSEA TOWN HALL.

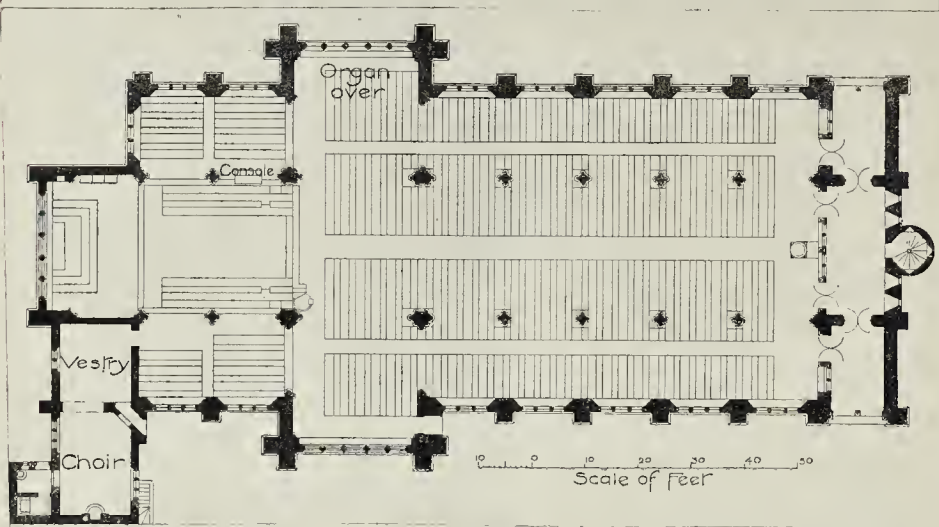
ADMIRERS of the richness and fancy of seventeenth century Renaissance architecture will not fail to be more than pleased with this beautiful work of Mr. J. M. Brydon's. Seeing how many of our most celebrated and best-known London churches are in the same style, it is, perhaps, unavoidable that, to a Londoner, any hall arranged and decorated in the same manner should have a slight ecclesiastical flavour about it; indeed those well acquainted with the style in Italy and other countries cannot help being struck with the same feeling at first, merely from the force of association. In fact, however, the luxuriance of the style, the freedom and fancy of its ornaments, and the way in which it in every part seems to laugh at all rule and constraint, make it far more appropriate for a building like a modern "town hall," to be used, we imagine, among other things, for banquets, balls, concerts, and such frivolities, than for a church.

The hall itself is a fine apartment, with a recessed *daïs* at one end, and a gallery over the entrance lobby at the other. Surrounding the walls to a considerable height is a  *dado*  of walnut, sumptuously moulded and luxuriantly carved in places; this forms a continuous base to the walls, which are divided into bays by grouped pilasters of Devonshire marble. At each end a pair of columns of Breccia is introduced, those flanking the *daïs* being exceptionally beautiful. The segmental arches connecting these pairs of columns seem to spring somewhat awkwardly. We should have liked better to see them elliptical: the form of the ellipse is introduced in the shallow domes of the beautiful ceiling, and would not have been out of place. The light is ample, and, being all high in the walls, is very pleasant. The coats of arms of old Chelsea families are introduced in the lunettes, but all other colours, both in the windows and on the walls, is reserved for future consideration.

The council-chamber and committee-room are essentially comfortable apartments, or will be so when they get a little colour on the walls, or at least in the way of carpets and furniture. The fireplaces, with their dog-grates, old Dutch tiles, and carved mantels, are gems, and so is the charming little minstrels' gallery in the council-chamber.

The kitchen is a fine apartment in the basement, fitted with apparatus to cook for a very large number of people, chiefly by means of gas. There is also a smaller hall in the basement, chiefly for political meetings, but not yet completed.

The accommodation generally is greater than in the original plans, and the whole scheme has evidently been thought out with a great deal of



Plan of Competition Design for Church of St. Paul, Kensington.—Mr. Jas. Brooks, Architect.

care since the first drawings were made.\* The architectural details show Mr. Brydon's masterly knowledge and taste.

Mr. Charles Wall, of Obelsea, was the general contractor for the works. All the carving, which is very good, both in design and execution, was executed by Mr. W. Ammonier; and the decorative plaster, which is also very good, is by Messrs. J. & S. Saunders. The marble work is by Messrs. Good, of Plymouth, and Mr. Houghton, of Portland-road; and the Breccia columns, mentioned above, by Messrs. Farmer & Brindley. Mr. Kemp executed the stained glass. The heating arrangements are by Messrs. Bacon & Co.; the fireproof floors by Messrs. Homan & Rogers; the fire-extinguishing appliances by Messrs. Merryweather & Son; the gas-fittings by Messrs. Verity & Sons; and the cooking arrangements by Messrs. Beuham & Son. Mr. Charles Osborn was Mr. Brydon's clerk of works.

#### OXFORD MARKET.

"I SHALL have it tender and hot from the most classic market in London,—that of Oxford," urges James Barry in inviting Edmund Burke to eat a steak with him one memorable evening at No. 36, Castle-street. Burke broils the steak meanwhile that Barry has gone out for the porter, which loses its "fine foaming top," pleads his host, in the wind across Titchfield-street. The Metropolitan Board of Works have decreed that Oxford Market shall be known no more. The market-house, its vane bearing date 1721, was pulled down six years ago for the Oxford Mansion. A view of it is preserved in the series published by the late Society for Photographing Relics of Old London. It was built by Edward (Harley), second Earl of Oxford and Mortimer, but was not opened for a market until 1732, says Allen in his "London." About that period,—authorities do not agree as to the precise date,—houses along the northern side of the then Tyburn-road were completed under the style of Oxford-street. That street formed the southern boundary of the old Tyburn estate, from Tottenham-court-road to Marylebone-lane. Hanway-street was already in existence, and Gibbs's elegant little church, St. Peter's, in Vere-street, was erected circa 1724.† With the exception of a few isolated houses,—one of them the Castle tavern,—the northern area between those two limits was open country, extending to the Bowling Greens and the old

\* See illustrations in the *Builder* for May 2, 1855.  
† Redecorated and reset 1852. Vide the *Builder* of December 19, 1852, and of Nov. 12, 1851.

parish church near to the Aye Bourne. Within Pennant's memory Oxford-street formed a rugged road, frequented by foot-pads and cut-throats. John (Holles), fourth Earl of Clare, who had married the Lady Margaret, third daughter and co-heir to Henry (Cavendish), second Duke of Newcastle, was gazetted Duke of Newcastle on April 30, 1694, three years after his father-in-law's decease. In 1710 he bought the Marylebone, or Tyburn, property, excepting the Park or Crown lands, from Sir John Austen for 17,500*l.*, the rental being then 900*l.* per annum. This estate devolved in the year following upon his only child, Henrietta. She brought it in marriage (1713) to Edward Harley, who in 1724 succeeded to his father, Robert, as second Earl of Oxford. By the union of their only daughter and heir, Margaret, with William (Bentinck), second Duke of Portland and Marquis of Titchfield, on July 11, 1734, the property passed to her husband's house, its present possessors.

#### MAP OF LONDON SHOWING THE BOUNDARIES OF SURVEYORS' DISTRICTS.

WE publish this week the third section of this map.

#### Illustrations.

##### SCULPTURE FOR THE HARRIS FREE PUBLIC LIBRARY, PRESTON.

WE give this week a general view and several enlarged groups from the sculptural decorations of the Harris Free Public Library and Museum at Preston.\* This is one of the most important works of late years in which sculpture of a high class has been employed as a decorative accessory to architecture; and we hope other examples may follow.

The subject of the design is the "School of Athens, Age of Pericles," it represents the Athenian statesman with the most famous of his contemporaries in philosophy, poetry, literature, and art:—

"The dead, but scepter'd sov'rans, who still rule  
Our spirits from their urns."

In the centre, Pericles, with his friend and adviser Anaxagoras, confers with Pheidias and Ictinus respecting the Odeon and the Parthenon: Pindar celebrates a Victor in the Games.

\* We gave a view of the building, showing the pediment filled by the sculpture, in the *Builder* of Sept. 9, 1852.

On his right, Parmenides, Zeno, and Socrates discuss Philosophy; and Thucydides meditates History. On the left are Eschylus, brooding over the future of Athens; Sophocles and Euripides in converse upon the Tragic Art; and Herodotus with his completed Books.

The sculpture is entirely designed and modelled by Mr. E. Roscoe Mullins. If we understand rightly, the general idea and arrangement is due to the architect, Mr. Jas. Hibbert.

#### CHURCH OF ST. PAUL, KENSINGTON.

MR. BROOKS'S design in the late competition is illustrated by us this week. It was submitted under the motto "Credo," and its principal features are described in the following short extracts from the report to the Committee, which accompanied it:—

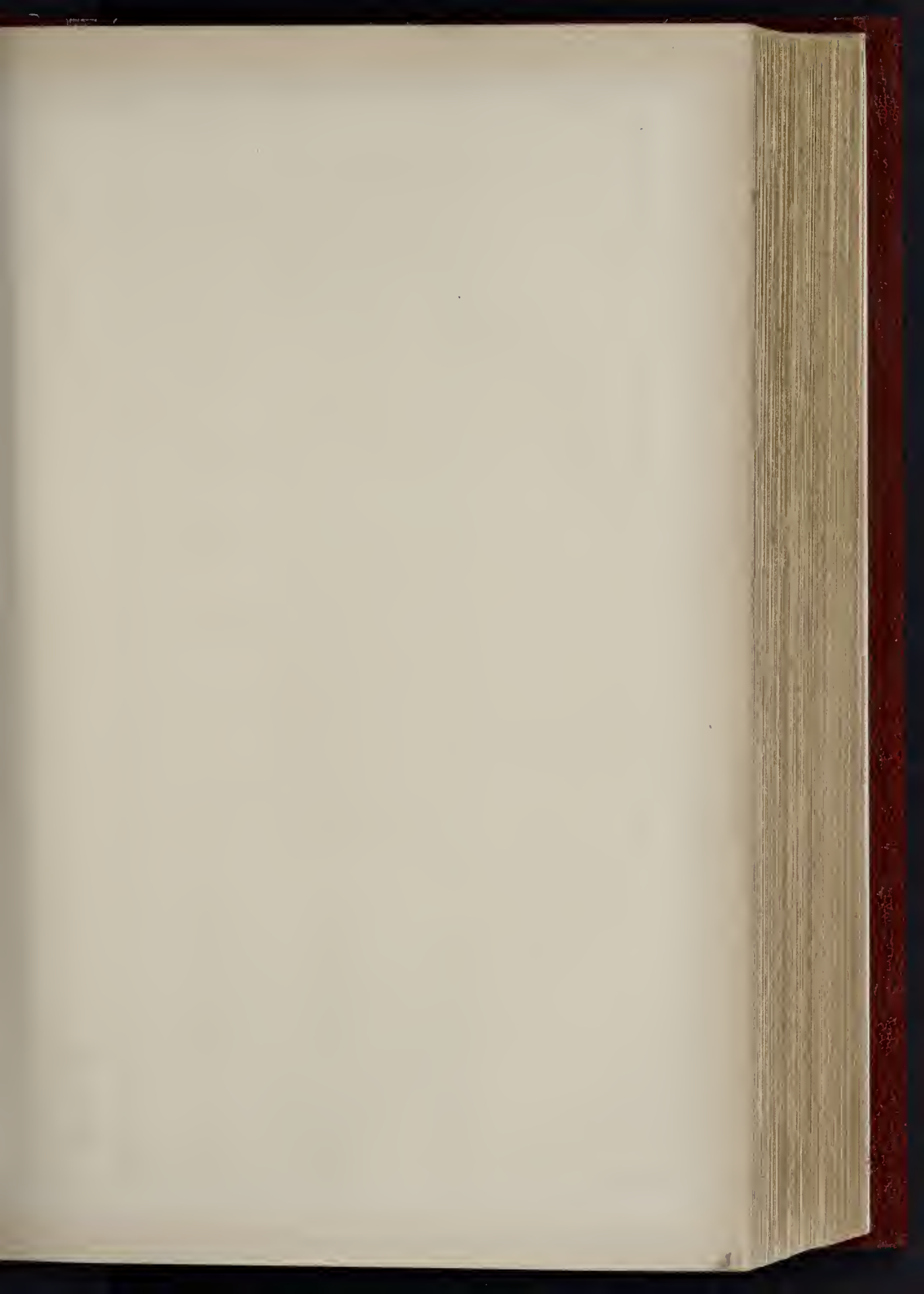
1. Being intended for a mission church in connexion with the parish church of St. Mary, Kensington, pains were taken that it should not have too prominent an appearance, but rather that of a chapel of ease, so that it might not be mistaken for a parochial church.

2. The situation being very circumscribed, not only as regards approaches, but from its being almost surrounded by very high houses, there would be an impossibility of obtaining a satisfactory view of the exterior, or, indeed, of obtaining any perspective view at all. For this reason a most simple treatment is applied to the exterior, and a more finished and complete appearance is given to the interior.

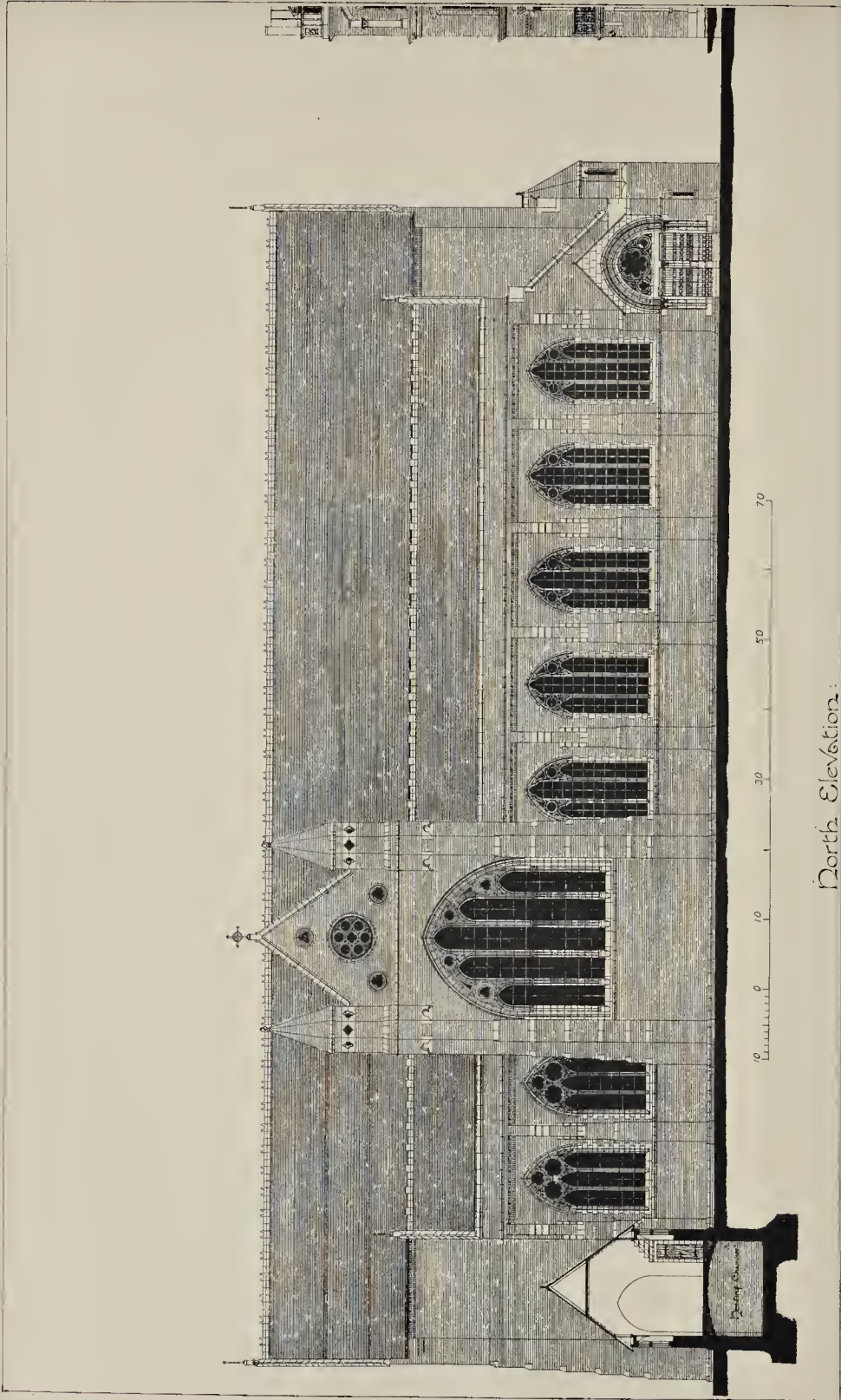
The church was to be built of brick, the outside faced with red bricks, and the inside surfaces plastered. All the dressings would have been of Bath stone. The principal feature of the interior is the formation of the ceilings, which throughout were intended to be of wood graining, as in the choir of St. Alban's Abbey Church. This arrangement adds materially to the acoustic properties of the church, and the formation of a tympanum on the walls at the end of each bay gives an opportunity for coloured decoration or fresco subjects.

The accommodation was for 1,100 worshippers, and the seats were arranged so as to bring a large proportion within sight and hearing of the preacher.

A tender from Messrs. Kilby & Gayford was obtained for the work, including all the fittings and furniture, for 9,050*l.*; architect and clerk of works, 620*l.*;—in all, 9,700*l.* The amount allowed by the committee for the church, complete with its fittings and furniture, and including the clerk of works and architect's charges, was 10,000*l.*

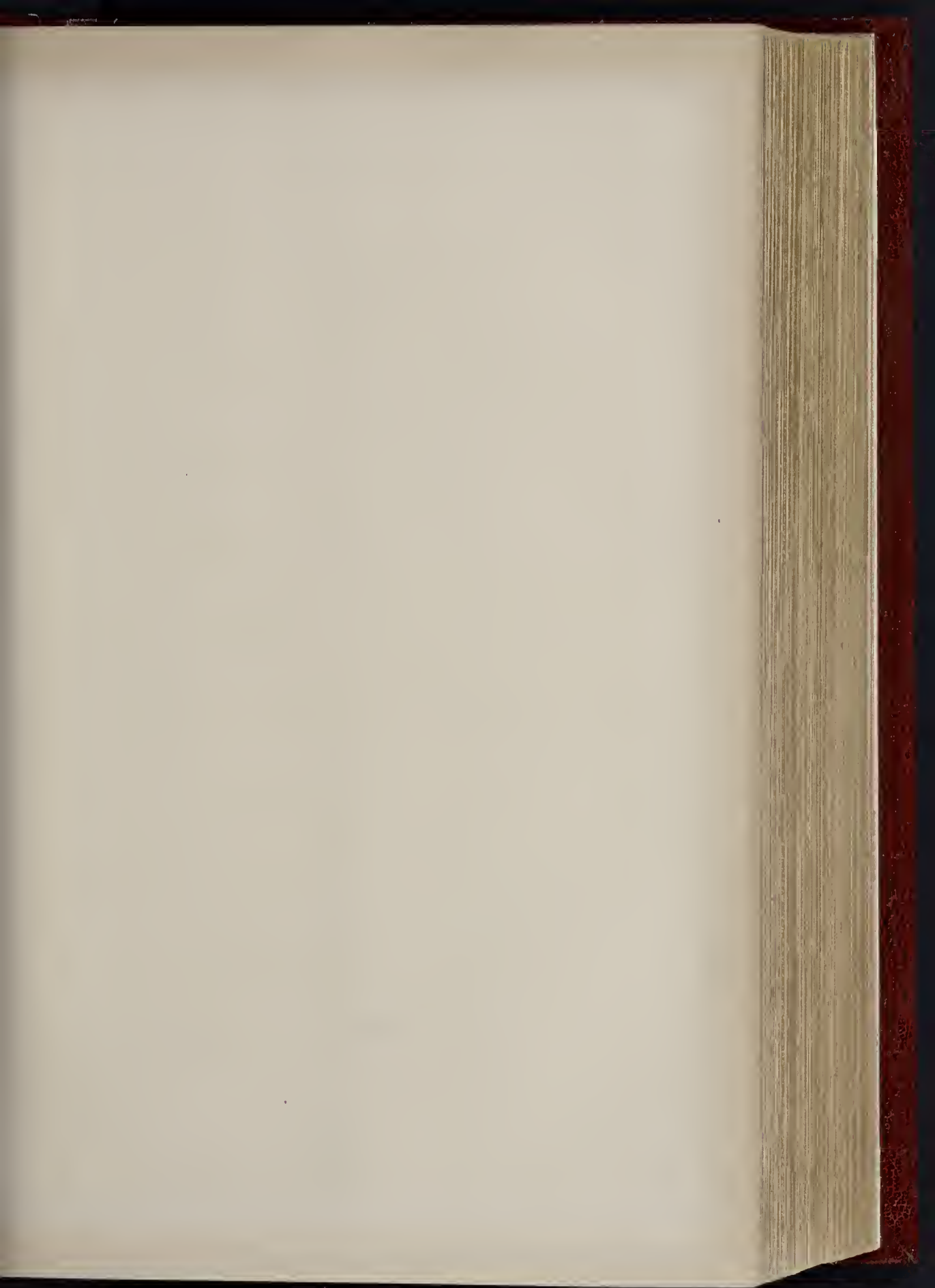


THE BUILDER, JANUARY 15, 1887.

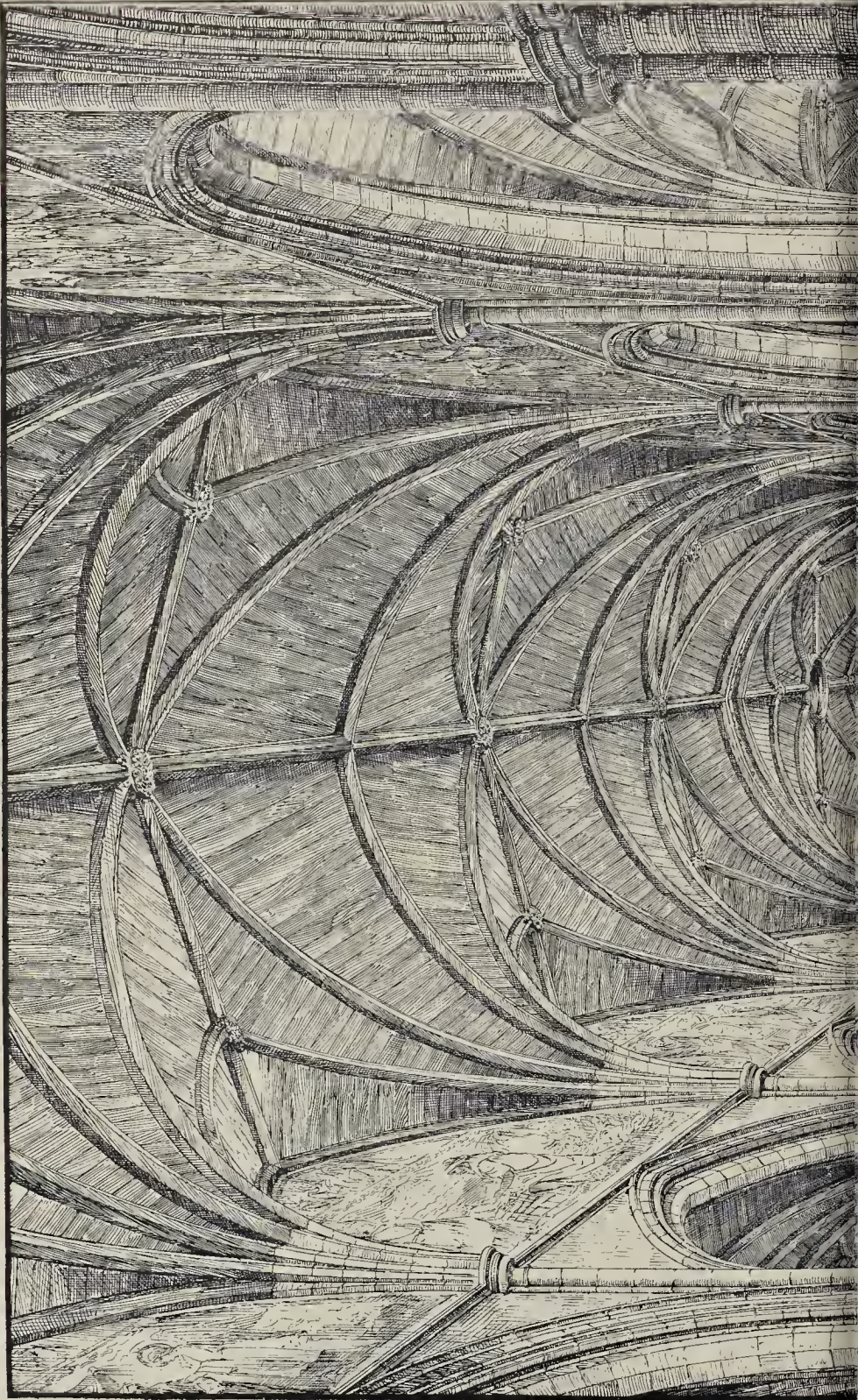


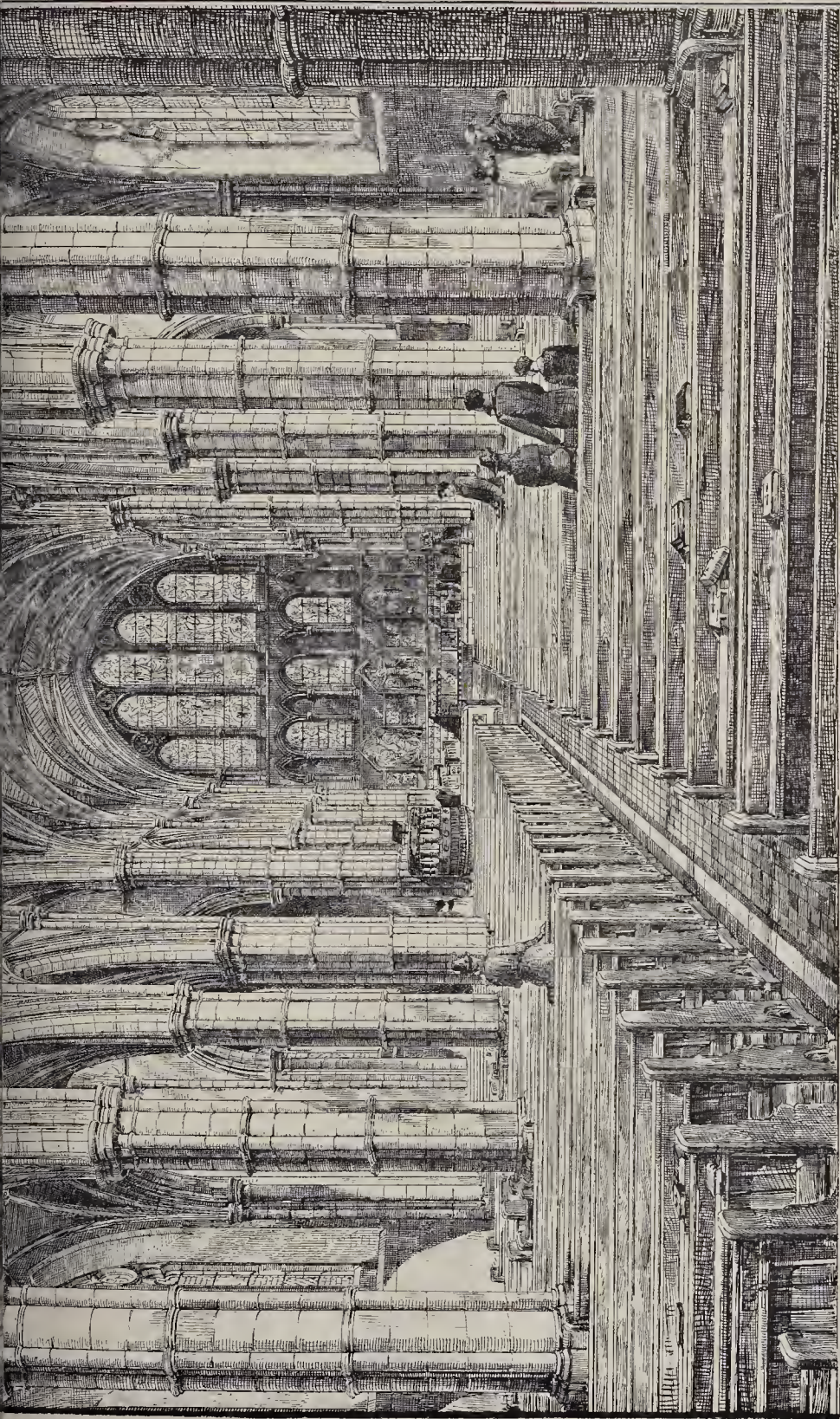
North Elevation.





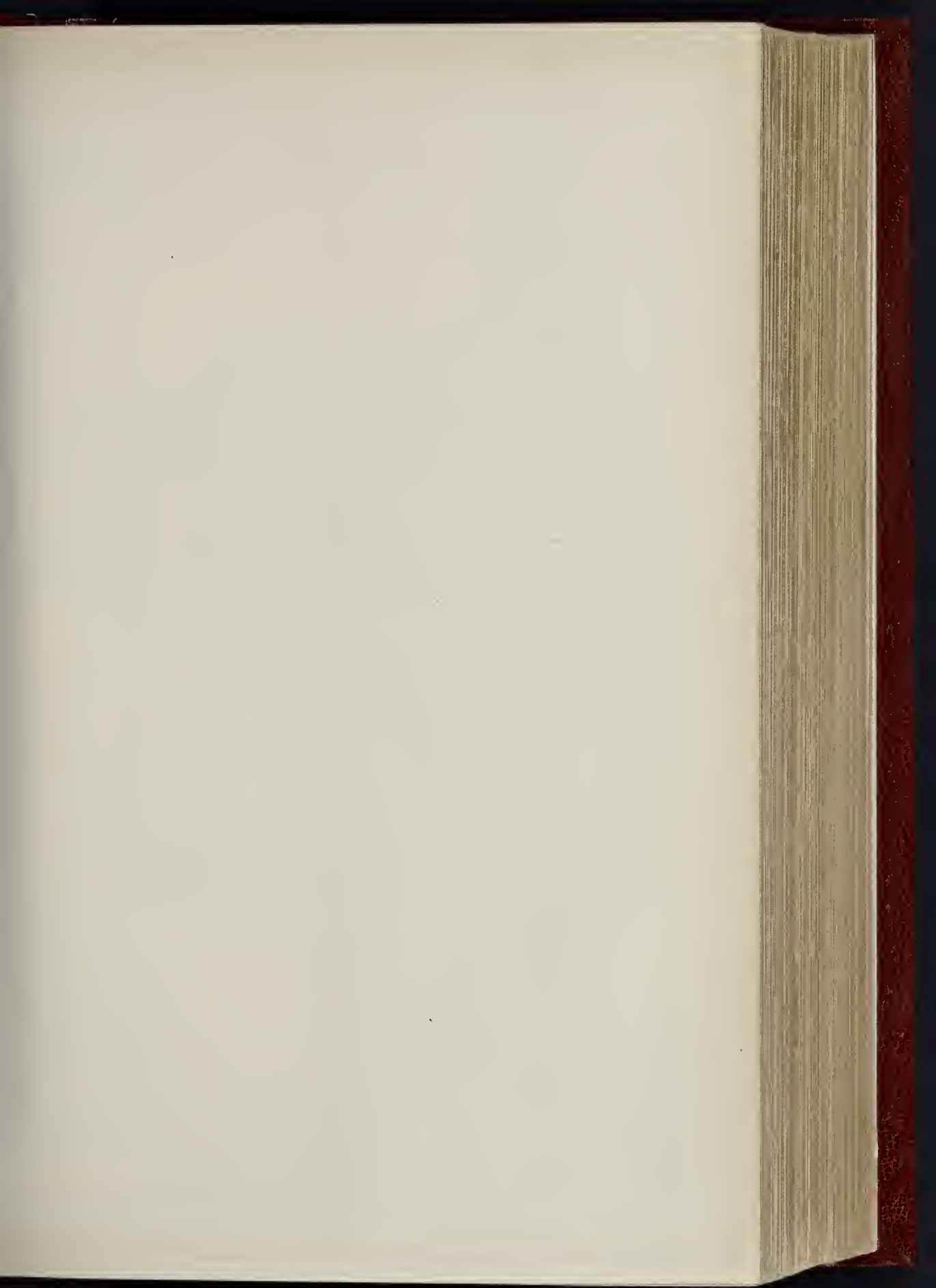
THE BUILDER, JANUARY 15, 1887.





COMPETITION DESIGN FOR CHURCH OF ST. PAUL, KENSINGTON, BY MR. JAMES BROOKS, F.R.I.B.A.





THE BUILDER, JANUARY 15, 1887.

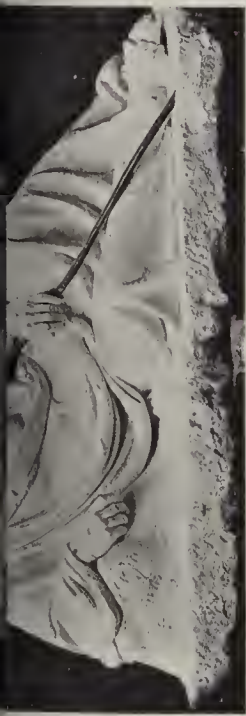


SCHOOL OF ATHENS.

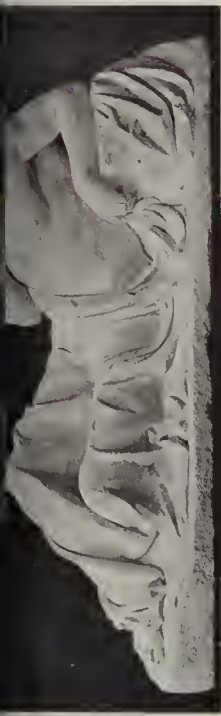


SOPHOCLES.

EURIPIDES.



HERODOTUS.



THUCYDIDES.



SOCRATES.

ZENO.

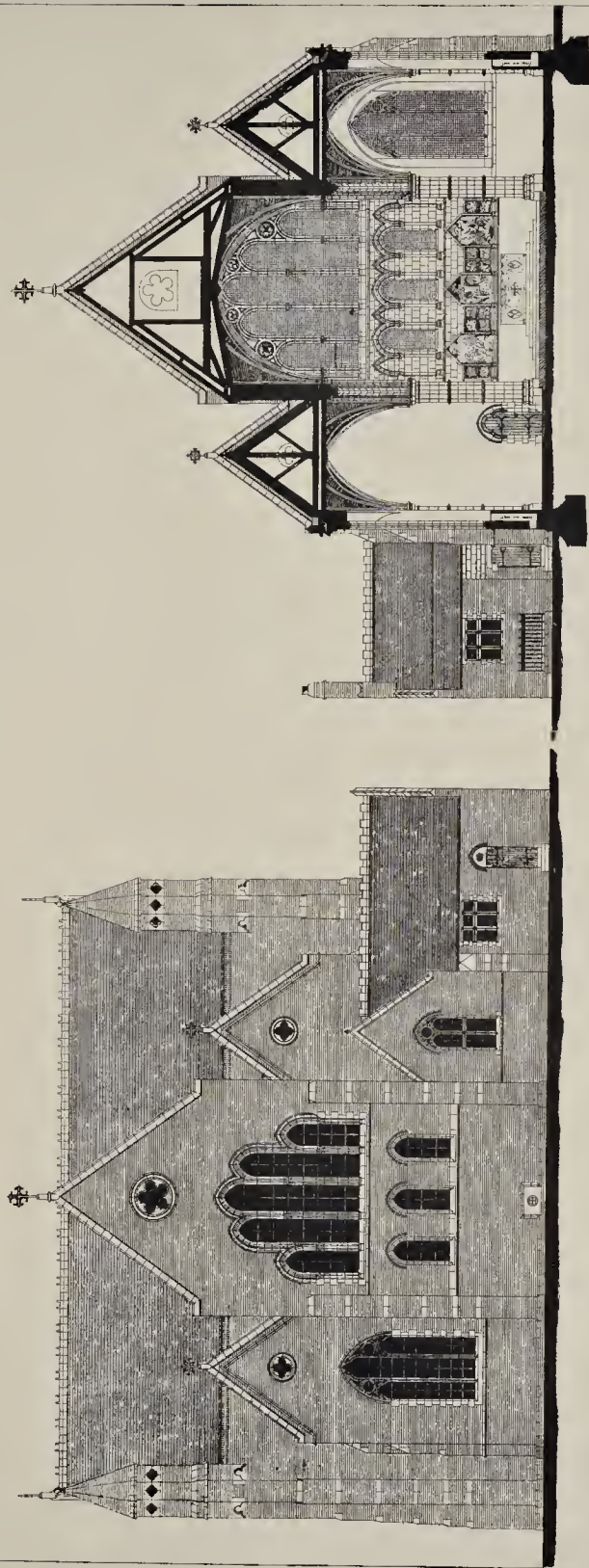
PARMENIDES.

SCULPTURE FOR THE PEDIMENT OF THE HARRIS FREE PUBLIC LIBRARY, PRESTON. MR. JAS. HIBBERT, ARCHITECT. MR. E. ROSCOE MULLINS, SCULPTOR.

THE PHOTOYVE Co. 302, STRAND, LONDON.







East Elevation:

Section thro' Chancel looking East:

COMPETITION DESIGN FOR CHURCH OF ST. PAUL, KENSINGTON, BY MR. JAMES BROOKS, F.R.I.B.A.

PLATE 1. THE SUPR. OF 4. 22 MARTIN LANE LONDON E.C.



THE PUBLIC HEALTH ACT, 1875.\*  
SUGGESTED REMEDIES OF ITS DEFECTS.

It is highly probable that the Bill dropped at the end of last Session may be revived in another form, and it would be well for each of us to point out and discuss cases that have come to our knowledge, and which we may consider require providing for in any future legislation. I therefore propose to deal with the paragraphs of the section consecutively.

**Street.**—The term "street" should include a dedicated road, whether built upon or not. A road may be an important thoroughfare largely used, but in a deplorable condition, and being confined only by walls and fences, the owners cannot be reached under the present Act.

**Boundaries.**—In some instances roads have boundaries running down the centre or along the building line: possibly the adjoining Authority may be a rural one. The present method of dealing with these cases is by mutual agreement. The Authority proposing to do the work should have power to treat the external premises as if in their district, and to recover the expenses in the usual way.

**Notices.**—It will be generally admitted that the present method is unsatisfactory and unreliable, however great pains may have been taken to be precise. The Manchester method of posting in the street and advertising in the newspapers is an admirable one. The great difficulty in describing the works in the notice is to decide upon the class of materials to be used and quality of work to be executed. This is very seldom done so as to give universal satisfaction. In some towns a hard-and-fast line of equality is adopted throughout: in others distinctions are drawn at the instance of the surveyor or his committee, and neither plan can he said to be equitable. In most towns the character of the streets will admit of their being divided into classes as follows:—

**Class 1.** Streets being main arteries of traffic and means of communication between one populous locality and another; or lined with important property.

**Class 2.** Streets running crosswise between main arteries, and only having light and local traffic.

**Also cul-de-sac.**

**Class 3.** Courts and alleys.

**Class 4.** Roads amongst better class residential property, such as suburban roads.

I would propose that these roads should be dealt with in this manner:—

**Class 1.** to be formed of the best materials and workmanship throughout.

**Class 2.** to be formed of secondary materials, but not inferior workmanship, and on sanitary grounds to have an impervious pavement, as residents in this class of property almost universally throw their slops and waste out of doors on to the roadway, which certainly should not be a filter-hed nor straining-tank.

**Class 3.** Having regard to the quality of the property and the convenience and comfort of the inhabitants in this class, it might be desirable to form these roads of macadam or asphalted carriage-ways with gravelled footpaths.

If the Local Government Board were to hold an inquiry in each town, and their inspector were to view the character of the streets it was proposed to classify, he, by hearing evidence as to the quality of materials the locality afforded, would be enabled to set up a standard to be used in each case, and this would go far to settle the present dissatisfaction and prevent costly and cumbersome litigation. The owners should have power to appeal to the Authority if the proposed works were considered excessive; and if no arrangement could be arrived at, then to a bench of magistrates, who, from local knowledge, could soon decide the equity of the matter. The great object should be to arrive at a satisfactory understanding before commencing the works, and thus prevent disputes as to facts arising afterwards which ought to have been decided at the outset. There should be no difficulty in doing this.

**Estimate and Preliminary Apportionment.**—The estimate of the works prepared by the surveyor should also include an approximate apportionment of each owner's share. The present method is to apportion by frontage only, although it is a popular notion that each party pays for the exact amount of work from the

building line to the centre of the road. To prepare separate accounts for each block would entail an enormous labour on the surveyor, and by particularising the items would enable each party to check the quantities in his own style, and would lead to interminable disputes and demands for amended accounts. Some method must be devised that will remove the present injustice of charging in streets of varying widths the owners of premises in the narrow portion a share of the costs of the works in the wider portion, and which relieves the owners in that part of a considerable amount of their proper burden.

**Intersections of Cross Streets.**—This question is also a very vexed one. The present plan of measuring the frontages net and apportioning the costs of the intersections over the whole area is the simplest if not apparently the most satisfactory method, and it would cost far more than the amount involved for any frontage to contest the fairness of the charge. It would certainly be very difficult where a street in a rectangular block running say east and west was paved to terminate at the west side of a street of less width running across it north and south; the streets at the end and both sides abutting on to it being unpaved, but likely to be, and to have an equal use and enjoyment of the intersecting area. The question to decide would be how far in each direction (other intersections being adjacent) will that user extend, and in what proportion are the expenses of completing it to be borne? Is there any man living who would hope to decide in a satisfactory way?

**Consequential Benefits.**—Collieries, workshops, and other premises using team labour are often situate a short distance from private streets, and having a communication therewith by means of a cart-road which may run between two rows of dwelling-houses. In many cases these places by their traffic cause the carriage way of what, for the requirements of the property, would be a fair and satisfactory street, to be cut up and rendered impassable, and bring down the Authority upon it with the powers of this Act; and when the works are completed, these destroying angels escape scot free and carry on their business at greater convenience and economy. They ought, in equity, to contribute to the cost of these works, and some system on the sliding-scale method should be devised to regulate the apportionments in these cases without the liability being incurred of going to arbitration on each one.

**Railways and Canals.**—A great deal has been argued about the hardship of compelling railway and canal companies to pay according to frontage. Certainly when railways are on viaducts or down in cuttings they cannot derive much if any use from the formation of the street; but, on the other hand, the roads may be a means of communication to their depots, and if they can be used for carrying thereto and therefrom, and from which the companies derive their revenue, then they ought to contribute towards the cost of completing such roads, which also may very likely in many cases reduce the distances to their premises, and provide them with a good and easy road; and further, if the railways and canals are upon the level, a use can possibly be made of the road at some future time by the erection of wharfs, &c. Certainly where main lines, not in the vicinity of any station, shut on to a road on a viaduct or in cutting, it can be of no possible benefit to them, and they should not be called upon to contribute to the cost of its formation.

**Sewers.**—Powers should be given to an Authority to contribute, if necessary, towards the cost of sewers in certain cases; that is to say, if for the purposes of a sewerage scheme it is desirable to construct an intercepting or trunk sewer in a private street, then the excess cost of such a sewer over one sufficient for the requirements of the street should be borne by the Authority. The writer has recently had a case of this sort in a road running along the boundary of one portion of his district, and this course was followed. It should be made plain to the surveyor that he must only design sewers sufficient for the necessities of the street he is dealing with. The writer knows several cases where sewers have been made as large as 3 ft. by 2 ft. when by no possibility could more sewage arise than would be discharged by a 9-in. pipe, and the defence for this has been that it is customary in the district to build sewers large enough for a man to traverse. Such reasoning is ridiculous, and for the sake of the

profession should be made impossible. There is one more difficulty with regard to sewers, and that is the character and condition of old sewers; in many cases these are large but loosely constructed, sufficient, perhaps, to carry off the drainage, but are without manholes and ventilation, and may discharge at undesirable points, and be incompatible with a drainage scheme for the district. Although the property owners may have paid to the parties who laid the sewer the cost of so doing, yet they should not be relieved of the responsibility of constructing another at the instance of the Authority, if the surveyor, as their professional referee, advises from structural and other reasons against their taking it over. The position and duty of the surveyor should be clear and well defined in such cases, as these matters of scientific knowledge cannot well be decided by magistrates or any other lay court.

**Levels.**—Frequently in altering the levels of streets it may be necessary to alter gas or water mains. Now, by the 47<sup>th</sup> Act, the only parties who have power to do this are the undertakers and the Authority, and one or other must bear the cost. The undertakers may have come upon the road when it was simply marked across a field, and laid their mains under the sod without any reference to future levels or requirements. When the Authority comes to deal with such cases, acting, as it were, as agent for the property-owners, it is manifestly unfair that such charges as will be incurred in altering these pipes to the requisite levels should be borne by the district rate; they ought, in all fairness, to be part of the works, and charged accordingly.

The writer has lately had a case of a road where on one side was a high bank sloping to the road, the sides of which continually slip down. Under the Act there is nothing to control this, and it appears the parties cannot be dealt with until the road is taken over, when they could be prosecuted at common law for an obstruction. It would certainly seem to be hard upon an owner in such a case to compel him to slope his banks at a given inclination, because he might fairly say it would rob him of so much land at the top level which he might reserve if he built a retaining wall, which it may not be convenient to do at the time the road is being formed. These cases may not often occur, but when they do they occasion considerable trouble,—probably some provision can be framed which will deal with them fairly to all parties concerned.

**Partial Works.**—It would often be a great convenience to a locality if parts only of a road could be dealt with and taken over by the Authority on completion. For instance, a road may be an important one as a thoroughfare, but may be only sparsely built upon; and there may be no pressing necessity for flagging the footways, which would be a useless expense to the owners, but the paving of the carriage-way would be a great public advantage. The writer has such a case, which is urgent; but in the present state of the law it is considered by his Authority that it would bear harshly upon the owner to deal with it according to the section.

**Method of Executing Works.**—Another question about which there is great difference is the procedure to be observed on executing the works. Some Authorities do so by their own men, while others let all work by contract after publicly advertising for tenders. The former is open to grave abuses, and nearly always gives dissatisfaction; whereas the latter is fair and above board, and removes ground for complaint as to the works being too costly and above market price. It would be well if this system could be made compulsory.

**Apportionments.**—The apportionment of the costs of the work should include all incidental works, such as searching for and examining sewers, advertising, surveying, plans and specifications, &c., and 5 per cent. for superintending and office charges. Many works are extensive, and must necessarily extend over a long period of time, consequently a considerable sum is incurred in interest on the money employed by payments on account. Under the present law this money if paid must be provided out of the rates, and cannot be recovered from the owners. This should be rectified, as the owners, if doing the work themselves, would certainly have to find the money from time to time for payments, and consequently to pay interest for it.

**Conclusion.**—This is now the completion of my task; and I may be told that many of the views I have advocated in the latter part of the

\* By Mr. W. Spinks, Assoc. M.Inst.C.E., Borough Surveyor, Dulwich, Read before the Association of Municipal and Sanitary Engineers and Surveyors. Continued from p. 99, ante.

paper have already been dealt with in the defunct Bill. Some, I know, have, and they were inserted at my instigation and through the instrumentality of the honourable and learned member for Ashton-under-Lyne, Mr. Jno. Addison, Q.C., who at very great trouble went with me through the Bill first printed (dated January 22, 1886) line by line, and to his kindness in affording me valuable suggestions and criticisms I am greatly indebted, and desire publicly to acknowledge it; for mainly by his endeavours the Bill was reprinted and re-issued to the House on March 29th, 1886, containing many of the above suggestions; but nevertheless I venture to bring them before you to elicit more information on the various cases, and in the hope of obtaining sounder views on such important points from the more matured judgments and longer experience of older and more able Members of the Association.

[In a letter received by us from Mr. Spinks he says:—"It is very desirable indeed now to get all the information we can as to the working of the 150th Section, and I am collecting, with a view to proper compilation, the results of the practice of several Borough Surveyors who have not been able to attend the meetings of the Association."]

#### THE ARCHITECTURAL ASSOCIATION.

The sixth meeting of this Association for the present Session was held at 9, Conduit-street, on the 7th inst., Mr. J. A. Gotch (President) in the chair.

Mr. Thomas M. Rickman, F.S.A., read a paper on "The Complement of Architectural Instruction," which we print *in extenso* on another page.

The Chairman, in opening the discussion, said that Mr. Rickman's paper struck him as being one of considerable value and interest, inasmuch as it dealt with aspects of the profession too apt to be lost sight of in the course of business and in the struggle for existence. It was pleasant to have attention diverted from the carking cares of getting one's bread and cheese to those allied pursuits, many of which Mr. Rickman had mentioned. At the same time, those students who were in the boyhood of their education ought not to feel themselves overwhelmed by the long list of sciences that had been touched upon. These sciences were extremely interesting, as throwing side-lights upon the profession, but he took it that Mr. Rickman did not insist they should be wholly mastered; indeed, it was obvious that though a knowledge of them would be of interest, it was impossible for an architect to master them, as well as his own particular duties. From this they might learn a moral which had been impressed upon them more than once during the session, viz., the extreme value to the architect of a good early education. The various "ologies" could, at any rate, be partly mastered in that period of the education closely following school, so as to be of extreme use and interest in after-life. Mr. Rickman had said that it was possible for any one of them to attain in time to the first rank in architecture, but he (the Chairman) was a little bit inclined to doubt that. At the same time, architecture was as varied as poetry, and just as there were various branches in poetry, so there were various branches in architecture, and a man might be a distinguished proficient in one branch, though unable to touch another. For instance, they could not conceive Milton doing the work of Shakespeare, nor Shakespeare doing the work that Milton did. And again, in poetry there were men like Herrick, and men like Gray, each of whom in his turn had done work of which any one might be proud, but they would not compare Herrick with Shakespeare, nor Gray with Milton. Some comfort, therefore, might be taken from the thought that though they were not all born to necessarily great and magnificent works in the way of Law Courts and cathedrals, they might yet give pleasure to the world by some less pretentious buildings; and that their capacities as architects were not measured by the enormous size of the buildings they erected. Mr. Rickman had further referred to false quantities in architecture, and they would all agree that a false quantity, whether in verse or in architecture, should be avoided. He would like to point out, however, that in Shakespeare's works there were thousands of false quantities to be met with. Shakespeare abounded in bad puns, bad

rhymes, and other blemishes of the kind, which in themselves were distinct blemishes, but, on the other hand, were completely lost in his wonderful power in other and greater matters. From this he would argue that it was possible, by endeavouring to avoid false quantities, to become really tame. Mr. Rickman had urged them to be many-sided, but in considering this advice they must be careful how they displayed their learning to the world. He was reminded of a passage in Rabelais, where Pantagruel, after listening with astonishment to a man who addressed him in a string of long and unusual words, exclaimed,—"I think thou must become kind of heretic." So, if architects made a display of unusual knowledge to the unlettered people they met, they might also be regarded as "heretics," and then their condition would be a very parlous one indeed.

Mr. E. C. Robins, F.S.A., in proposing a vote of thanks, said that he had heard several of Mr. Rickman's papers, which were always full of matter for very serious thought. Mr. Rickman himself was an example of concentration of purpose and of determination to master one thing before attempting to master any other. He did not know any member of the profession who had set himself so earnestly to the study of that particular branch in which he was so well known to be an expert in his business proper. While making that business no one could have accused Mr. Rickman of diverging to the right hand or the left to seek out those things which were not seriously allied to his own particular practice. Now that he had succeeded so well he had hallowed his mind to take a wider range, and the year or two ago had read before the Institute a most interesting paper on the lessons of a boulder,\* it being one of Mr. Rickman's holiday delights to geologise and find out evidences of the truth of what might be found in books. There were two ways of learning things, one from the book side and the other from the practical side, or from the things themselves. There was no doubt that if, on the Saturday afternoons, they acquired information from the outside objects instead of from the mere inside of books, they would gain a much larger idea of the beauty of nature, and collect a greater number of examples, than by mere continuous reading. The thoroughness with which collateral knowledge was grasped was in direct proportion to the thoroughness with which special or expert knowledge was attained. Mediocrity in the latter meant mediocrity all round, as a rule, but that was not without its exceptions.

Mr. Cole A. Adams seconded the vote of thanks. Mr. Rickman, as a Past-President, who had filled the chair many years ago, must have revisited the "Locksley Hall" of the Architectural Association, with perhaps mingled feelings of pleasure and some pain; because since the year he was President almost a revolution had been effected in matters of art. In that room the "Battle of the Styles" had been fought over and over again, and Gothic, which at one time every member of the Association swore by, had now been partially set somewhat on one side, while Classic was pushing to the front. He did not suppose that Mr. Rickman wished them to master all the "ologies," but that when they came across this, that, and the other, they should endeavour to find out something about it, thus adding to their store of knowledge, and their interest in life. He remembered some years ago staying in a country house where the great philosopher, Herbert Spencer, was also a guest. Talking of the advantage of taking up subjects apart from one's own calling, Mr. Spencer said, "I advise you very strongly to take up some subject which is quite apart from anything connected with your business. In my own case, I have always made a practice of doing that, and I do it for this reason, that the man who sticks too closely to any branch he may take up, is in very great danger of becoming a monster. He develops in one direction; his mind is forced into an unnatural training, and in that way he becomes a danger to himself and a danger to society." He (the speaker) had always noticed that the men who took up subjects outside their daily work had a power of expression and information upon such matters that not only added to the charm of their own lives, but also to that of those with whom they came in contact. Following out these lines, they would take up the tiny shell,

see in it "a miracle of design"; "and sermons in stones, and good in everything."

Mr. Lawrence Harvey remarked that he had been much interested by Mr. Rickman's paper, because it had entirely confirmed the teaching of his own master, Professor Semper. Some time since he (the speaker) had treated of the question of style in that room,\* and perhaps they might remember that the definition of style which he then gave was that it was the stamp which the surrounding elements printed on a work of art when that work was generated. It was evident that one of these elements would be the society in which they moved, and as architects had to do with well and ill educated people, with rich and poor, it was necessary to be in thorough harmony with the society around them, and have a good general education. What Mr. Rickman had laid before them was not at all beyond what such an education should be. It was not necessary to know every subject thoroughly, but they should be able to understand it. One of the elements of style was, of course, the purpose which a building, or any work of art, had to fulfil; and that was the reason why a theatre was not like a church. The second element of style was the material to be used, and, if they appreciated the elements of style rightly, they would not design a building in brick on the same lines and with the same mouldings as a building in stone, but would even make modifications in the design according to the stone used. The third element was the kind of tools or machinery used in working the material. If they admitted the first of these elements,—the purpose of the building,—they must study in the architect's office, mixing in society, and getting such a general education as to understand everything that came before them. As to the questions of materials and tools, he could see no other way of properly understanding these than by labouring with their own hands, working at joinery, turning, and carving, both in wood and stone. It was not essential to become first-rate workmen, but they must have a correct knowledge of what could be produced with tools, thus enabling them to give a thoroughly good style from that point of view, to their work. Therefore, every science referred to by Mr. Rickman was of practical importance to the architect. It would, of course, be only putting a Tantalus' cup before the members if they had no means of learning these, but he believed that lessons were to be given at the City and Guilds of London Institute on wood-working tools, affording opportunities for those who wished to acquire a knowledge of the subject.

The motion was then put, and carried by acclamation.

Mr. Rickman, in replying, expressed his pleasure at meeting the members of the Architectural Association once more. He was not aware of any subject under heaven that an architect or a surveyor could take up which he would not find of some use in the practice of his profession. In conversing with people on scientific matters, it was not necessary to use long words, such as could only be used by those who had the most accurate experience of a subject. The object of understanding these things was, that when they got hold of a man who knew them well, they might draw information from him. They must learn to be good listeners, drawing from the man who understood his subject the information he was capable of giving, but themselves understanding the sort of information they were likely to receive. They might be in company with men a long time, and yet not draw them out in any way, but some casual remark would call forth information, and that was the object of acquiring those subsidiary matters, and having them in their heads, rather than being able to give a lesson in class. Architects, as a rule, would not have very large buildings to do. They would begin with the smaller works, and it was by exercising their eyes on such buildings that their architect's experience would be gained. If they learned to recognise false quantities they would avoid them, and he was obliged to Mr. Harvey for his idea of what style was. The Chairman had found out by his paper how imperfect his (Mr. Rickman's) education had been, his notions of false quantities having been drawn from the Latin and not from the English grammar. Since he was at school the whole subject of Prosody had been metamorphosed. He used to be told that, as there were quantities in Greek and

\* "Professional Lessons from a Boulder: a Plea for Geology as Part of an Architect's Education." See *Builder*, June 13, 1885, p. 823.

\* See *Builder*, Nov. 23, 1885, p. 749.

Latin, so there were quantities in English; but now there was nothing except accent, and it was a great question with many writers of the present time whether Latin and Greek were not more dependent in their prosody on accent than on quantity. He was taught to look upon false quantities as the most heinous sin possible, and it was in that view of false quantities in Latin verse that he had adopted the term to the little mistakes, the errors in taste and in etiquette, which the young architect would invariably make in the first works he carried out. Whether they looked upon the points that influenced the eye in architectural work as accents or quantities, they must learn that there were proprieties to be followed if the buildings were to be a pleasure to the beholders. These proprieties which they hoped to produce must be obtained, to a large extent, by following the proprieties their predecessors had carried out, so that it was not for them to write jingling rhymes in architecture, but to study the buildings containing a higher rhythm and more noble rhyme than those put up by the speculative builder, or by the ordinary run of architects, who had no idea in their heads except that of earning their five per cent., and whose clients did not wish for anything more than the utmost convenience and accommodation that could be got for their money. He had to thank Mr. Robins for his kind expressions. He remembered that Mr. Robins many years ago was one of those who were good enough to have confidence in him, and, therefore, he esteemed anything that gentleman might say. Mr. Robins had recommended the use of the Saturday afternoons; he (Mr. Rickman) recommended the use of every opportunity they, as architects, might have. An education in London would tell them a great variety of things. Materials of all sorts were brought from the country, but they would not know, from London experience alone, the peculiarities of those materials, how they were obtained, and how much better the materials brought to London were than the ordinary materials found in the country. The advantage of travelling throughout England was that the materials could be seen in their own homes. The materials brought to London ought to be better than the ordinary ones found in the country, and the style of dealing with them should be different. At the same time, the very best materials were not always got in London; for instance, the best Portland stone was not always obtained, but rather that which was the most easily converted to London purposes. Thus the selection made for London might teach them, when they went into the country, to gather more information on the subject of the materials than they could obtain from their usual City life. An architect should travel a great deal, and might do so for the purpose of sketching. He himself had walked thousands of miles through England and had seen nothing but old churches, but he now looked upon that as a very great waste of time; not that it was a wrong thing to see the old churches, but the right course would have been to have studied other things as he went along. When he now read the shilling book on Saturday half-holidays, published at Birmingham, he found it contained an amount of information on the roads, hills, churches, buildings, and manufactures of the country he used to walk about, not a fiftieth part of which he had ever picked up as he went along. He would, therefore, advise his bearers, if possible, to learn to appreciate these matters before they had the opportunity of travelling, and when that time came let them keep their eyes open and make good use of them.

**Sanitary Registration of Buildings Bill.**  
At the monthly meeting of the Council of the Sanitary Assurance Association, on Monday last, the draft of this proposed Bill was reconsidered. Sir Joseph Fayer, K.C.S.L., M.D., F.R.S., presided; and there were also present Professor Roger Smith, Dr. Danford Thomas, Mr. Mark H. Judge, Mr. H. Rutherford, and other gentlemen. A report on the draft Bill was submitted, with several clauses re-drawn. The Bill was further amended, and ordered to be printed, for final consideration at the next meeting of the Council. The new Bill is proposed to be compulsory with regard to schools, hotels, asylums, hospitals, and lodging-houses, while clause 6 has been made much more stringent in the matter of qualification of persons entitled to give sanitary certificates.

ARCHITECTURAL SOCIETIES.

**York Architectural Association.**—The dinner in connexion with this Association was held on the 5th inst., at the Queen's Hotel, Micklegate. The president (Mr. V. Hepper) occupied the chair, and was supported by Mr. G. Benson, hon. secretary, and by Mr. E. Priestley Shires, of Plymouth, the vice-chair being occupied by Mr. Walter G. Penty, who was supported by Mr. Norman R. Yeomans, hon. treasurer. Mr. W. G. Penty proposed "The Health of the President," who, in thanking the members, said no efforts of his would he wanting in furthering the objects of the society. Mr. Dickinson submitted "Art, Science, and Literature," to which Messrs. Worthington, Shires, and Benson respectively responded. After "Success to the York Architectural Association" had been drunk, the President proposed the health of "Our Guest" (Mr. B. Priestley Shires), remarking that as hon. secretary, from the formation of the society until his removal to Plymouth, Mr. Shires had worked assiduously in promoting the aims of the society.

**Glasgow Architectural Association.**—The usual monthly meeting was held on Tuesday evening, the President in the chair, when a paper on "Colour in Decoration" was read by Mr. Wm. J. Boston, who said that while form must take precedence of colour in architecture, still the aid of colour, whether of material or applied, was so important as to demand the utmost thought and skill. The laws of harmony were explained, and some of the simpler rules, which may be learned from Nature, applied in a practical way to internal decoration. Throughout, reference was made to the writings of Ruskin, Goodwin, Dresser, and O. Jones, and instances given of decorated buildings which the essayist considered examples to be admired and imitated. A discussion followed, and a vote of thanks was awarded to Mr. Boston.

ARCHÆOLOGICAL NOTES.

**Hythe Church (Kent).**—Kentish papers mention an interesting discovery in the chancel of the parish church of Hythe, during the progress of the work of restoration. It is known that prior to the existing nave and transepts there existed a fine Norman church, of which a doorway, an arch, and some portions of two windows still remain, and have been embodied to the existing church. No trace, however, of an earlier chancel or aisle was to be seen. On the recent removal, however, of the plaster from the walls of the south aisle of the chancel, two complete Norman arches were found spanning the Early English arches, and themselves showing traces of rich ornamentation. It is added that now that the plaster has been completely removed it is found that the north chancel wall will have to be rebuilt, bringing the total cost of the renovation work to nearly 2,500l.

**Lincoln Cathedral.**—The *Lincolnshire Chronicle* says that some excavations which have recently been made in the south aisle of the choir of the minster, and in the retro-choir, have laid bare a portion of the foundations of the original eastern termination of the cathedral as erected by St. Hugh, and taken for the holding of the Angel Choir; and have also brought to light the tomb in which the body of that canonised hishop was at one time apparently deposited, with some small remains of its contents. The foundations prove that, as previous investigations at the close of the last century had given reasons for believing, St. Hugh's church ended in a polygonal apse with chapels attached, somewhat resembling that at Westminster Abbey. The apse formed a semi-hexagon with a semicircular chapel, similar to those of the eastern transept, projecting from the two sloping sides, and a polygonal chapel, forming a complete hexagon attached to the eastern wall. This was probably the Lady Chapel. Between this chapel, and the semicircular chapel on the south side, there is a small circular appendage, the purpose of which is not very evident. At first sight it appeared to have been the foundation of a turret for a novel staircase. But on the most careful investigation there is no trace of the central tower. If a chapel, it must have been one of unusually small dimensions. Perhaps, when the excavations are completed on the north side, some light may be thrown upon its destination. The sepulchre of St. Hugh was discovered where

it was anticipated, beneath the black marble table on carved supports, erected by Bishop Fuller, about 1670, bearing a Latin inscription of elegiac verses, of considerable elegance, stating that the saint's body lay below. The original place of the shrine was the centre of the space behind the retables.

**Queen Eleanor's Cross, Northampton.**—At a recent meeting of the Architectural Society for the Archdeacons of Northampton and Oakham, Mr. Scriven adduced a large amount of documentary evidence with a view to showing the original form of the top of this structure. He showed that nothing had yet been discovered to prove how the top was finished; and the mythical fifth figure with which it is sometimes credited he considered was never made for the Northampton Cross; indeed, the first evidence relating to the five or six figures made by William of Ireland mentioned "five for the Cross at Northampton and elsewhere." After quoting much historic evidence, Mr. Scriven said that his conclusion was that the termination consisted of a shaft springing from the original base now remaining, with a richly-carved ring either surrounding it or forming a junction of the shaft in the head of the cross, which head was magnificently wrought in a group of figures representing the Crucifixion. It was certainly not a headless cross, for there was proof of the head being taken from Corfe, carried to Northampton, and set up there.

**The Ruthwell Cross in Annandale.**—A Carlisle paper announces that steps are being taken to protect the celebrated runic cross at Ruthwell, in Annandale, from the influence of the weather. A design has been prepared by a Glasgow architect for a recess on the outside of the church wall, behind the pulpit, for the reception of the cross, the church wall to be opened, and the cross to be in view of the congregation. The entire cost will be about 300l.

CASES UNDER THE METROPOLITAN BUILDING ACT.

WOODEN VERANDAHS.

At the Worship-street Police court, on the 5th inst., before Mr. Hannay, Mr. Alexander Payne, District Surveyor of East Hackney (South) and North Bow, summoned Mr. G. Bethell Holmes, of 84, King Edward's-road, Hackney, for having erected a wooden verandah in the rear of his house, No. 84, King Edward's-road, without giving the requisite notice to the District Surveyor, and without conforming to the rules of the Act. The building was 8 ft. by 14 ft., and 8 ft. to 10 ft. high, open, and supported by posts towards the garden, and enclosed on the other sides partly by the walls of the dwelling-house, with which it communicated, and partly by wooden boarding and open lattice-work. The roof was formed of wooden boarding covered with zinc. It formed a covering over the back door of the house, to which it was an addition. The District Surveyor contended that the whole tenour of the Act was to reduce the woodwork round about a dwelling-house, on account of danger from fire, and that section 25, clause 1, plainly forbade an erection of this kind, unless constructed of fire-proof materials, and quoted a case in which the defendant had been ordered to amend a similar erection five years before, being a verandah and balcony communicating with a house in No. 2, Fremont-street.

The defendant, who was represented by counsel, endeavoured to show that this was an erection to which the rules of the Act did not apply, but only quoted, in support of this, cases under other sections which did not refer to additions to a building.

The Magistrate said he often had a difficulty in deciding cases under the Building Acts, but this was a very clear one, and unless the defendant could show that the erection was of brick, tile, stone, or other fireproof materials, according to section 25, clause 1, he should make the order to amend, in conformity with the rules of the Act.

Ultimately an order was made against the defendant to amend in twenty-eight days, and he was also fined 20s. for doing the work without notice, and costs.

EXCESS OF CUBICAL CONTENTS.

At the same court, on the 7th inst., before Mr. Bushby, the case of F. R. Meeson, District Surveyor for East Hackney (North) v. Connell, was heard.

It appeared that the defendant in 1879 erected extensive works at Upper Clapton for laundry purposes, and recently made an addition to them. The original building and the addition exceeded 215,000 cubic feet, and the District Surveyor required a party wall under sec. 27, sub-sec. 4. The defendant contended: 1st, That the premises were not used for trade purposes; 2nd, That the case of *Scott v. Legg* governed this case.

The District Surveyor pointed out that the case of *Scott v. Legg* referred to an addition to an "old"

building, whilst in this case the addition was to a "new" building, as defined by sec. 8.

The magistrate decided that the building was used for trade purposes, but that the case of *Scott v. Legg* governed this.

The summons was withdrawn.

#### NEGLECT TO GIVE NOTICE OF ALTERATIONS.

At the Marylebone Police Court, on the 4th inst., Mr. Charles Hedges, builder, of 17½, Upper North-street, Caledonian-road, was summoned for having commenced certain alterations at 159, Kentish Town-road, without having previously given notice to the District Surveyor.

Mr. F. Wallen, the Surveyor for West St. Pancras, said that on the 18th ult. alterations were discovered in progress involving two irregularities, one of them being of a somewhat dangerous nature, consisting of the cutting away of a chimney-breast and corbelling out the overhanging work above, built with one of the party walls, without any certificate from him, as provided for by sec. 20, rule 15. Moreover, the work was done in a very defective manner, and had to be amended. After the discovery the defendant called at the Surveyor's office and gave notice of the work, which, as then appeared, had been commenced on the 16th of December. The Surveyor pointed out the danger that was likely to arise from such works being done without a previous survey by him, in order that he might certify whether they could be safely done, and what precautions were necessary, and also, in case of alterations where an irregularity was found to exist, the difficulty of discovering how far the alteration had extended.

Mr. D. Rutzon, the magistrate, inflicted a fine of 40s., and 2s. costs.

#### THE TREATMENT OF SEWAGE.

Sir.—The question raised by Dr. Tidy, and referred to in the *Builder* of January 8 [p. 70], as to the area of land required for sewage purification, is one as to which it is essential to give accurate figures. In thirty-two of the principal places in which land has been used for the purposes of sewage filtration and irrigation, the area has been on the average 389 acres to a daily flow of a million gallons of sewage. If we allow the usual mean of 30 gallons per individual per day, this gives an acre of land to every eighty-five persons,—an enormous proportion as compared with that mentioned in your article; but one which is not hypothetical, but practical.

With regard to the effect of drainage through earth, it is necessary to give proper attention to the strength of the sewage. From 80 to 100 grains of solid matter per gallon is the ordinary amount of foreign matter contained in urban sewage. Land is unable to deal with sewage of this strength, as is shown in the case of Edinburgh. The sewage of that city contains 102.36 grains of impurity per gallon, as it is poured on the land. The effluent that runs off contains 64.94 grains of foreign matter per gallon, and is thus only a slightly-diluted sewage. On the other hand, in seven towns, the mean strength of the sewage of which is 62.66 grains of foreign matter per gallon, or a little less than that of the Edinburgh effluent after passing through or over the land, only 14.68 grains per gallon are removed by irrigation. This includes almost all the matter in suspension, but still leaves 47.94 grains of matter in each gallon of effluent. In fact, irrigation removes on an average only 26 per cent. of the foreign matter; but is especially effective as to the organic matter in suspension, and the organic nitrogen, where these elements are found in a low proportion in the sewage. It is, however, ineffective where they occur in ordinary proportions.

When these definite facts,—which may be verified from the reports of the Rivers Pollution Commissioners,—are properly considered, it will be seen that the small amount of purification effected by irrigation filtering is attained at an enormous cost, although it is somewhat special in its nature. A better effluent can, no doubt, be procured by going to the double expense of precipitation with subsidence, and subsequent filtration through land, than is produced by either of the processes alone. But the financial aspect of the question is one of cardinal importance, and the idea of providing an acre of land for every eighty-five persons is one that only needs to be distinctly stated as the actual practice, to show how little value attaches to theoretical accounts of the treatment of sewage.

Jan. 8th, 1887.

FERRONETER.

#### KITCHEN BOILER EXPLOSIONS.

Sir.—Referring to a remark of a jurymen last week [p. 104] with reference to safety-valves which were used for explosions, and which he said should be used in every case; this is perfectly right, providing the right kind of valves are used and fixed in the right place. Unfortunately, however, there are many so-called safety-valves in the market which are worse than useless, as, after being used a little time, they become set fast, and take a deal of force to open them with a chisel or similar instrument. This is no fancied or supposed case, for I have had to do it myself. The only kind of valve that is to be depended upon for this work is a properly made dead-weight safety-valve, which will not set fast, however long it may be fixed before coming into use; this is to be relied upon, and only requires to be properly fixed not far from the boiler and where it must be at once seen if, through extra pressure, it blows off; certainly not up the chimney, this being the last place to fix it. The valves that are not to be depended upon for this purpose are those with indiarubber seats and spiral springs, or metal with spiral springs, or levers and weights.

W. STAINON.

\* \* \* We quite endorse our correspondent's recommendations.—Ed.

#### COMPETITION, GLASGOW EXHIBITION, 1888.

Sir,—I beg to point out to intending competitors for the above building, that the guinea charged for the conditions and plan of site is not the usual deposit, which, on receipt of a bona-fide design, would be returned; but it is a sum paid for the privilege of competing. At least, I cannot look at it in any other light, as the principal matter supplied to competitors surely cannot cost so much.

GUINEA.

#### GELATINE MOULDS.

Sir.—Could any of your readers tell me the best way to prepare gelatine moulds for casting plaster of Paris ornament, and also of what oil used for painting the face of the mould is composed?

JOHN LIVINGSTONE.

#### MASONS' WAGES.

Sir.—May I ask, through your journal, whether it is true that several masons lately employed in the restoration of Buckingham Palace were last week called out by the Masons' Society, because they were only paid 8d. per hour? The insertion of this would greatly oblige.

A. B.

#### PROVINCIAL NEWS.

*Appleby*.—Mr. S. J. Smith, C.E., recently held an inquiry at the Town Hall, Appleby, in reference to an application by the Corporation to the Local Government Board for power to borrow 1,000l. for the purposes of street improvement, sewerage, and sewage disposal.

*Birmingham*.—The new artisans' dwellings, situate in Heath-street, are now completed. They have a frontage of nearly 900 ft. They are letting rapidly, being in the vicinity of many large works. The site having a rapid fall considerable care was necessary in adapting the buildings to the land. Stone carving and Minton's tiles have been freely used in the elevation. Mr. J. Statham Davis was the architect, and Mr. Edward Airey the builder (both of Birmingham).

*Kingston (Surrey)*.—New Municipal Buildings are about to be erected here by the Corporation. That portion of the intended buildings which will stand on the site of Clatters House will be 50 ft. high, the central tower rising 50 ft. above the main body of the buildings, which will contain two stories. The old Assize Courts adjoining are intended to be so reconstructed as to form a large assembly-room or public hall in connexion with the other parts of the building. The hall will be 96 ft. long by 42 ft. wide, with two dressing-rooms adjoining. At one end of the hall there will be a stage of large dimensions, and at the opposite end a gallery extending across the hall, and 32 ft. in depth. There will be several entrances, the old Assize Court-yard being utilised on one side for the purpose. At one side of the stage there will be a supper-room 32 ft. by 22 ft., which it is also proposed to utilise as the magistrates' retiring-room. The new buildings have three entrances from the front, and amongst other apartments which it has been designed to contain, one on the ground floor, 73 ft. by 37 ft., is proposed to be used for Free Library purposes. The municipal offices proper will be on the floor above, and will be nine in number, in addition to a strong

room. The assembly-room formed out of the old Assize Courts is proposed to be used as the magistrates' court as well as for other public purposes. The plans for the new buildings have been designed and prepared by Mr. Macaulay, the Borough Surveyor, and the cost of carrying them out is estimated at 14,000l.

*Lancaster*.—At the recent annual distribution of prizes to the successful students at the Lancasterian School of Art, the Mayor (Admiral T. Storey) intimated that in addition to his gift of a new School of Art and Art Gallery as a memento of the Queen's jubilee, he intended to make provision for technical education, and especially chemistry, and would provide a laboratory, class-rooms, and small lecture-theatre.

*Liverpool*.—A portion of the new Exchange Station of the Lancashire and Yorkshire Railway, has just been opened for traffic, and the old building is now in course of demolition, previous to the erection of the other half of the new premises. When the station is completed it will be one of the largest in the kingdom. It has frontages to Tithebarn-street and Bixth-street, and is built of stone and granite in the Italian style of architecture. The approaches to the platforms from Tithebarn-street and Bixth-street are by easy gradients, exhibiting a vast improvement on the approach to the old station by a steep incline and numerous steps. The platforms at the Pall Mall end of the building are practically level with the street. The total area of land devoted to the building is about 3,400 superficial yards. The main frontage to Tithebarn-street will contain the entrance to the hotel; also a row of fifteen shops abutting up to the street. Two passenger entrances, 15 ft. and 20 ft. wide respectively, are made from Bixth-street, and there are cab entrances and exits from Pall Mall; there is also a main carriageway from Moorfields. The station buildings proper consist of lofty dining-rooms, refreshment-rooms, waiting-rooms, lavatory accommodation, and the usual offices required for a railway station of the first class. The station, when completed, will have six platforms, each 255 yards in length, with eleven pairs of rails. The hotel will have an entrance from Tithebarn-street as well as entrances from the passenger approaches and cab landing, and will have seventy bedrooms. The buildings have been designed by Mr. Henry Shelmerdine, and the engineering works have been designed and carried out under the supervision of Mr. William Hunt, C.E., engineer-in-chief of the company; the contractors for the work being Messrs. Robert Neill & Sons, Manchester.

*Lyndhurst*.—The New Forest Hall, Lyndhurst, was opened on the 27th ult. It will seat from 300 to 400 persons. Mr. John Blizzard, of Southampton, was the architect, and the hall has been built by the proprietor, Mr. William Gerrard.

*Osselt*.—According to the *Leeds Mercury*, it is intended to celebrate the Royal Jubilee Year of 1887 by building public offices and a large hall in which public meetings, &c., can be held. Mr. Henry Holton, of Dewsbury, has been appointed architect. The plans show that the new premises will front to Bank-street, one side abutting upon Illingworth-lane. The front elevation is in the Classic style.

*Stafford*.—It is proposed to erect public baths here as a memorial of the Jubilee year, but the plans are not yet finally adopted.

*Tolworth (Surrey)*.—The Kingston Rural Sanitary Authority propose to erect a new infectious diseases hospital at Tolworth, an outlying locality within the district of the Authority. The building will contain four blocks, and the estimated cost, including furnishing, is 10,000l. The administrative block will contain, on the ground-floor, the visitors' room, matron's sitting-room, kitchen, surgery, hall, lavatory, and other conveniences. The first floor will contain a number of bedrooms, three nurses' cubicles, linen stores, and bath-room. In this block there will also be extensive cellars under the ground-floor in the basement. Another block, designated the special isolation block, the estimated cost of which is 2,400l., will contain two wards, each 36 ft. by 18 ft., and 13 ft. high, each ward being fitted with three beds. This block will also contain two smaller wards, each 24 ft. by 18 ft., to hold two beds each, and in addition the block will likewise contain two nurses' rooms. A third block is described as a two-ward pavilion, each ward being 36 ft. by 26 ft., and together will have accommodation for twelve beds. There will also be nurses'

rooms, and bath and store rooms. The laundry arrangements will be provided in the fourth block, and will consist of an ambulance shed, ironing and drying room, and disinfecting apparatus on the ground-floor, and on upper floor the washhouse and mortuary. Mr. Jacob Gibbon, of Verulam-buildings, Gray's Inn, is the architect, and Mr. Charles Ward is the contractor, the amount of his contract being 7,850l. This sum is exclusive of architect's fees, legal expenses, and furnishing. An official inquiry into the proposal was held on the 31st ult. by Mr. Arnold Taylor, on behalf of the Local Government Board.

**Wimborne.**—From statements made at the meeting of the Rural Sanitary Authority on the 31st ult., it appears that the late flood has done much damage in the town, the bridge over the river Stour being so injured that it will cost about 6,000l. to put it into a proper state of security.

**SEWERAGE AND DRAINAGE WORKS.**

**Dorking.**—A Local Government Board inquiry was held at Dorking on the 30th of December, by Mr. Arnold Taylor, into an application made to the Local Government Board for sanction to a loan of 7,000l. for the purposes of sewage outfall and disposal works. Mr. Urban Smith, C.E., of the firm of Smith & Ansdn, the Local Board's Engineer, attended in support of the application, and previously to the inquiry the Inspector went over the works (which are in course of construction) with the Engineer. There was no opposition to the proposed loan, and the proceedings were of a formal character. Both the sewerage works and the works of disposal at Dorking have been for some time in progress under separate contracts, and are now nearing completion. The anticipated cost is 20,000l.

**Guildford.**—At a special meeting of the Guildford Urban Sanitary Authority, held on the 31st ult., to consider a letter from the Local Government Board as to the sewerage of the district, a committee was appointed to make inquiries and collect information as to the best course to be pursued in the matter. It was stated in the course of the discussion that more than half the town sewage went into the river, but this was contradicted by the Mayor and other members of the Board.

**Newhaven.**—The tender of Mr. James Haywood, contractor, Eastbourne, has been accepted by the Newhaven Local Board for the construction of a complete system of sewerage with outfall sewer and storage culvert. The sewage will be delivered during the ebb tide in the River Ouse, at the mouth of the harbour, and close to the sea. The amount of the contract is 5,557l. The scheme has been approved by the Local Government Board and the Harbour Company, and negotiations with the War Department and Board of Trade are approaching completion. The engineer to the works is Mr. W. H. Radford, Assoc.-M. Inst. C.E., Nottingham, and the scheme was selected from more than twenty designs in open competition.

**Sutton (Surrey).**—On the 29th ult. Mr. Arnold Taylor, one of the Inspectors of the Local Government Board, attended at the Public Hall for the purpose of holding an inquiry into the application of the Local Board for powers to borrow a further sum of 7,000l. in connexion with the drainage of the town. The chairman of the Local Board (Mr. T. Wood) remarked that when the former inquiry was on, and when they obtained the sanction to borrow 13,000l., the sum of 16,000l. was mentioned, but Mr. Taylor thought they had better apply for 13,000l. first. Mr. Taylor said this was so. The Clerk (Mr. P. L. Marten) said the land acquired by the Board was 6a. 2r. 3p., the cost being 2,900l., together with expenses, with the exception of those of the arbitrators and umpires, which were not yet ascertained, but these might be put down at just over 200l. The amount of the No. 1 contract with Messrs. Cook and Smith was 4,120l., and the amount which had been paid them up to the present was 6,650l. Mr. Cunliffe's contract for the outfall works was 5,331l., and he had received 2,800l.—There was no opposition to the Board's proposals.

**Swarwick.**—A small farm of fifteen acres is now being laid out for sewage irrigation near Bulterley Reservoir. The land is a stiff clay, but it is being specially prepared and lightened to a considerable depth with fine ashes, and

close drained. It is believed by the method adopted the strongest clay land may be made suitable for the reception of sewage, and thus one of the great difficulties in the way of sewage purification in some districts will be removed. The farm will receive the sewage from a population of nearly 4,000. Mr. W. H. Radford, of Nottingham, is the engineer for the works.

**WATER SUPPLY.**

**Bristol.**—It is reported that at length an effort is being made to utilise the 14,000,000 gallons of water per day which the Great Western Railway Company are pumping at the Sudbrook springs on the Monmouthshire side of the Severn Tunnel, and which are at present allowed to run to waste, while it costs the company nearly 10,000l. a year to pump it into the Severn estuary. The water has been submitted to analysis, and has been declared to be the purest spring water, entirely free from organic matter, and the finest water that could be desired for domestic purposes. The Mayor of Bristol presided over a town's meeting in the Guildhall, on the 29th ult., in favour of a scheme for using the spring as a further water supply for Bristol by bringing it across the Severn by a tunnel beneath the bed of the river. A company has been formed for this purpose, and as a desire had been expressed that the Corporation should have the control of the water-supply of the city, the Bill which had been drafted contained a clause enabling the Corporation to exercise all the powers of the Act on payment of the costs and expenses incident to obtaining it, and sums expended by the company in exercise of its powers, with 5 per cent. interest. Resolutions in favour of the scheme were unanimously adopted.

**Carlisle.**—The new filter-beds constructed for the Corporation of Carlisle by Messrs. R. H. & H. Hodgson, of Workington, and making an important extension, at a cost of about 8,700l., of the means of supplying this city with water from the river Eden, have just been brought into use. Mr. Hepworth, the Engineer of the works, had printed for the occasion an interesting sketch of the history of the Carlisle water-supply from 1837 down to the present time. The new extensions include an subsiding reservoir, having an area of 5,353 yards super., and a sand-filter with an area of 2,401 yards super., the total area being about twice that of the old filter. The whole of the walls are of cement concrete, and the foundations are laid upon the rock for a considerable length, the remaining length being laid upon the gravel. The walls of the subsiding reservoir, which occupies the north end of the site, are 4 ft. in thickness at the bottom, and 2 ft. 6 in. at the top. The bottom of the bed is covered with Lazonby flags, having a fall from all sides towards the centre, where is fixed a 12-in. diameter pipe, by which all the water and sediment that may have deposited on the flags may be drawn off from the reservoir, when it is required to be cleaned. The water is admitted from the river into the reservoir by a 24-in. valve placed in a culvert at the north end of the reservoir. The outlets from the reservoir to the sand-filter are four in number, 12-in. diameter each, with valves attached, and are fixed at a height of about 2 ft. above the level of the flags. The water in the new reservoir will have ample time to settle before passing through to the sand-filter. The walls of the sand-filter are 4 ft. 6 in. thick at the bottom, and 2 ft. 6 in. at the top. The filtering material consists of six layers, through which the water has to percolate. The first or bottom layer, which is hedged round and over the tunnels for conducting the water into the service reservoir, consists of a layer, 15 in. in depth, of washed stones, from 4 in. to 8 in. diameter; the second layer, 12 in. in depth, of a bed of stones, 3 in. diameter; 3rd, a bed of stones, 1 in. diameter, laid 3 in. deep; 4th, a bed of stones 1-in. diameter laid 3 in. deep; 5th, a layer of pebbles not more than 1-in. diameter laid 3 in. deep; and 6th, a layer of fine sand, 2 ft. 6 in. deep. The water, after passing through the filtering media, is conducted into the old service reservoir.

**Penance.**—The *Cornish Telegraph* of the 23rd ult. contained an article describing the working of the "districting" system in conjunction with Deacon's waste-water meters, which afford a ready means of localising the points at which waste is occurring. Wa

described this system in some detail in the columns of the *Builder* a few years ago.

**Sevenoaks.**—The shareholders of the Sevenoaks Waterworks Company have authorised the directors to make application to the Board of Trade to grant a provisional order, to be subsequently confirmed by Parliament, for extending their limits of supply to the parishes of Brasted, Sundridge, Cbovening, Otford, and Kemring, all within the county of Kent; to levy rents and rates thereon, and to amend the Sevenoaks Water Act, 1878, and extend it, and the Water Clauses Acts, to the said parishes; to raise additional capital for the purposes aforesaid by ordinary or preference shares or stock, or by debentures, or debenture stock, and for other purposes.

**Sheffield.**—A public meeting of the ratepayers of Sheffield was held on the 28th ult., to ask their sanction, as required by Leaman's Act, to a Bill promoted by the Corporation for the compulsory purchase of the works of the Sheffield Water Company, and to the opposition to the application of the Water Company to be allowed to continue to charge the extra 25 per cent. granted to them for twenty-five years. After the hearing of the Bradford dam in 1864, Parliament authorised the Company to charge for 25 years an extra 25 per cent. on their rates. They are now going to Parliament to ask that the 25 per cent. might be charged in perpetuity. The Corporation have not only decided to oppose the application, but to endeavour to obtain possession of the Company's undertaking. The ratepayers were now asked to sanction their action. The meeting was held in the Montgomery Hall, and was presided over by the Mayor (Mr. H. Stephenson). The members of the Corporation were present, and the meeting was largely attended. Two resolutions were submitted, one authorising the Corporation to promote a Bill of their own, and the other to oppose the Bill of the Water Company, and they were carried almost unanimously. A poll was demanded, and it will be taken this month.

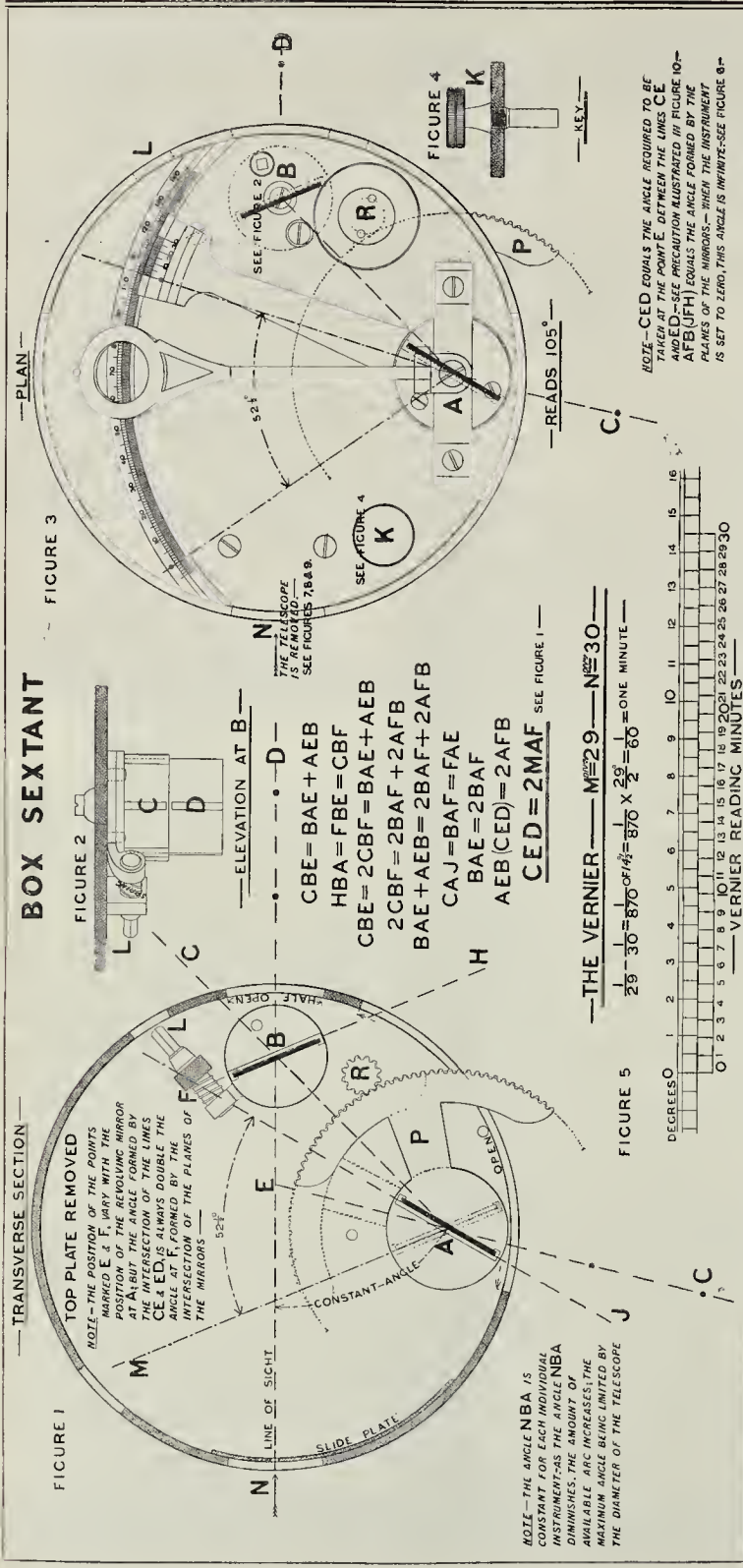
**SCOTCH NEWS.**

**Dundee.**—At a meeting held at Dundee on the 27th ult. it was agreed to erect a Technical Institute near University College, to be worked in connexion with the college. The new building is to be known as the Baxter Technical Institute, the late Sir David Baxter, Bart., of Kilmarnock, having left 20,000l. for its erection with a view to the improvement of working men in scientific knowledge.—The *Dundee Advertiser* says that the year just closed has been anything but remunerative to those engaged in the building trade in Dundee. Considerable additions have been made to house property within the burgh during the year, but the depression in the staple trade and the keen competition existing among the master builders have materially affected contract prices.

**Portobello.**—The works in connexion with the erection of a new railway station are just being commenced. The plans have been prepared by Mr. Carswell, chief engineer to the North British Railway Company, and the works will be carried out by Messrs. James Young & Sons, railway contractors, Edinburgh. Operations are expected to be completed about the end of June.

**Stirling.**—At a special meeting of the Stirling Town Council held on the 23rd ult. to consider a proposal to purchase a part of the Gowan Hills for the formation of a new cemetery, Provost Yellowlee moved that the Council accept the offer of the Commissioners of Woods and Forests of the proposed cemetery ground at 310l., and remit to the Cemetery Committee to take in estimates for inclosing the ground and levelling a section of it for interment purposes. This motion was carried by sixteen to two. Resolutions were also adopted, but by very small majorities, agreeing to purchase in addition, ten acres in one part of the Hills, and five acres in another, should the Crown be willing to sell them separately at the same rate as that asked for the whole of the hills, say 55l. per acre.

**"New Buildings in Eastcheap."**—In the paragraph with this heading which appeared in our last (p. 104), Mr. Richardson was mentioned as clerk of works. We are asked to state that Mr. Chas. Watkins was clerk of the works, and that Mr. Richardson is Messrs. Perry's foreman.



**The Student's Column.**  
 FIELD WORK AND INSTRUMENTS.—III.  
 Surveying Instruments.

III.—THE BOX SEXTANT.

THE principle of this instrument resembles that of the optical square, in depending primarily upon the following facts:—(1) when a ray of light is reflected at a plane surface the reflection takes place in a plane perpendicular to the reflecting surface, the incident and reflected rays making equal angles with this surface; (2) when a ray of light proceeds in a plane, at right angles to each of two plane mirrors, inclined at any angle to one another, and is successively reflected at the plane surfaces of the mirrors, the total deviation of the ray is double the angle of inclination between the mirrors. The angle so formed by the glass mirrors in the case of the optical square was seen to be fixed at 45°, giving a right angle between two directions; but in the case of the box sextant, one glass, namely, the one containing the complete mirror, is constructed to revolve upon a centre, and worked by means of a curved rack-and-pinion wheel, as shown in fig. 1. This glass is called the index glass, and is marked A in our illustration. The glass marked B is called the horizon glass, and is fixed in a plane perpendicular to that of the instrument. The angles observed by a sextant being double the angles moved over by the index, the limb of the instrument is graduated, as shown in fig. 3, as though it were double the size, in order to record absolutely the angle observed. The angles are marked to read from zero to 140°; but it is to be noticed that after passing 120° the angles become less reliable. The divisions zero to 140° are usually marked upon a silvered plate, and have a vernier scale attached, which works upon the end of a bar, to which is fixed upon the inside, below the top plate, the movable index mirror. This mirror, with its attached vernier-bar, is revolved by means of the milled screw R, in fig. 3, which acts on the rack and pinion shown in fig. 1. The horizon-glass is half silvered and half unilvered, and is attached to the top plate, as shown in fig. 2, connected in a manner capable of adjustment, as we shall explain in our next article.

For convenience of carrying the instrument it forms, when closed, a box of about 3 in. in diameter and 1½ in. deep. The top cover which protects the plate, shown in fig. 3, is reversible so as to be unscrewed and attached by an under screw beneath the box, thus forming a handle for holding the instrument when in use. These screws for attaching the box or cover to the upper or lower side of the instrument run round the outside lower edge of the circumference of the instrument. Before screwing the cover to the underside of the instrument a small slide shutter must be opened in the lower plate to allow of two darkening glasses being lowered by means of two levers, which appear in the side of the instrument, generally just under the zero point of the graduated plate. These two coloured glasses, which are made to fold inside when the box is closed, are intended for astronomical purposes and are to be used when observing the altitude of an object such as the sun, one or both of the darkening glasses



BOX SEXTANT

NOTE.—WHEN AN OBJECT IS VIEWED AT AN INFINITE DISTANCE, AND THE INDEX OF THE INSTRUMENT IS SET AT ZERO THE CLASS B SHOULD BE PARALLEL TO THE CLASS A.—THE ADJUSTMENTS ARE EFFECTED, WITH THE KEY K, (1) HORIZONTALLY, BY TURNING THE SQUARE HEAD OF THE SPINDLE L, WHICH HOLDS THE SPRING AS SHOWN, AND IS FASTENED BY A SCREW END TO ITS CONNECTION WITH THE UPPER PLATE.—(2) VERTICALLY, BY MEANS OF THE SCREW NEAR B WHICH RAISES OR LOWERS ONE SIDE OF THE UNDER PLATE, TO WHICH THE CLASS B IS ATTACHED.

FIGURE 6

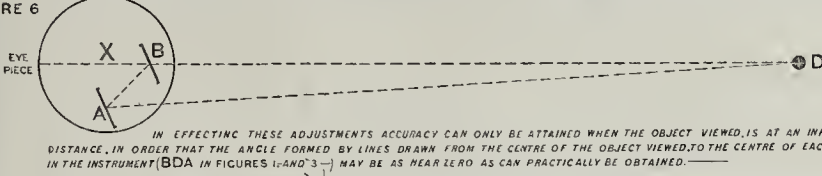


FIGURE 7

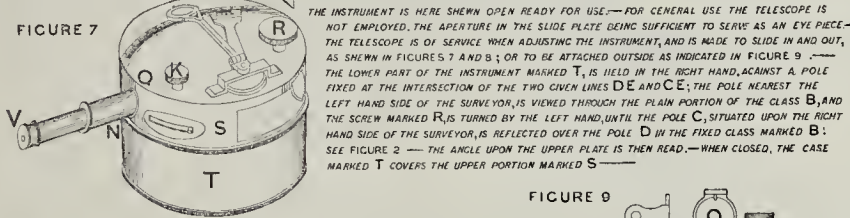


FIGURE 8



NOTE.—IN SOME INSTRUMENTS THE TELESCOPE IS CONNECTED BY THE ATTACHMENT MARKED Q IN FIGURE 8.

FIGURE 9

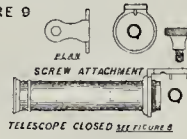
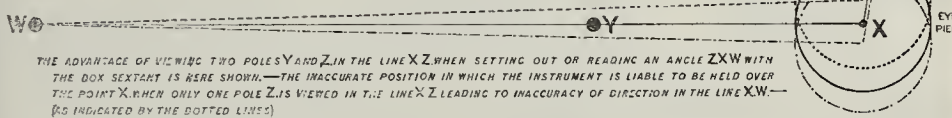


FIGURE 10



being left in position according to the brilliancy of the object viewed. Thus they are of service at sea as shades when obtaining the altitude of the sun; that is to say, you look at the horizon through the plain portion of the glass B, and then bring the edge of the sun to the horizon with the little milled bead R outside the instrument. To the sight is attached a telescope, omitted in figs. 1 and 3, but will be shown in figs. 7, 8, and 9. This telescope is made to slide in and out, and is provided with a sun glass for use in adjustment. The lenses employed have a concave surface in the eye-piece, with two lenses in the object glass, having the interior curves necessarily deep, about 2½ in. radius, on account of the short focus.

When, as in use at sea, you have to look through the plain glass with the telescope, the shades worked by the levers above described are absolutely necessary to be used, either together or separately, at the time of observation, but in ordinary land surveying work they must be lowered through the aperture, which is closed by the sliding-shutter, so as to be out of the line of sight when they are not required. The telescope also is found to be generally inconvenient as it takes time to arrange, and is, therefore, removed as soon as the instrument is known to be in adjustment. When the telescope is removed, a sliding-plate, shown in fig. 1, takes its place, and the eye is guided by a small aperture in this sliding-plate opposite the fixed half silvered glass. The vernier shown in fig. 3, and enlarged in fig. 5, enables the angles taken to be read to minutes. It will be observed that this vernier is the same as described by fig. 4 of our last article. It is not necessary to have the index or vernier, when about to read an angle, placed at zero to start with, as the angle depends entirely upon the conjunction of the objects viewed, appearing as one in the glass B opposite the eye-piece, but when it is desired to close the box it is necessary to place the vernier scale somewhere near the zero point by means of the milled-screw, R, otherwise the curved rack will project, as shown at P, in fig. 3, and prevent the cover passing over it.

SCHOOL-BUILDING NEWS.

**Basingstoke.**—New Board schools are in course of erection here, and the foundation stone was laid last month. The site of the schools is on the Fairfields. (The architect is Mr. Charles Bell, whose plans were selected in competition.) When finished, they will accommodate 1,300 children. Mr. H. J. Goodall, of Basingstoke, is the contractor for the work, the amount of the contract being 10,351l. The buildings will be in two blocks,—one for the infants and the other for the older scholars,—and the material used flint, with brick dressings; the central hall principle,—class room leading out from the hall,—is adopted. The heating apparatus is by Messrs. Rosser & Russell, of London. The infant school is a one-story building, excepting the caretaker's department, and the upper school is a two-story erection.

**Great Horton (Bradford).**—New schools, erected by the Bradford School Board, at Great Horton, have just been opened. The buildings, which consist of three blocks,—the mixed school, the infants' school, and the caretaker's house,—are designed in the "Queen Anne" style. The mixed school consists of a large assembly-hall, 88 ft. by 45 ft., well lighted at both ends and at the sides, above the roofs of the adjoining class-rooms. The height to the ceiling is 29 ft. The roof is of open timber-work, and the ceiling is panelled in wood moulds in a simple manner. Around the assembly-hall are grouped twelve class-rooms, about 25 ft. square, and capable of accommodating from fifty-six to sixty-four children each. Each class-room has glass partitions from the assembly-hall, and all are arranged so as to have left-hand light. The infants' school has an assembly-hall similar to the mixed school, but 53 ft. by 36 ft., and 26 ft. high. Five class-rooms are arranged around it, with glass partitions, as in the mixed school. Some of these rooms are arranged for desks, whilst others have galleries. The architects are Messrs. Morley & Woodbone, of Bradford and Bolton (who were appointed after competition). The contractors for the various works have been:—Messrs.

Holdsworth Brothers, of Wyke, masons; and Messrs. J. Moulson & Son, joiners; Mr. Smithies, slater; Mr. Wallace, painter; and Mr. Throp, plasterer, all of Bradford. The heating work has been done by Mr. T. Mears, of Bradford; the gasfittings by Mr. Laycock, Bradford; and the railings by Mr. Stork, Bradford. Mr. Johnstone, the Surveyor of Works to the Board, has superintended the work. The total cost of the building has been about 11,000l.

**Sheffield.**—New Sunday schools in connexion with Glossop-road Baptist Church were opened on the 28th ult. The new building continues the frontage of the original building of the church and former school up Shearwood-road, making altogether a street front of 330 ft. It harmonises in character with the old building, although it is somewhat less ornate in detail. The plan of the new central school presents a large central hall, surrounded with two tiers of class-rooms, capable of being added to the auditorium when required; and with a gallery on three sides. There are three separate entrances to the new portion, respectively for boys, girls, and infants, and separate retiring-rooms, also separate lavatories, &c., for male and female teachers. The total cost of the new premises, with certain alterations in portions of the old buildings, has been 3,530l. The work has been carried out by Mr. A. F. Ripley, of Rotherham, under the direction of the architect, Mr. C. J. Innocent, of George-street. The sub-contractors were Messrs. E. and W. Oxley, of Hanover-street, for the carpentering, &c.; Messrs. Bissett & Sons, of Wilkinson-street, for the plastering; Mr. J. E. Elliott, of Surrey-street, for the gasfitting and plumbing; and Messrs. Truswell & Sons, of Durban Foundry, for the heating, which is on the hot-water high-pressure principle.

STAINED GLASS.

**Coniston.**—Mr. Ruskin has presented a stained-glass window to the Church of the Sacred Heart of Jesus, Coniston. The window is placed in the west wall. It is triplet in form, and the subject of illustration is the vision of St. John in the

Isle of Patmos. The window is the work of Messrs. Hardman, of Birmingham.

**Hanney.**—A three-light stained-glass window has just been fixed at Hanney Church, near Wantage, Berks, in memory of the late wife of the vicar, the Rev. James Macdougall. The style of the window is that of late sixteenth-century Italian work. In each light a figure is represented, viz., "Faith" on the left hand, "Charity" in the centre, and "Hope" in the right-hand light, with emblematic floral ornament in the canopy and at the foot of each figure. The window has been executed from designs by Mr. George M. Macdowell by Mr. James B. Westropp, at the Royal Stained Glass Works, Old Windsor, under the direction of Mr. R. Owen Allsop, architect, Norfolk-street, London.

**Newmarket.**—A stained window has been placed in the east end of St. Mary's Church by Mrs. Joseph Dawson, in memory of her husband. The subject of the window, which has three lights, is the Ascension, and the work has been well carried out by Messrs. Lavers, Westlake, & Co.

**Northampton.**—Two stained glass windows have just been added to St. Edmund's Church, Northampton. They are the gift of Mrs. Franklin, in memory of her nephew, Samuel Taylor Mea. Mrs. Franklin was assisted in the choice and arrangement of the subjects by Mr. M. H. Holding, A.R.I.B.A., and the making was entrusted to Messrs. Hardman & Co., of Birmingham. The fixing was done by Mr. Wm. Tomes.

**St. Day (Cornwall).**—A stained-glass window has lately been fixed in the parish church here in memory of the Dowager Lady Williams. The window is the work of Messrs. Taylor & Son, of Berners-street, London, and its subject is the miracle of healing related in the eighth chapter of St. Luke's gospel.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

517, Improved Cement. J. & A. Bidwell.

This is a cement composed of zinc white and various varnishes. The advantage is that it will furnish to a bright gold or silver colour, and is thus of special use in decoration.

1,496, Electric Bells. T. Crampton.

This invention relates to a bell actuated by electricity, and constructed in such a manner that the armature, electro-magnets, and clapper, are contained within the bell proper. The clapper is balanced by gravity, without springs, but is moved whenever a current of electricity is passed through the armature.

1,913, Ventilating Cows. E. H. Shorland.

The subject of this invention is a square or angular cow, with upright louvers, fitted with shields, placed at an angle to the openings. It is claimed that it is a more convenient form for fixing than many in general use.

5,942, Improved Door-Spring. F. Stent.

This invention consists in a door-spring which is entirely concealed from view, and is capable of being readily brought or thrown out of action at will. The closing is effected by a spiral spring, and can be modified by a flexible band.

5,973, Tenoning Apparatus. J. Grant.

In this apparatus adjustable saws are used, the object of the invention being to obviate the great waste of time and loss of material that occurs with the use of machines as ordinarily constructed for this purpose.

1,654, Hinges. A. Gold.

By this invention the manufacture of the hinges is greatly simplified and economised, the complication of pinning, and the use of washers, and the riveting over joining, are dispensed with.

2,378, Kilns for Tiles, Pottery, &c. Geo. Lazenby.

The improvements claimed by the patentee are in the direction of keeping the kiln free from the products of combustion, and this is effected by placing an inner wrought-iron casing inside the outer shell of the kiln. The case then being heated, the articles are fired without the products of combustion coming in contact with them.

##### NEW APPLICATIONS FOR PATENTS.

Dec. 31.—17,116, E. Moore, Curing Damp Walls.—17,119, P. Richards, Trapping Drains or Sewers.—17,130, A. Mack, Plaster Boards.—17,139, A. Laver, Automatically Opening and Closing Doors.

Jan. 1.—25, E. Banner, Testing Pipes, Drains, and Sewers.—31, F. Beauchamp, Window Fasteners.

Jan. 3.—43, W. Martin, Domestic Firegrates.—73, A. Bonit, Electrical Indicators.—80, D. Balsar, Fixing Mouldings and other Woodwork.

Jan. 4.—83, H. Johnson, Downcast Ventilator.—

89, H. Owens, Opening and Closing Fanlights, Ventilators, Casement Sashes, &c.—115, W. Thompson, Portable Houses.  
Jan. 5.—133, W. Bessley, Ornamentation of Tiles, &c.—156, F. Wade, Wood Paving, &c.  
Jan. 6.—176, T. Wilson and I. Johnson, Ventilating Apartments.—178, T. Murgatroyd and J. Turner, Device for Painting and Varnishing Brushes.—209, K. Worrall, Distemper.—215, H. and A. Cunningham, Wood Screws.

##### PROVISIONAL SPECIFICATIONS ACCEPTED.

13,306, R. Scrivener, Enamelling and Facing Bricks, Tiles, &c.—15,227, E. & J. Verity, Sash and Casement Fastener.—15,419, J. Hodges, Mortise and Rim Locks.—15,534, P. Walker, Ventilators.—15,953, G. Courtier, Kitchen Ranges.—15,998, J. Bryant, Alarms for Doors, Windows, &c.—16,071, W. Meers, Joint for Earthenware Sanitary Pipes.—16,083, W. Sanday, Combined Mitre-vent, Shoot, and Cramp.—16,105, J. Craig, Outlet Ventilators.—16,336, K. Shouler, Drain-pipes, &c.—16,360, C. Ewing, Self-closing Sash-fastener.—11,208, H. Wilson, Drying Timber, &c.—14,505, S. Willett, Door Indicator.—14,538, W. Sargent, Circular Glass Ventilators.—15,312, G. Ewing, Flushing Apparatus for Water-closets, &c.—15,545, A. Henderson, Syphon Trap Closet-pans.—15,600, G. Courtier, Drain Traps.—16,471, G. Reidfern, Hearths or Fireplaces.—16,527, J. Harvard, Window-sash Fastener.

##### COMPLETE SPECIFICATIONS ACCEPTED.

2,967, J. Hicks and C. Tiptot, Levels.—3,006, H. Watson, Water taps, &c.—15,257, O. Lessing, Cut and Stained Glass for decorative purposes.—6,474, J. Barrett, Opening and Closing Doors in Connection with Hoists.—15,948, H. Haddan, Alarms for Doors, &c.

#### MEETINGS.

MONDAY, JANUARY 17.

Royal Academy.—Mr. J. E. Hodgson, R.A., on "Art a Universal Language." 7. 8 p.m.

TUESDAY, JANUARY 18.

Birmingham Architectural Association.—Mr. Edward R. Taylor on "Serpents of Architecture." 7.30 p.m.

Wednesday, January 19.

British Archaeological Association.—(1) Mr. J. Romilly Allen, F.S.A. (Scot.) on "The Crosses of the Isle of Man." (2) Mr. C. Kosch Smith, F.S.A., on "Roman Chichester." 8 p.m.

Society of Arts.—Mr. J. B. Marsh on "Cameo-Cutting as an Occupation." 8 p.m.

Civil and Mechanical Engineers' Society.—Mr. Francis Campin on "The Design of English and Foreign Iron Bridges." 7 p.m.

Builders' Foremen and Clerks of Works' Institution.—Annual Meeting. 8.30 p.m.

Royal Meteorological Society.—Two papers. 7 p.m.

THURSDAY, JANUARY 20.

Parkes Museum of Hygiene.—Mr. M. Ogle Tarleton on "Engineering and Architecture in relation to Sanitary Science." 5 p.m.

Edinburgh Architectural Association.—Mr. W. Scott Morton on "Taste in a Six-Roomed House." 8 p.m.

Royal Academy.—Mr. J. E. Hodgson, R.A., on "Art a Universal Language." 7. 8 p.m.

FRIDAY, JANUARY 21.

Architectural Association.—Prof. W. H. Corfield, M.D., on "House Sanitation." 7.30 p.m.

#### Miscellaneous.

**The Wood Trade of London.**—Messrs. Churchill & Sim's "Wood Circular" for January says,—"For the last five years we have had to report the wood trade of London as being in a very depressed condition, but of none of those years it is necessary to give such gloomy accounts as of 1886. Prices, which in January were believed to have touched the lowest possible point, continued to recede until the end of the year; and consumption, which, in spite of an abnormal cheapness of supply had been falling for some years, and which was also thought to have reached its lowest in 1885, has again experienced a further serious decrease. An idea of what this shrinkage in the demand has been will be quickly gathered from the following figures:—In 1881, the consumption of deals, battens, and boards was 29,650,000 pieces, from which total it has declined to 26,800,000 pieces in 1886. These quantities represent the delivery of deals, battens, and boards of the Port of London both from the ships' sides and from the docks, but they do not alone show the extent of the loss of consumption, for each year the average size of these goods grows less, and the falling off in actual quantity is consequently greater. It being impossible to arrive at any reliable estimate of the cubical measure of overside deliveries, we give the statistics published by the Dock Companies of their deliveries, which show an actual quantity of 250,000 Petersburg standard hundreds drawn from their yards in 1881, against 188,000 in 1886,—each intervening year the quantities growing smaller."

**Sale of the Stewart Collection.**—The valuable collection of works of art belonging to the late Mr. A. T. Stewart, of New York, is announced to be sold by auction on March 23rd, 24th, and 25th next, at Chickering Hall, in that city. The collection will be on exhibition from February 18th up to the date of the sale in the rooms of the American Art Association. The merchant prince was a lover of art, and gratified his taste in this direction by gathering together at a considerable expense a number of the most celebrated pictures, sculptures, and bronzes in existence. According to the catalogue, the collection includes three paintings by Meissonier, one of which is the famous "1807." For this latter work Mr. Stewart gave 12,000. Other great artists whose works are represented are Gérôme, with three paintings, including "The Gladiators" and "The Chariot Race"; Fortuny, with three works, amongst them being "The Snake Charmers"; and Rosa Bonheur, with "The Horse Fair." Other paintings which will, no doubt, be viewed with interest when exhibited are the following:—"A Scene in Morocco," by Benjamin Constant; Cattle piece by Auguste Bonheur; "Auction at the Fair," by Jimenez y Hernandez; "The Child's Party," by Knauts; a landscape with sheep, by Jaque; "The Disputed Boundary," by Erskine Nicol; "Niagara," by Church; and "The Prodigal Son," by Duhute. There are also works by the following artists:—Danigny, Troyon, Bongueren, Fichel, Madrazo, Jacquet, Alfred Stevens, Boldin, Horace Vernet, Detaille, Escosura, Piloty, &c. There are a certain number of works by American artists, viz.:—Albert Bierstadt, R. C. Minor, J. R. Tait, and William Hart. Amongst the numerous marble statues (about forty-five in all) are the "Greek Slave" and "Eve," by Hiram Powers; "Demosthenes" and "Flora," by Crawford; and "Queen of Palmyra," by Hosmer. There are also silver ware, Dresden, Sevres, and Royal Worcester ware, Japanese silver, and porcelain, silver ware, Dresden, Sevres, and Royal Worcester ware, Japanese silver, and porcelain, silver ware, Dresden, Sevres, and Chinese curiosities, rare enamels, and bric-a-brac, which probably attract general attention. The heirs of the estate belonging to Mr. Stewart's widow have decided to sell the whole of the contents of her residence, including the superb art-treasures which the interior of the mansion at present contains.

**British Archaeological Association.**—At the meeting of this Association on the 5th inst., Mr. W. De Gray Birch, F.S.A., in the chair, communications were read from Mr. T. H. Round and others, calling attention to the dilapidated condition of the remains of St. Bishop's Priory Church, Colchester. This well-known ruin was damaged by the recent earthquake, and the effects of the exposure to the elements for many years,—the buildings having been unroofed during the Parliamentary siege of Colchester,—are so serious that the nave arcades are likely to fall at any moment. A paper was read on the Roman stations at Piers Bridge and at Rokeby, by the Rev. Prebendary Scarth. The inscriptions discovered at both places were described and discussed. Reference was made to the recent discovery of a very perfect portion of a Roman road from Bowes to Binchester. In the course of the discussion which ensued, Mr. Cope called attention to the unprotected condition of the lapidary inscriptions at Rokeby, and Mr. Romilly Allen, F.S.A. (Scot.), described the injury which has resulted from want of shelter, to some other interesting inscriptions at Ilkley. A paper was also read by the chairman upon the works now in progress at the baths of Bath. Resolutions were passed in favour of the Ancient Monuments Act being extended so as to include Roman remains in its schedule, in addition to those of pre-historic date, as at present.

**Robert Boyle & Son, Limited.**—The first annual meeting of the shareholders in this company was held on Tuesday, the 11th inst., at Cannon-street Hotel, when a dividend at the rate of 12 per cent. on the ordinary shares was declared. The Managing Director, Mr. Robert Boyle, stated that, taking the general depression in trade into consideration, the business done by the company during the past year might be considered as very satisfactory, and that the prospects of the company at the present time were exceptionally bright, the business done during the first three months of the second year of the company being in excess of that done during any corresponding three months since the foundation of the business. The election of directors and auditors brought the proceedings to a close.

**New Tramways in South London.**—The London Southern Tramways Company, whose system, under the Act of Parliament which they obtained some years ago, extends from Vauxhall to Stockwell, Longborough Junction, and Camberwell-green via Goldborough-lane, and via Milkwood-road to Herne Hill, Tulse Hill, and Norwood, have up to the present time only been able to construct their lines in the direction of Vauxhall as far as the Swan at Stockwell, in consequence of the delay in the widening of South Lambeth-road, which the tramway route traverses on its way to Vauxhall. The Metropolitan Board having recently obtained possession of the property necessary to widen South Lambeth-road, the improvement has been carried out, and the tramway company are now laying down their lines along that thoroughfare from the junction of Stockwell and Clapham roads to Vauxhall. When this extended route is opened, the Southern Company's cars will be placed in communication with the cars of the South London Tramways Company at Vauxhall, and with those of the London Tramway Company at the junction of Brixton and Stockwell roads. There is also a probability of tramway communication being shortly extended from Clapham to Tooting. The South Metropolitan Tramway Company are again applying for Parliamentary powers to lay down lines from Clapham to Balham and Tooting, passing along the east side of Clapham Common, and the Wandsworth and Streatham local authorities interested have already given their sanction to the undertaking, subject to a junction being formed with the Clapham terminus of the London Tramways Company, and the widening of certain portions of the carriage-way between Clapham and Tooting.

**Identification of a Monument in Winchester Cathedral.**—The *Hampshire Advertiser* says that for many years a quaint and even ugly, though costly, monument, in the north aisle of the Cathedral, without inscription, has puzzled antiquaries. It has just been identified, however, by Mr. H. D. Cole, the heraldic antiquary, aided by the Dean, Dr. Kitchin. Mr. Cole discovered on the monument a shield of arms, in the Cathedral Registry the burial of a Mr. E. Cole, and in the Guildhall a portrait of a Mayor of that name, with a shield of arms upon it exactly like those on the monument. These are the arms of Cole and Holcroft, and solved the mystery at once. The monument is that of Mr. Ed. Cole, M.P. and Mayor of Winchester in the sixteenth and seventeenth centuries, and a subscriber to the fund for Defence against the Spanish Armada. The Dean, anxious to commemorate such a local worthy in Church and State, and a Mayor withal, had had a tablet designed by his son, and coloured like the Jacobean memorial, placed under it. This bears the joint arms of Cole and Holcroft, and the arms of Cole separately, and the following inscription:—"The monument above is to the memory of Edward Cole, Esquire, Burgess of this city, 1601; Mayor, 1587, 1598-1612. Principal Registrar of the Bishop of Winchester. He married Christian, daughter of W. Holcroft. He died in 1617, aged 63." Beneath the inscription, and under the Cole shield, are the figures 1886, to show the period of identification.

**Glasgow Cathedral: Lighting with Gas.** The work of lighting the cathedral with gas has been completed. In the interior the length and grandeur of the nave are developed by groups of light at the extreme ends, two handsome standards leading up to the choir. On entering the choir four lines of standards give vistas which culminate in two tall and delicately-wrought standards at the east end. The cathedral from this cause has its interior beauties visible for the first time. The plans and designs for the lighting and executing of the work are by Mr. Skidmore, of Coventry, who lighted the cathedrals of St. Giles's and St. Mary's, Edinburgh, Calcutta, and various cathedrals in England. The drawings and plans were approved by Mr. Robertson, Government architect at Edinburgh.—*Glasgow Herald.*

**Bridge across the Sound.**—With regard to the proposed tunnel under the Sound, a Swedish journal suggests that a bridge across it would be both cheaper and more advantageous. As the Sound is shallow a long way on to the Danish side it would be easy to fix pillars most of the distance. It is added that the distance is only a little more than between New York and Brooklyn.

**The Queen's Jubilee: Proposed National Institute for Wales.**—At a public meeting of the inhabitants of Cardiff and other parts of the Principality, on the 6th inst., an important work was resolved upon. Two proposals were submitted, one on behalf of the South Wales University College for a new building in the outskirts of the town; the other, a proposal for a National Institute, which had been carefully matured by Mr. Edwin Seward, A.R.I.B.A. This scheme was, after close discussion, adopted as the most appropriate to the occasion. When the building is completed it will combine accommodation for the Royal Cambrian Academy, the Cardiff Naturalists' Society, the Cardiff Literary Society, the Cambrian Society of South Wales and Monmouthshire, and the Cymmrodorion and other learned societies, including the Cardiff Photographic Society. This will form a much-needed extension of the Municipal Library, Science and Art Schools, Museum, and Art Gallery of Cardiff, for which building Mr. Seward has acted as architect.

**The Hughli Bridge at Bengal.**—The Hughli Bridge at Bengal, which is now in course of construction, will, it is stated, be completed and opened before the end of the cold season. One of the enormous girders has just been successfully placed in position. Great difficulty was experienced in removing it to the required place, which was fortunately accomplished, however, without a hitch. The girder consists of steel, and weighs no less than 1,200 tons. The span is 420 ft. This is the longest cantilever span that has hitherto been constructed in India, although that of the Indus bridge at Sukkur will be an even more prodigious scale. The work is being carried out under the superintendence of Mr. Bradford Leslie.

**Proposed New Railway in Dorsetshire.**—A meeting of Dorsetshire landowners and others was held the other day at Dorchester, to promote a new line of railway from Dorchester through the famous vale of Blackmoor to Templecombe, so as to obtain more direct communication with London, and effecting a saving of more than an hour in the journey. The line is estimated to cost 223,000*l.* Lord Alington and other landed proprietors supported the scheme. It was decided to have the necessary survey of the line made, and the result reported to an adjourned meeting in February.

**A Long Adit.**—According to the *Bauszeitung für Ungarn*, the longest tunnel in the world is a mining tunnel at Schemnitz, in Hungary. It is 10-27 miles long, and therefore one mile longer than the St. Gotthard. It is used for carrying off water from the workings. The height is 9 ft. 10 in., and breadth 5 ft. 3 in. It was commenced in 1782, the original cost being 7*l.* per foot run, and was completed in 1878, the final price being 22*l.* per foot. The total cost was nearly a million sterling, but a saving of 15,000*l.* a year is made by the absence of pumping machinery.

**Cardiff.**—Messrs. William Godwin & Son, Llugwardine Works, near Hereford, have just supplied, under the direction of Mr. F. R. Kempson, architect, Hereford, a pavement for the chancel of St. John's Church, Cardiff.

PRICES CURRENT OF MATERIALS.

|                                            | £. | s. | d. |
|--------------------------------------------|----|----|----|
| <b>TIMBER.</b>                             |    |    |    |
| Greenheart, B.G. .... ton                  | 6  | 10 | 0  |
| Teak, E.I. .... do                         | 9  | 0  | 14 |
| Sequoia, U.S. .... foot cube               | 0  | 2  | 4  |
| Ash, Canada .... load                      | 3  | 0  | 4  |
| Elm .... do                                | 3  | 10 | 0  |
| Fir, Dantsic, &c. .... do                  | 1  | 10 | 0  |
| Oak .... do                                | 2  | 10 | 0  |
| Canada .... do                             | 0  | 0  | 6  |
| Pine, Canada red .... do                   | 2  | 0  | 3  |
| " yellow .... do                           | 2  | 5  | 0  |
| Lath, Dantsic .... fatbom                  | 3  | 0  | 5  |
| St. Petersburg .... do                     | 4  | 0  | 5  |
| Wainscot, Riga .... do                     | 2  | 15 | 0  |
| " Odessa, crown .... do                    | 3  | 5  | 0  |
| Deals, Finland, 2nd and 1st. .... std. 100 | 7  | 0  | 0  |
| " 4th and 3rd .... do                      | 6  | 0  | 0  |
| Riga .... do                               | 5  | 10 | 0  |
| St. Petersburg, 1st yellow .... do         | 6  | 10 | 0  |
| " 2nd .... do                              | 7  | 0  | 0  |
| " 3rd, &c. .... do                         | 6  | 0  | 0  |
| Swedish .... do                            | 6  | 0  | 15 |
| White Sea .... do                          | 7  | 0  | 17 |
| Canada, Pine, 1st .... do                  | 17 | 0  | 0  |
| " 2nd .... do                              | 11 | 0  | 17 |
| " 3rd, &c. .... do                         | 6  | 0  | 0  |
| " Spruce, 1st .... do                      | 6  | 0  | 11 |
| " 3d and 2nd .... do                       | 5  | 0  | 7  |
| New Brunswick, &c. .... do                 | 4  | 0  | 12 |
| Battens, all kinds .... do                 | 4  | 0  | 12 |
| Flooring Boards, sq. 1 in. Pre-            |    |    |    |
| pared, first .... do                       | 0  | 9  | 0  |
| Second .... do                             | 0  | 7  | 6  |
| Other qualities .... do                    | 0  | 5  | 0  |
| Cedar, Cuba .... foot                      | 0  | 0  | 3  |
| Honduras, &c. .... do                      | 0  | 2  | 0  |
| Australian .... do                         | 0  | 2  | 0  |
| Mahogany, Cuba .... do                     | 0  | 4  | 0  |
| St. Domingo, cargo average .... do         | 0  | 4  | 0  |
| Mexican .... do                            | 0  | 0  | 3  |
| Tobacco .... do                            | 0  | 0  | 0  |
| Honduras .... do                           | 0  | 4  | 0  |
| Maple, Bird's-eye .... do                  | 0  | 6  | 0  |
| Rose, Rio .... do                          | 7  | 0  | 0  |
| Box, Turkey .... do                        | 5  | 0  | 17 |
| Satin, St. Domingo .... foot               | 0  | 0  | 0  |
| Porto Rico .... do                         | 0  | 7  | 0  |
| Walnut, Italian .... do                    | 0  | 4  | 0  |

|                                      | £.  | s. | d. |
|--------------------------------------|-----|----|----|
| <b>METALS.</b>                       |     |    |    |
| Iron—Bar, Welsh, in London. .... ton | 4   | 7  | 8  |
| " " in Wales .... do                 | 4   | 2  | 6  |
| " Stordshire, London .... do         | 5   | 10 | 0  |
| Sheets, single, in London .... do    | 6   | 15 | 0  |
| Hoops .... do                        | 6   | 0  | 7  |
| Nails, rods .... do                  | 5   | 15 | 0  |
| Copper—                              |     |    |    |
| British, cake and ingot .... ton     | 42  | 10 | 0  |
| Best selected .... do                | 43  | 10 | 0  |
| Sheets, strong .... do               | 50  | 0  | 0  |
| Chill bars .... do                   | 39  | 0  | 0  |
| YELLOW METAL .... lb.                | 0   | 4  | 0  |
| LEAD—                                |     |    |    |
| Pig, Spanish .... ton                | 12  | 12 | 0  |
| English, common brand .... do        | 12  | 17 | 0  |
| Sheet, English .... do               | 13  | 15 | 0  |
| SPALTER—                             |     |    |    |
| Silesian, special .... ton           | 14  | 10 | 0  |
| Ordinary brands .... do              | 14  | 7  | 0  |
| TIN—                                 |     |    |    |
| Strait .... ton                      | 101 | 0  | 0  |
| Australian .... do                   | 101 | 0  | 0  |
| English ingots .... do               | 104 | 0  | 0  |

|                                | £. | s. | d. |
|--------------------------------|----|----|----|
| <b>OILS.</b>                   |    |    |    |
| Linseed .... ton               | 20 | 5  | 0  |
| Cocoonut, Cochiu .... do       | 37 | 10 | 0  |
| Ceylon .... do                 | 26 | 5  | 0  |
| Palm, Lagos .... do            | 23 | 10 | 0  |
| Rapeseed, English pale .... do | 22 | 5  | 0  |
| " brown .... do                | 20 | 17 | 0  |
| Cottonseed, refined .... do    | 18 | 5  | 0  |
| Tallow and Oleine .... do      | 25 | 0  | 0  |
| Lubricating, U.S. .... do      | 6  | 0  | 0  |
| " refined .... do              | 6  | 0  | 13 |
| TURPENTINE—                    |    |    |    |
| American, in casks .... cwt.   | 1  | 7  | 0  |
| Tar—                           |    |    |    |
| Stockholm .... barrel          | 0  | 15 | 0  |
| Archangel .... do              | 0  | 11 | 6  |

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

| Nature of Work, or Materials.             | By whom required.                            | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|-------------------------------------------|----------------------------------------------|-----------------------------------|--------------------------|-------|
| Labourers' Dwellings .....                | Cor. of Liverpool .....                      | C. O. Ellison & Son .....         | Jan. 18th                | xiii. |
| Clinker Brick Paving .....                | Beckenham Local Bd. ....                     | G. B. Carlton .....               | Jan. 24th                | ii.   |
| Stoneware Pipe Sewers .....               | do. ....                                     | do. ....                          | do.                      | ii.   |
| Rebuilding Baths, &c. ....                | Tottenham Local Board .....                  | De Pape .....                     | Jan. 25th                | xiii. |
| New Postal Sorting-Office .....           | Richmond (Surrey) U.S.A. ....                | G. Elkington & Son .....          | Jan. 27th                | xiii. |
| Works, Materials, &c. ....                | Com. of H.M. Works .....                     | Official .....                    | do.                      | ii.   |
| Sewers, &c. ....                          | Vestry of St. Mary Abbot's, Kensington ..... | do. ....                          | Jan. 31st                | xiii. |
| Construction of Reservoir .....           | New Malden Local Bd. ....                    | T. L. Heward .....                | do.                      | ii.   |
| Widening and Repairing Roadways, &c. .... | Northwich Local Board .....                  | H. Bancroft .....                 | Feb. 1st                 | ii.   |
| York Flagging and Granite Setts .....     | Cor. of Croydon .....                        | W. Howell .....                   | do.                      | ii.   |
| Completion of Reservoir .....             | Lancaster Corporation .....                  | Jas. Mansergh .....               | Feb. 5th                 | xiii. |
| Road Materials .....                      | Com. of H.M. Works .....                     | Official .....                    | Feb. 10th                | ii.   |
| Works, Repairs, and Materials .....       | War Department .....                         | do. ....                          | Not stated.              | ii.   |

PUBLIC APPOINTMENTS.

| Nature of Appointment.                    | By whom Advertised.       | Salary.                | Applications to be in. | Page. |
|-------------------------------------------|---------------------------|------------------------|------------------------|-------|
| Assistant Surveyor .....                  | Hendon Local Board .....  | 100 <i>l.</i> .....    | Jan. 17th              | xvi.  |
| Surveyor .....                            | Cambridge U.S.A. ....     | 40 <i>l.</i> .....     | Jan. 31st              | xvi.  |
| Surveyor and Inspector of Nuisances ..... | Lower Babington L.B. .... | 7 <i>l.</i> , &c. .... | do.                    | xvi.  |

TENDERS.

BLACKHEATH.—For the erection of four dwelling-houses and shops at Combe Farm Lane, for Mr. James Murray. Mr. John James Downes, architect and surveyor, Lewisham High-road.—
Samuel J. Gerrard ..... £4,344 0 0
H. L. Holloway ..... 4,300 0 0
Hobson Bros. .... 4,160 0 0
Lorden & Son (accepted) ..... 3,939 0 0

FOREST GATE (Essex).—For the completion of ten houses in the Homford-road, Forest Gate, Essex, for Messrs. Wise & Wilson. Mr. James F. Wesley, architect, Forest Gate.—
Marsden, Finchley ..... £1,730 0 0
Stone & Quinerton, Stockwell ..... 1,392 0 0
Gillatt, Finsbury ..... 1,377 0 0
Martin, Forest Gate ..... 1,118 0 0
Easley & Sons, Walthamstow ..... 1,060 0 0
Simpson, Forest Gate ..... 998 0 0
Bishop & Webb, Stratford ..... 890 0 0
Horlock, Manor Park ..... 850 0 0
Haney, Forest Gate ..... 850 0 0
Kydd, Forest Gate (too late) ..... 855 0 0
A. W. Derby, Limehouse ..... 843 0 0
Simpson, Hackney ..... 780 0 0
Nicholls, Leytonstone ..... 778 0 0
White, Plaistow ..... 778 0 0
Searis, Leytonstone ..... 780 0 0
Watson, Hford ..... 722 0 0
Aylott & Co., London ..... 675 0 0
Moir, Forest Gate ..... 660 0 0
Hatcher & Green, Islington ..... 633 0 0
\* Accepted.

HUNGERFORD.—For alterations and additions to Parkers-grove, for the Hon. Anthony Dawson. Mr. James H. Money, architect.—
W. G. Adey ..... £2,895 0 0
J. Woodbridge & Son ..... 2,787 0 0
W. Wilkins & Son ..... 2,728 0 0
Chas. Claridge ..... 2,410 0 0
S. Elliott ..... 2,470 0 0
W. H. Simmonds ..... 2,444 0 0

LONDON.—For the London Salvage Corps Station in Shaftesbury-avenue, for the Fire Offices. Mr. Wimbale, architect.—
Scribner & Co. .... £17,873 0 0
Rider & Son ..... 17,708 0 0
Greenwood ..... 17,588 0 0
H. & E. Lea ..... 17,463 0 0
Colls & Son ..... 16,978 0 0
Wm. Dowds ..... 16,844 0 0
James Morter ..... 16,700 0 0
Lawrence & Son ..... 16,250 0 0

SIDCOT (Somersetshire).—For the erection of a sanatorium at Sidcot School. Mr. A. P. I. Cottrell, architect, Bristol.—
J. Palmer ..... £1,400 0 0
W. H. Cowlin & Son ..... 1,150 0 0
W. A. Green ..... 1,120 11 6
J. Roach & Son ..... 965 0 0
W. Veals ..... 988 0 0
E. Eades ..... 865 0 0
K. Williams ..... 861 12 0
C. A. Hayes ..... 877 0 0
A. Miller ..... 875 0 0
T. Thomas ..... 843 0 0
J. Thorne (accepted) ..... 822 10 0

STOKE NEWINGTON.—For works at the new Congregational Church, Rectory-road, Stoke Newington. Mr. E. A. Lewcock, architect and surveyor, Bishopsgate-street. Within:—

Table with 5 columns: Heating, Ventilation, Builders' Fittings, Amount of Tender. Lists various contractors and their bids for heating and ventilation systems.

RAMSGATE.—For the erection and completion of three cottages in Broad-street, Ramsgate, and alterations to slaughter-house in rear; also for alterations and additions to slaughter-house in Cavendish-street, Ramsgate, for Mr. C. K. Wood. Mr. E. L. Elgar, architect and surveyor, Ramsgate.—
Coppen & Co., Margate ..... £1,061 0 0
J. B. Finch, Birchington ..... 1,054 0 0
T. Duckett, Ramsgate ..... 795 0 0
J. Newby, Ramsgate ..... 725 0 0
H. Bowman, Ramsgate ..... 687 0 0
C. Collins, Ramsgate ..... 670 0 0
Newby, Ramsgate ..... 667 0 0
C. Home, Ramsgate ..... 660 0 0
W. W. Martin, Bochewood Park (accepted) ..... 654 0 0

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

FIRE BRICKS. E. BOWEN, Fire Brick Manufacturer, STOURBRIDGE. Manufacturer of Best Stourbridge Fire Bricks, and Cement Fire Bricks, Ours Retorts, Mulls, &c. Leaden-street and Brady-street, near Bethnal Green Station.

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### The Royal Commission on Depression of Trade.



HE Report of the Royal Commission on the Depression of Trade is not in its main section a very strong or decisive document, and it is rendered still less so by the result, not uncommon in the case of commis-

sions of this kind, that the members of the Commission cannot sufficiently agree together as to the bearing of the evidence laid before them to enable them to join in one Report, and that a Minority Report is appended, signed by four of the members, differing in certain very important points from the conclusions of the majority, while one of the minority, Lord Dunraven, himself dissents from the dissenters to a certain extent.

Taking the Reports as published last Saturday in the *Birmingham Gazette* as correctly given (they are not, we believe, as yet available to the public in Blue-book form), the main distinction between the majority and the minority Reports is that the signatories to the latter regard the main Report as too optimistic and as not taking sufficiently into account the permanent character of some of the influences that are at work, adverse to the interests of labour. But the most important distinction in principle between the two Reports is that, while the majority are of the pure faith in regard to Free Trade, the minority distinctly suggest the policy of answering protection by protection. They avoid, it is true, absolutely suggesting this as a principle in so many words, and Lord Dunraven dissents even from the suggestion of it, which, as he very truly says, "is clearly indicated in certain portions of the Report"; but that is what it comes to.

The main Report is drawn up in a logical progression, giving facts as supposed to be ascertained; probable causes; suggested remedies. It is impossible to follow the document into all its ramifications, but we may take note of the principal heads of the conclusions arrived at. The Report is not unjustly characterised by the dissenting minority as too favourable in its conclusions and somewhat masking the gravity of the situation. It admits, however, the existence of a condition of trade and industry in this country "which may fairly be described as depressed," meaning by depression a "diminution or absence of profit with a corresponding diminution in employment for the labouring classes." Those who chiefly complain of diminution or absence of profit are the large

producers of goods and employers of labour; the Report entirely supports the view, which is pretty evident without any Commission, that the labouring classes are suffering not from any marked diminution in the rate of wages so much as from the want of full and regular employment and wages. "Those who are in the receipt of fixed salaries or who draw their incomes from fixed investments have apparently little to complain of"; one of those somewhat too self-evident propositions which meet us occasionally in the Report.

The chief features of the commercial situation are summed up thus:—

- (a) A very serious falling off in the exchangeable value of the produce of the soil;
- (b) An increased production of nearly all other classes of commodities;
- (c) A tendency in the supply of commodities to outrun the demand.
- (d) A consequent diminution in the profit obtainable by production. And
- (e) A similar diminution in the rate of interest on invested capital.

The diminution in the rate of profit obtainable from production, whether agricultural or manufacturing, has given rise to a widespread feeling of depression among all the producing classes."

Of these it is evident that the two first are the most important items of the summary, having a direct relation to one another in so far as the disposal of the products of manufacture within this realm is concerned. As the Report says in another section:—

"The purchasing power of a large portion of the community,—that, namely, which depends directly upon the productive capacity of the soil,—has been seriously crippled. Bad seasons and the competition of the produce of other soils which can be cultivated under more favourable conditions than our own, have reduced the quantity or the exchangeable value of the commodities which the agricultural classes have to offer for the products they desire. Meanwhile, a process of an exactly opposite kind has been going on in other branches of industry.

Most of those commodities, the production of which is independent of the seasons and of the natural qualities of the soil, have been produced in steadily-increasing quantities.

Machinery is being continually made more perfect, new processes which cheapen the cost of production are being continually introduced, and the quantity of this class of commodities which is annually placed upon the market is thus steadily increasing.

This tendency, which is, under ordinary circumstances, perfectly natural and usual, has been intensified in recent years owing to the stimulus given to production by the great demand for all manufactured goods which followed the war of 1870-71.

A demand which was only temporary, and which might have been satisfied in the course of a very short period, was treated as if it were of a permanent character; and manufacturers in this country and elsewhere enlarged their power of production accordingly, as if the demand could be expected to continue. This it might very possibly have done if it had not been checked by the falling off in the productive power of the soil above alluded to."

We are thus brought back to the old orthodox faith of the political economist, that "the soil is the ultimate source of wealth." Its present poverty in our country is partly due to causes beyond human control; how far its future improvement may be within human control is suggested by the author of the article in the current number of the *Edinburgh Review*, on "English Land, Law, and Labour":—

"If rents are to be permanently reduced, landlords must become their own agents. If increased production is to afford the remedy for agricultural collapse, scientific training is required by the tenant-farmer. If the soil is to be tilled by a peasant-proprietary, preparation must be made to educate them for the task. Thus, from every point of view, education becomes an indispensable condition in the future of agriculture. In England little provision is made to supply the want. Our manufacturers woke from their dreams of industrial supremacy to find that technical schools on the Continent had, in a few years, counterbalanced the advantages this country had gained from an early start. It is not impossible that our agriculturalists may, from the same cause, find themselves left behind in the race."

Considering the question of over-production in the abstract, the Report (which harps pretty constantly on this string) observes that if the aggregate quantity of commodities produced is on the increase, and is growing at a more rapid rate than the population, the depression in particular industries, or among particular producers, is no indication of a corresponding national loss. This certainly strikes us as a curious way of putting the matter, if the reference is to produce in manufactured goods, as from the context it appears to be. The old dictum about "the real worth of anything" surely holds good here: the production of manufactured goods for which there is not a market would seem to be a draining of the national resources rather than an addition to the national wealth. The remark seems the more unexpected as the Report fully admits the difficulty in finding a sufficient market, and is in fact largely occupied in suggesting the reasons for this restriction of the market, and the means to be adopted to revive and extend it. It is observed that the remarkable feature of the present situation is the length of time during which over-production has been carried on, after the stimulus received during a period of exceptional demand. But the statements in the Report itself seem to show that what has happened has not been so much a continued and systematic over-production (indeed no one, it may be said, overproduces systematically) as a continued process of closure of foreign markets by the combined influence of severe competition and foreign protective tariffs, of the influence of which our producers have only gradually had their eyes opened by the logic of facts:—"Our

trade with foreign countries is becoming less profitable in proportion as their markets are becoming more difficult of access owing to restrictive tariffs." This is very plainly put, and, on the face of it, appears certainly to count one to the arguments of the supporters of that vague ideal which is known as "fair trade." Seeing this *crux* of the question put forward in so plain a manner, we naturally looked for some definite expression of opinion in the portion of the Report devoted to remedies, as to the method of meeting this difficulty, but in vain. While the facts of the effect of foreign tariffs are admitted, the subject is to all appearance studiously shirked in the recommendations of the Report, and from a note of dissent by one of the Commissioners, Mr. Jamieson, we gather that this was from a disinclination to enter into the merits of the question of Free Trade *versus* Fair Trade. Now in so far as that the Commission are true to their Free Trade colours we are with them, but inasmuch as the effect of foreign protection is so plainly referred to as an adverse agency, it would seem as if the Commission hardly manifested the courage of their opinions in avoiding any further consideration of the subject, or any attempt to remove from the Free Trade policy the apparently damaging effect of their admissions. "This was looked for at their hand, and this was balked." It is on this point, as we have observed, that the minority Report has its chief difference with that of the majority. The minority consider that any industry contending against the insuperable difficulties "artificially created by the legislature of foreign States" must sooner or later fall into a condition of languor, capital and talent being gradually withdrawn from it. The minority Report, indeed, admits that it would be "an act of suicidal folly to attempt to counterwork these influences by a like system of enormous import duties"; but "a slightly preferential treatment of the food products of India and the Colonies over those of foreign nations would, if adopted as a permanent system, gradually but certainly direct the flow of food-growing capital and labour more towards our own dependencies and less towards the United States than heretofore." "Preferential treatment" is an admirable phrase, like "remuneration" in "Love's Labour's Lost," and the use of it shows the fear that the minority have of being numbered with the unbelievers; but, of course, it is only a round-about term for protection, and it is not surprising that Lord Dunraven should have added a special note to repudiate any share in it on his part. That foreign protection is an injury to our national pocket at present we hold to be undeniable; but, for nations as well as individuals, there are other interests besides the pocket, if one may still be permitted to say so. There can be, we hold, no possible question that Free Trade is for the good of the world generally; for the good of commerce, for the good of enterprise, for the good of that healthy life which is based on the principle "let the best man win"; only a large proportion of the world does not see it yet; does not see that the thing called "Fair Trade" is a mere arbitrary convention by which A agrees with B, "You rob me, and I will rob you, and we will each agree how much we will rob each other, so it will be all fair." It is to the credit of England to have been the first to see the fallacy and stupidity of this arrangement, and if we are temporarily losing by it in funds, we are at least taking an honourable lead in the right direction, which we can ill afford to drop, considering how lamentable things are behind in some less honourable things, such as the art of making war; nor do we know how soon we may have occasion to note the deadening effects of protection on national spirit and enterprise in the case of nations which are now filling their pockets temporarily at our expense. The faith in Free Trade is one to which the civilised world is certain to come round sooner or later; and though we should have liked to have seen the authors of the Report before us express themselves definitely on the subject, with a *Uberavimus animas meas*, we at all events feel grateful to them for sticking to their guns.

In connexion with this part of the subject, we may notice the curious little demonstration which Professor Bonamy Price, one of the majority, has made in regard to the limitation of hours of labour, and which has drawn down upon him the wrath of the *Pall Mall Gazette*. In reference to a paragraph in which it is observed that shorter hours of labour, however they may increase the cost of production, are compensated for by the other advantages they afford to the working classes, he says this is "specific repudiation of the great doctrine of Free Trade. Shorter hours of labour do not and cannot compensate to a nation for increased cost of production and diminished output. They tax the community with dearer goods in order to confer special advantages on the working man. They protect him, and that is a direct repudiation of Free Trade." Now, we are with this, in so far as it is opposed to the absurd principle which has been put forward occasionally at Trades' Union Congresses, and on which we have before commented, that the position of the industrial classes, commercially, could be benefited by doing less work and getting more hands to do it. But the idea of "Protection" in respect to this can only be sustained in the case of Government limitation of hours. Now, the majority Report distinctly repudiates any such suggestion. What it says is, that "it is for the country and the working man to consider whether the advantages of shorter hours compensate for the increased cost of production or diminished output. We believe that they do, and on social as well as economic grounds we should regret to see any curtailment of the leisure and freedom which the workman now enjoys." It may, perhaps, be said that these remarks are *ultra vires*, strictly speaking, of the Commission, which was not deputed to consider the social status of the working classes. But certainly the choice of the working man to limit his hours, though it may be carried so far as to be a mistake in his own interests, has nothing to do with "protection" in any sense, and the protest seems uncalled for in relation to its antecedents.

In the main, the suggestions for the amelioration of the present state of things, as made in the majority Report, are healthy and spirited in tone. They suggest (1) cheapening the cost of production in so far as it is consistent with the maintenance of sound quality and good workmanship. Of course, in reference to the matter touched on in the last paragraph, this negatives the idea of any further reduction of hours of work, in regard to which, in fact, the "working classes" have the advantage of many other workers in the community, whose labours extend through a greater period of the twenty-four hours than theirs, and have no specified limit. (2) Increased vigilance in the look out for new markets and in keeping our place therein. (3) Improved technical education; on which head all who know are agreed. (4) Diplomatic and consular assistance in regard to the wants and opportunities of foreign markets: in regard to which there is a salutary caution added, that while all general information of this kind should be looked out for and made public by consular representatives (which part the German consuls seem to be very actively taking), any direct interest of diplomatists or consul in the work of special firms should be entirely discontinued, lest the said officials should sink into the position of being "agents" in another and by no means desirable sense. (5) Statistics of internal trade, which are reported as very deficient. (6) In regard to railway and canal transport, it is suggested that greater facilities should be given for ascertaining the rates which the companies profess to charge, together with any modification of those rules which they make in favour of any individuals or classes; that the canal system should be further developed, and that no railway company should be allowed, either directly or indirectly, to control or own a canal; and that every facility should be afforded for the construction of light railways or tramways, for reducing the cost of transport. In a general way, however, we may observe that railways are regarded with a rather notable leniency by the Commission,

which almost shuts its eyes to the complaints as to the preferential rates for Continental merchandise, about which a good deal has been heard lately.

We are also struck with the exceedingly indulgent view taken as to the forcing up of wages by the action of the Trades' Unions. It is curious to read in one sentence that while the aggregate share in the wealth which falls to labour has increased, that falling to capital has diminished; "in other words, that while wages have risen profits have fallen"; and that "this is obviously a process which cannot be continued beyond a certain point"; and to read in the next sentence that the unfavourable elements in the existing condition of trade and industry cannot with any justice be attributed to the action of Trades' Unions. We shall be curious to see what is the nature of the evidence on which this conclusion is founded. We attach, of course, no moral blame to the efforts of the Trades' Unions to keep up wages. They were organised to do the best they could for the interests of their class; but that, in pushing this too far without regard to the state of the times, they have to a considerable extent checked the employment of capital in England and brought in foreign labour to their own detriment, seems undeniable; and it is to be regretted that this important question was apparently rather lightly dismissed by the Commission.

#### THE R.I.B.A. COMPETITION DRAWINGS AND DESIGNS.



THE exhibition of architectural students' work now open in the Conduit-street Galleries is one of the best, if not quite the best, that we can remember. The competition for the Owen Jones Studentship especially has brought together a number of sketches and studies which, both in quantity and quality, make a valuable addition to the usual collection, and the older competitions have mostly been well contested. The winner of the Owen Jones Studentship, Mr. Sydney Vacher, has submitted a large number of sketches of colour decoration, in all styles and periods, and collected from a great variety of sources, in all of which the colour is shown in its full strength, just as it really is or was intended to be, without taking account of accidental effects of light or time, sketches which are not and are not intended to be attractive in themselves, but scrappy, dirty, covered with notes, and altogether earnest, independent, and, to a student, delightful,—careless of everything but just the particular that was to be noted at the moment. Among the sketches are some of the studies of Italian diaper ornaments for the hook Mr. Vacher lately brought out, and a sketch for the decoration of the pulpit of St. Margaret's Church, Westminster, which was done under his direction; also some patterns of wall-papers, made by Messrs. Jeffrey from Mr. Vacher's designs.

The sketches and studies of Mr. Gerald Horsley, who takes the second place in the competition and a special prize, are such a treat to look at as one has not had since Mr. Barrett, competed for the Pugin Studentship two years ago. It is difficult to imagine a more perfect pen-and-ink sketch than that of the head of Augustus, or more beautiful pencil work than is shown in the drawings of the two Sibyls, and of the ambone from St. Miniato at Florence, and again in the almost conical carving of "Pharaoh" from the stalls at Amiens. The magnificent study of a portion of the celebrated retablo in Westminster Abbey, and the delicate drawing of a spray of red lilies, are enough to make most respectably good draughtsmen emigrate without delay. Mr. Horsley is also doing some practical work in the way of colour decoration, as witness the cartoons of some lunettes for the roof of Netley Church which are exhibited.

The studies of Mr. H. Wilson, submitted for this same prize, show very careful work, and an accurate colour-sense. They all seem to have been collected in London from pictures in the National Gallery and the exhibits at

South Kensington, supplemented by capital original designs.

Mr. Briggs has some very good and useful sketches from Pompeii.

The chief competitors for the Pugin Studentship exhibit work well up to the high average of excellence always now attained. Mr. Thomas Maclaren takes the studentship with what is certainly the best collection; many of his drawings and sketches are old acquaintances, some of which have taken other prizes, and many have already been illustrated in our pages, among which latter may be mentioned the design for "A Town Mansion," and a drawing of a bit of foliage from Melrose Abbey, which is quite the best of the pencil work there. The sketch of the great window of St. George's Chapel, at Windsor, has not been improved since we saw it last by the slight tinting that has been added. We think, too, that the very fine sketch of the tower of St. Mary's, Oxford, suffers from the crude greens of the shrubs at its base. The drawing of the pulpit at Siena Cathedral is a magnificent pencil study, but the best and most useful piece of work is the sheet containing the shaded and tinted elevation and details of the library door of the same building.

Mr. Arnold B. Mitchell's sketches are clever, ambitious, and plucky, and the system he has adopted of pencil drawings washed with a pencil-coloured tint, is probably a very rapid way of getting an effect which is certainly worth getting; but we cannot help feeling that the sketches are a trifle hard, and that too much time has been spent upon subjects that would be telling, and too little on real study. The best sketches are those of a sword-hilt in the Bargello at Florence, and a bright little general view of Siena.

Mr. E. P. Selby, who shares with Mr. Mitchell the honour of receiving medals of merit, has done some good work, of which some sketches of the marble paving of Siena Cathedral are probably the best.—Siena Cathedral figures unusually but deservedly frequently in this exhibition.

Mr. R. W. Paul, certificate of honour, shows work which tells of a rapid hand and practised eye, and which falls little behind that of more successful competitors in effective finish; his measured drawings of the tomb of William de la Marchia, Wells Cathedral, are particularly good. Mr. Frank Simon must have run the two last-named competitors rather close for their honours; his work is very artistic and good, and although the soft pencil and rougher paper he uses are not adapted to very delicate drawings, his sense of light and shade and his accuracy are notable.

Of the design prizes, the Tite Prize has this year brought out the best work and the largest number of competitors. The subject was "A Classical Church on an isolated Site." The design of Mr. Frank W. Simon, which takes the prize, shows a very considerable mastery of Classical planning and design; it is correct in style and very effective in its monumental, lofty, and graceful proportions and refined detail; the drawing, too, is delicate and pretty, and worthy of the design. Mr. John Keppie's design, which is placed second, shows great restraint and some originality in the treatment of the plan and elevations, and its weaknesses only become apparent in the perspective drawing, which shows the almost ugly effect of the irregular octagon dome and the quite ugly effect of the little towers at the west end. The detail is good and the style evidently familiar to the designer to some extent, but he probably omitted to try his effects in perspective until too late. Mr. W. Stirling, whose design is placed third, cannot be accused of being hum-drum or commonplace. Not content with a design in the freest of free Classic styles, such as is seen in some of the terra-cotta work of North Italy,—the west front of the Certosa at Pavia, for instance,—a design as bizarre as it is original and, in many respects, clever,—he has added the daring experiment of making his drawings in bright red. As a design seriously considered, though it looks reasonably well in elevation, it can, after all, only be put down as more than moderately successful if intended to

be executed in terra-cotta, when the extravagance of the carving and ornaments would serve to hide the imperfect joints. Of the other designs, that of "Unity" appears to us the best. It is severe, well proportioned, and appropriately decorated, but the drawing, at any rate where the figure is introduced, leaves something to be desired. "Lux" has made a reasonably successful study of Wren's London churches. He justifies his motto by introducing the very unclassical feature of coupled windows in the clearstory, thus flooding the interior with a rather unnecessary amount of "lux." "Fiat Lux" has introduced the novel arrangement of nave columns which support transverse arches instead of a longitudinal wall, so that the roof spans the whole width of the church, an arrangement which might lead to some novel artistic effects, and perhaps be less extravagant than it appears at first.

The competition for the Soane Medallion this year falls far behind that for the Tite prize, both in the number of competitors and in the excellence of most of their work. The medallion has been awarded to a careful study in that style to which it is difficult to give a name, since people have ceased to consider "Queen Anne" appropriate to any erection in red brick. Jacobean might describe most of its features, but will not do for all. Mr. Norman Shaw's building at the corner of St. James's-street is the very evident prototype of Mr. Francis E. Masey's study, and he certainly could not have chosen a finer design on which to work. His ranges of windows are effective, and so are the open arcades, but the turrets are too small in scale for effect, and the ingenious arrangement of entrances is very awkward. The plan is well balanced and convenient on the whole, but the corridors would be very dark. Mr. A. Whitehead, who takes second place, has a somewhat similar plan, but the corridors are better lighted, and the entrances are more convenient. The style is Classical, but the grouping is more adapted to a larger building and results in a too broken effect. The design would decidedly gain by the omission of the central turret and some of the spikes and urns with which it is ornamented. We should like to comment upon the design "Usui Civium," which we consider is architecturally a finer study than any of the pre-named work in this competition, but space falls us.

Of the three competitors for the Grissell Medal, Mr. Strong has fully earned his success by his careful calculations and adjustment of stresses, but if the scientific construction of a roof of 60 ft. span of wood necessitates so many joints and such a forest of timbers, we hope every such roof will, in future, be built of iron.

The competition for the Silver Medal has not collected quite so much good work as usual lately. Mr. James H. Cooke, who receives the medal for his drawings of Stokesay Castle, is evidently a practised draughtsman, and his drawings are only less beautiful than those of Mr. Frank Bellis, of Haddon Hall, who comes second, and only lost the first place, as was explained to the meeting on Monday, by omitting to measure some of the important stone jointing.

Mr. R. Elsey Smith has won the Essay Medal with a clearly-written account of the history of wall piers and buttresses, prefaced by an introduction dealing with the scientific theories connected with the subject, and accompanied by a portfolio of photographs and sketches illustrating it.

It was announced on Monday evening by the Hon. Secretary of the Institute that, in future, drawings which had obtained for their authors the Gold Medal of the Royal Academy or the Soane Medallion, or which had been executed by students during the compulsory tours connected with those prizes, would in future be excluded from consideration in making the award of the Pugin Travelling Studentship.

**Nineteenth Century Art Society.**—Wednesday, the 26th inst., has been appointed for the reception of works of art intended for the Spring Exhibition of this Society, at the Conduit-street Galleries.

ARCHITECTURE BY ADMINISTRATION.



HE architect is gradually assuming a new character. Long ago he ceased to be either a painter or a sculptor. Now he is in danger of altogether abrogating his claim to be considered an artist. He is becoming an administrator,—the director of other people's faculties,—and no more.

This change is partly due to the general movement in the world around us. But it is also due in part to an indolent yielding to unworthy solicitations. A modern building,—like a modern war vessel,—is a complex thing, and in proportion to its complexity the difficulty of designing and adjusting its multitudinous parts by a single mind increases. The advice of specialists in certain departments must be sought, and may be honourably obtained. No one will, for example, expect an architect to devise in detail a scheme of electric lighting. He must rely upon the aid of the electrical engineer, who should have due credit for his work. The architect must be content to receive directions for the necessary structural provision and preparation, and limit his share in the matter to the design of the visible fittings.

But this and similar necessities of modern practice have brought up a crowd of impetunate advisers, who would (and do) encroach upon the architect's peculiar province,—who will, in the expectation of supplying their manufactures, relieve him of his proper duties, calculate the strength of his girders and stanchions, and draw for him in elaborate detail the constructive portions of his works. The smith will suggest (to  $\frac{1}{2}$ -in. scale) ornamental ironwork; the plasterer will draw his strap-work and floral adjuncts, and only asks to have a diagram of the ceiling spaces to be filled, or even the size of the room; the firm who supplies the tiles or mosaic has a staff of young men who do nothing but provide "architects" with designs, and so on. From this prevailing condition of things two considerations arise.

First, that architecture so conducted degenerates into a mere manufacture. Buildings which are the reputed work of Mr. A. share with Mr. B.'s and Mr. C.'s certain characteristics, which are finally traced to Messrs. X. & Co. And the conclusion sooner or later is brought home to the public mind that A. and B. and C. are all impostors, using for their own emoluments and self-glorification the various artistic abilities of other people.

The second consideration is, that architecture by administration can be undertaken by administrators who are not even in name architects. Let our younger men look to it. Architecture is now sold at "the stores," and takes its place amongst other commodities dispensed by the universal provider.

This is a point which should be pressed upon young architects, who should be exhorted to design (in their own proper persons) everything that is ascribed to them.

It is possible that no one man will be able to design in all departments so well as he who restricts his attention to one. But there will be an ample compensation in the fact that a building designed throughout by one and the same person will be an original work, complete and congruous, and bearing the impress of a single mind.

Architecture so followed is an art. Pursued by the method to which we have alluded, and which threatens to become popular, it is a mere business, not of the most honourable kind, for it robs the actual designer of his credit, and gives honour where it is not due.

NOTES.



HERE seems to be a chance of finding a site for the re-edification of Temple Bar at last, and one that is eminently suitable for it, as was pointed out in the columns of the *Builder* nearly two years ago. According to the *Standard* of Monday last, the occupants of chambers on the south side and north side of Nos. 6 and 7, King's Bench Walk, Temple, respectively, have received notice from the



Benchers of the Inner Temple to give up their chambers in March. "The reason for this is that the outer walls of both these buildings, which are some of the oldest in the Temple, have been condemned as unsafe, and will consequently be pulled down. Advantage will at the same time be taken of this opportunity to widen the Whitefriars entrance to the Temple, which is at present inconveniently narrow, and a new and handsome gate will, it is said, replace the ancient wooden structure at present in use. It is expected that the alterations will be completed by October next." If the *Standard* had said "ramshackle" in lieu of "ancient" as the descriptive adjective of the existing gate, it would have been nearer the mark. It is an ordinary piece of joinery, and is probably not fifty years old. However, that by the way. There can be no doubt that this is the site for the re-erection of the old City gateway. It is within the City itself; the gateway would necessarily have to be put up with its eastern and western *façades* in the same relative positions as they formerly occupied, thus preserving the "orientation," so to speak; it would form a fine and appropriate entrance to the Temple from Whitefriars; and it would be well seen from New Bridge-street as the termination of the long *vista* westwards along Tudor-street and Temple-street, now widened for almost the entire length, one or two jutting buildings only remaining *in situ* temporarily, pending the development of the building estate on the Embankment. Re-erected on this site the "Bar" would remain identified in name as well as in fact with the Temple and its associations, while it would form an important architectural addition to this rapidly-improving part of the City, being in close vicinity to the civic and public buildings already erected and likely to be erected on the Embankment land. The new approaches to the Embankment from Fleet-street in continuation of Bouverie-street, Whitefriars-street, and Dorset-street are likely to do much for this hitherto somewhat benighted part of the City. We notice that Mr. James C. Powell, of the Whitefriars Glass Works, writes to the *Standard* unconsciously adopting and recommending the site which was proposed in our columns two years ago for the re-erection of the "Bar," if the stones "be still in existence." We believe they are, but we are not sure that they have been very tenderly cared for by their natural custodians, the Corporation of London.

THE meeting in furtherance of the French Railway Jubilee, held at the Cannon-street Hotel on Tuesday, left no doubt that the proposed International Railway Exhibition this year in Paris is likely to be conducted in such a way as to be a success, and that English engineers and railway authorities have done well to join hands with the French in furthering its success. It is unnecessary, however, for newspaper writers on the subject to take the complimentary tone some of them do, as to our possibly having a good deal to learn from the French as to railway work. We are behindhand in the matter of comfortable and roomy railway-carriages, though this defect has been a good deal made up lately; but in the matter of railway working, speed, and efficiency, our best railways are, we believe, at the head of the world; and there is no occasion for any unnecessary humility on this topic, at all events.

WITH a promptitude which deserves all praise, the *Railway Age* publishes full statistics of the mileage of new railways constructed in the United States during the year only just closed. We learn from the figures given, that 8,010 miles of new lines (reckoning main track only) were built in 1886, against 3,131 miles constructed in 1885, 3,825 miles in 1884, 6,741 miles in 1883, 11,568 miles in 1882, and 9,796 miles in 1881. The two last years showed the greatest activity in railway construction of any former year; but 1886 runs 1881 pretty closely, whilst 1871 (with 7,379 miles) follows close upon last year. Kansas leads the way with 1,520 miles, the greater portion of which was laid during the last six months of the year. Nebraska comes

next with 737 miles, and then follows Dakota with 678 miles, Minnesota with 587 miles, and Texas with 543 miles. The five States named make up a total of 4,065 miles of new railway, or more than half the mileage constructed in 1886. Assuming the average per mile of roadway to have been 20,000 dols. per mile, we obtain an annual expenditure for permanent way of 160,000,000 dols., or over thirty-two million pounds sterling; and to this must be added the capital spent in rolling stock and equipment.

THE recent case of *Simmons v. Kinsirinki*, which was an action for an infringement of the light to the plaintiff's buildings, and in which the jury found a verdict for the defendant, settled no legal point. It is certainly noteworthy, however, in one sense, for we are informed by the report of the trial that "scientific and other evidence was called in support of the plaintiff's case." Likewise, we are told that Mr. Joseph, an architect, and other expert witnesses, were examined on behalf of the defendant. The question for decision was whether there had been a substantial diminution of the light to the plaintiff's building. It is not to the credit of the profession of architects and surveyors that a number of gentlemen can be found to give diametrically opposite opinions upon a question as to which there should be very little doubt. It is natural that professional men should differ on the value of property, for this is a matter of comparative uncertainty. But a person of ordinary vision should be able to say whether a room is substantially deprived of light by a neighbouring building. We fear that the case shows that Professor Kerr's admirable work on the Consulting Architect requires wide and careful perusal.

THE undoubted success,—so far as it has gone,—of the new Agricultural Hall at Kensington makes it incumbent on the management to take care that visitors run no dangerous risks. But the staircases which lead to the gallery, with which the grand circle and some other parts of the building are in communication, appear likely to cause risk to limb, if not to life, in case of a panic. They are tortuous, and not very large,—large enough, perhaps, for the needs of an ordinary theatre, but insufficient for the vast numbers who visit Olympia, and have to use them. Even after an ordinary evening performance the crush is extreme, and were a panic to arise the result might be very serious. Staircases in such a place as this hall should be broad and as straight as possible, or else so numerous, if not of large size, that a full house may be able to be emptied with rapidity and with ease through a number of different exits.

A SAFE method of blasting (if the term can be correctly applied in this instance) in fiery mines has been suggested by Dr. Kosman. The system is described in a paper recently read by the inventor. It consists of bringing dilute sulphuric acid into contact with a fine zinc powder. A cartridge case of glass, 7 in. long and 1 in. in diameter, is divided into two parts, the volumes of the two divisions being as 1 to 4. The division is made by reducing the diameter of the glass cylindrical case to about one-third of an inch, and inserting a plug of cork, india-rubber, or asbestos. The larger division, which is closed at the bottom, having been filled with the dilute sulphuric acid, the cartridge is distributed to the miner for use. When the operator wishes to apply the cartridge he fills the smaller part of the glass cylinder with the zinc dust, and then forces a small metal rod through the zinc into the plug. In order to cause the cartridge to perform its work one or two smart blows are given to the metal rod or needle. This drives in the plug and breaks the glass, so that the acid runs into the part containing zinc-dust, and a rapid though not instantaneous evolution of hydrogen takes place, the expansive force being sufficient to break down the rock. The shot-hole is loaded and tamped in the ordinary way, but should the rock be porous or jointed it will

require to be clayed to prevent the escape of gas. Dr. Kosman gives the following particulars of working. A cartridge, 25 millimètres in diameter and 180 millimètres long,—about 90 cubic centimètres,—will contain 50 cubic centimètres of sulphuric acid and 12 grains of zinc dust, or 10 grains of metallic zinc. The latter will liberate 0.3 grains of hydrogen, or, by volume, 3.37 cubic centimètres. This volume of gas being confined to 90 cubic centimètres the resulting pressure will be approximately 37,000 atmospheres. The evolution of hydrogen is not thought to add to the danger owing to the rapid diffusion of that gas in atmospheric air. Particulars of the system may be found in the eighty-seventh volume of the "Transactions of the Institution of Civil Engineers," p. 41.

A FEW weeks ago we drew attention to Mr. Shilleto's translation of Pausanias; a book has since appeared, by Dr. Kalkmann, a "Privat docent" of the University of Berlin, which no student of Pausanias, even through the medium of a translation, can afford to neglect. In his "Pausanias der Perieget,"\* Dr. Kalkmann gives us a series of most interesting essays on the "sources" of Pausanias. Some of us are so used to regarding Pausanias as in himself the most final of "sources" that we may feel a little aggrieved to have to push our inquiries further back. It would not be easy, however, to over-estimate the importance of the line of inquiry that Dr. Kalkmann opens up. He himself regards his book as merely "path opening" (*bahn brechende*), but the "path" is one that every commentator is henceforth bound to follow. If Pausanias is to be used as evidence, we must convince ourselves that he is a credible witness,—that he is not a historian of the type that Lucian describes, who, "though he had never set foot outside Corinth or seen a battle, not so much as a painted fresco, yet begins his history of the Parthian war with the words, 'Ears are less trustworthy than eyes; I write therefore, what I have seen, not what I have heard'; and goes on to narrate how, 'from his seat in a high tree, he saw the Parthians hurling snakes from long poles against the enemy.'" How far Pausanias stands convicted of this, at that time, fashionable sort of mystification we leave it to Dr. Kalkmann to tell.

WITH reference to our remarks in the *Builder* for the 8th inst. (p. 77) with regard to the lion of St. Mark, Signor Boni writes in explanation that the framework of the lion was erected in 1815 to support the figure which returned from Paris in fragments, and that the iron nuts have in some places cracked the bronze plates of which the figure is composed. Signor Boni says that he has been accused by his countrymen of wishing to preserve monumental antiquities beyond the bounds of possibility, and that he feels no remorse in suggesting the substitution of a framework of copper for the present iron framing. He further explains that he does not propose to restore any missing portions of the figure, but only to modify or suppress such features as were added in 1815, and which falsify the symbolical value of the lion or alter its character. He proposes to remove the hooks between the lion's paws, which is of lead and dates from 1815; to take out the eyes, which were added in 1815 and are of white glass, and make the lion appear blind, and to replace them by crystal of an amber or ruby colour. The wings were, it appears, also the work of the year 1815, and are entirely different from the original design. Signor Boni acknowledges that it will be impossible to restore the original wings, all trace of them having been lost, but thinks it is possible to give the new wings a shape which will harmonise with the lines of the antique bronze; but how he proposes to carry this out he does not state. The capital of the column he proposes to retain in its present state, only substituting copper cramps for the present iron cramps.

\* Pausanias der Perieget. Untersuchungen über Seine Schriftstellerei und Seine Quellen. Von Dr. A. Kalkmann. Berlin: Reimer, 1886.



DR. SALOMON REINACH has done good service to archeology by the issue, in popular form, of his advice ("Conseils") to intending student travellers in Greece and Asia Minor. A noted epigraphist himself, his advice is primarily offered to inscription collectors, but much of it would well apply to the whole field of archeology. His most important piece of counsel is, "Bewell prepared before you start," and in the clearest and simplest way he details the essentials of mental equipment. Know precisely what is already known in the country you intend to visit, and thus avoid the waste of time involved in collecting materials already published. Dr. Reinach proceeds to explain carefully how a squeeze is taken, and to give directions for the sort of photograph that is desirable. He even gives hints as to the method of taking a topographical sketch. His book is thoroughly practical, and its principles applicable far beyond the limits of epigraphy. It is for want of some such advice as this that so little is done for science by the average educated traveller.

WE are very glad to find that at the Manchester Jubilee Exhibition an important place is to be given to original artistic work in "artisans' and women's industries." The Executive Committee have granted a sum of money to be spent in awards for the best original work in furniture, wall paper, carpet and calico designs, wrought-iron, wood carving, modelling in clay and terra cotta, brass-work, and embroidery. This should form a most interesting feature of the proposed exhibition.

SIGNOR RAGGFS statue of General Sir Arthur Kennedy, the late Governor of Hong Kong, which has been temporarily placed on the open ground opposite Shaftesbury Avenue, is said by the General's friends to be a very good likeness, and has at all events that individuality of expression which a good portrait likeness generally shows. The head is finely modelled. As to the rest of the statue, what can be made of military uniform in sculpture? It is better in bronze than in marble: that is all that can be said. It would be a great boon if any method were adopted of putting up memorial likenesses of eminent men in such a form as to get rid of the insuperable modern costume difficulty; say by treating them as a bust on the head of a "term," the shaft or plinth of which might be ornamented with small decorative bas-reliefs having some symbolical or historical reference to the subject of the monument. Nothing, we fear, will ever get over the artistic unsuitability of modern costume, military costume especially, for sculptresque treatment. The statue has been cast by Messrs. Young & Co., at the Eccleston Iron Works, and appears to be a very good piece of founder's work. It is ultimately to be erected at Hong Kong.

THE exhibition of landscapes in oil and water-colour, by Mr. MacWhirter, in illustration of "the land of Scott and Burns," now on view at the galleries of the Fine Art Society, in New Bond-street, is of much interest topographically, and includes some very effective works in the artist's broad though rather mannered style. Among others is a fine view of Neidpath Castle, recently referred to in our review of a work on Scottish Castellated Architecture. The scenes into which architecture comes, the views of Ayr and Dumfries, &c., are among the best of the series, and appear to combine topographical accuracy with artistic effect in a very well-balanced manner.

THE Metropolitan Board of Works have received forty-three applications for the post of Superintending Architect in response to their recent advertisement, eighteen of which are from architects or surveyors who applied before. Among the best known of those who previously applied, and who now apply for the second time, may be mentioned

Mr. J. Douglass Mathews, Mr. E. J. Tarver, Mr. R. Walker, and Mr. W. Woodward. Among the new applicants are Mr. T. Blashill, Mr. G. Corson, of Leeds, Mr. John Hebb, and Mr. A. Peebles. At the meeting of the Board on the 14th, it was moved and carried that the applications be referred to the Works Committee, with instructions to select and submit to the Board the names of not more than six of the candidates whom they thought most suitable to the office. Some of the best of the new applicants would have been ineligible on account of the limitation of age under the former advertisement, and the result shows that the Board have done wisely in withdrawing this limitation.

GOWER-STREET.

WERE it not for the new face which it has assumed within the past two years, Gower-street could claim to rank as one of the dullest, gloomiest thoroughfares in town. Within the memory of, doubtless, most of our readers it fully answered to the phrase which the Laureate applied, it is generally believed, to Harley-street. Looking at the then depressing vista of its blackened house-fronts, their monotonous elevations wholly unbroken or unrelieved, we have difficulty in realising the fact that less than sixty years ago the street was so free from smoke that grapes and wall-fruit would ripen in the open-air sun in the gardens at the rear. Lord Eldon once lived (1804-1815), being one of its earliest inhabitants, in Bedford-square, at the southern end of Gower-street. There is record that in the course of a case in court he took occasion to mention how the ever-increasing encroachment of London smoke had injured his fruit trees; just as Archbishop Howley, at Lambeth, found that his beloved garden was ruined by the kilns of the neighbouring pottery works.

An inspection of certain maps goes to show that Gower-street was planned, if not indeed inhabited, before the beginning of this century. As "Gore-street" at the lower end (in a map of 1799), it runs as far north as Pancras-street. But all the ground eastwards, and north of Montague House (British Museum) and Bedford House is shown as open fields with a diagonal hedgeway from Baltimore House (Russell-square) to Totten Hall. Again, from Baltimore House to the Brill (Somers Town) is marked "The Duke of Bedford's New Road." This for part of its length corresponds with the later Woburn-place. Between these two roads lies an enclosure—the Archery Ground, almost identical with what is now the site of Tavistock-square. Here the Toxophilite Society (a remnant of the old Finchbury Archers, 1781), established themselves in 1791 under a term of a lease granted by the Duke of Bedford. They remained until 1805, when they were compelled to retreat before a foe against whom their artillery could avail nothing to Highbury Barn. Hence they removed to Bayswater, and ultimately, in 1834, to their new quarters in Inner Circle, Regent's Park.

The open areas, of which we speak, was originally known as Long, and latterly as Southampton, Fields. It had been renowned in the seventeenth century, as Macanlay reminds us in his famous Chapter III., for peaches and snipes. It speedily acquired repute of a very diverse character. For there, according to a legend of the period illustrated by Macanlay, was fought that duel between two brothers which gave the name of the Field of Forty Footsteps to the place of their deadly encounter. Far into the eighteenth century Southampton-fields formed a favourite duelling-ground, and on Sundays were rendered hideous by the resort of patrons of the ring, with all the rascaldom that followed in their train.

Gower-street takes its name evidently from the second wife of John, fourth Duke and eighth

Earl of Bedford, who married Gertrude, eldest daughter of John, first Earl Gower. So plainly, indeed, has the genealogical history of the Russells been written in the nomenclature of the numerous thoroughfares with which Gower-street communicates, that it were worth while to illustrate under what circumstances these names were adopted. In traversing Gower-street we pass from the Bedford to the Grafton estates, being two of the great dual properties whose undivided existence forms a striking feature in the cadastral history of London. The district that is commonly called Bloomsbury was known to Stow as Lomsbury, a corruption probably of Blemunds, or Bleomunds, Bury. This and St. Giles were later sub-manors of the ancient manor of Ruggemere, which "in Domesday is described as a manor in Osnstun [hundred], belonging to Ralph, a canon of St. Paul's. It was assessed for two bides. It was worth thirty-five shillings (a year) . . . It was then, and had been, in the demesne of the canons of St. Paul's."† The name of Ruggemere yet attaches to a prebendal stall at St. Paul's. The mere lay in the slightly rising ground between Tyburn and Holborn. Its draining by a ditch or dyke is generally ascribed to one William Blemund, temp. John, and the course of his fosse should perhaps be identified with the bend of High and Broad streets, St. Giles, and the western end of High Holborn, which formed the highway before New Oxford-street was laid out. Some say that the manor-house stood where is now Bedford-place. We cannot here follow the history further back than to say that in the early part of the seventeenth century Henry Wriothesley, Earl of Southampton, bought the sub-manor for 600*l.*, his town-house being then in High Holborn, just west of the Bars. This was pulled down before 1657 (teste Howell). After the Restoration, Thomas, fourth Earl of Southampton, Lord Treasurer, built Bedford or Southampton House on what is now the northern side of Bloomsbury-square. Evelyn refers, under date 9th of February, 1665, to "a noble square or piazza, a little town," which his lordship was then building in Blomeshury. Mscanlay, too, on the authority of the Travels of the Grand Duke Cosmo, writes:—"Foreign princes were carried to see Bloomsbury-square, as one of the wonders of England."‡ Much of the eastern side, olim Seymour-row, is modern, and harmonises but ill with the others. Southampton House, eventually demolished in 1800, passed, together with the estate, to the Russells, on the marriage of Lady Rachel, née Wriothesley, second daughter and eventually heir of Thomas, fourth Earl of Southampton, to William Lord Russell (so often but erroneously called Lord William Russell), who, in Burnet's words, triumphed over death in Lincoln's Inn-fields on 21st July, 1683. Viscountess Russell was widow to Francis, Lord Vaughan, son of the Earl of Carbery. She died here in 1723. Their son succeeded 7th September, 1700, to his grandfather (who had been advanced Marquess of Tavistock and Duke of Bedford, 11th May, 1694) as second duke. In pursuance of our scheme, we should state that several members of the family were named Francis, and that Francis, second Lord Russell of Thornhaugh,§ inherited, 3rd of May, 1627, as fourth Earl of Bedford. The great John Russell of Henry VIII.'s day was elevated, 9th of March, 1539, Lord Russell of Cheneys, co. Buckingham, and obtained grants of Tavistock Abbey and Woburn Monastery, co. Bedford. He was advanced Earl of Bedford, 9th of January, 1550. Wriothesley, the second duke, had married 1695, Elizabeth, daughter and co-heir to John Holland of Streatham, and acquiring a considerable fortune by that union, was created, 13th of June, 1695, Baron Howland of Streatham, co. Surrey.¶ His nephew John, who succeeded, 23rd of October, 1742, as fourth duke, married, 11th of October, 1731, Diana, youngest daughter of Charles, Earl of Sunderland; and in 1737, Gertrude, eldest daughter of John, first Earl Gower. Francis, the son by this second marriage, married Lady Elizabeth Koppel, daughter of William, second Earl of

\* "The long unlovely street."—In Memoriam.  
 † This spelling in the old map, we may observe, is proof positive (if any were needed) of the incorrectness of the common Cockney pronunciation of the name of the street, with the same sound for the "ow" as in "how," "cow," &c. The old family name after which the street is called is a one-syllable word, pronounced Gore, as written in the 1799 map referred to.  
 ‡ Usually fixed in what is now the space between Woburn and Russell squares. But the bearings given by Southey in his "Commonplace Book" correspond with the now Drummond-crescent and the adjacent end of Drummond-street, beyond Euston-road. Moser, under date 16 June, 1800, says he saw that field just before it was destroyed for building purposes.

\* Compare with the local and personal names given in the text: one or two of the street names have been altered.  
 † The Rev. W. J. Loftie's "History of London," Edit. 1844.  
 ‡ History of England, cap. iii.  
 § Hence, Thornhaugh-mews. Thornhaugh-street is now Huntley-street.  
 ¶ Howland-street was the early home of the late Sergeant Ballantine.

\* S. Reinach, "Conseils aux Voyageurs Archéologues en Grèce et dans l'Orient Hellénique" (Petite Bibliothèque d'Art et d'Archéologie). Paris, 1886. Leroux.

Alhmarle, and left issue Francis\* and John, who succeeded in turn to the dukedom. John, sixth duke, married 21st of March, 1786, Georgiana Byng, second daughter of George, fourth Viscount Torrington; and for his second wife, on the 23rd of June, 1806, Georgiana, daughter of Alexander, fourth duke of Gordon.

So much of Gower-street as extends northwards of Francis-street was at one time known as Upper Gower-street and Gower-street North. At No. 15, Upper Gower-street lived and died (1834) a celebrated antiquary, Francis Douce. No. 65 Gower-street was the last London home of Jack Bannister, the actor, who in wit and simplicity seems to have been a second Gay. The house at the corner of Montague-place and Gower-street was used as a laboratory and repository by the singular recluse, Henry Cavendish. He devoted all his time to chemical experiments and research, being rarely seen out of doors except when going to or from Dean-street, Soho, where he kept his books, and would lodge a receipt for each volume he abstracted. An intimate of Banks and Davy, he was seldom known to entertain visitors, and even when he did, no other dish than a leg of mutton, one or more, ever suggested itself to him. In this house he died in 1810. At the northern end of Gower-street, where the road is blocked by one of the many barriers that still impede the traffic, are University College and the North London or University College Hospital. The latter was founded soon after the opening of the College, under Lord Brougham's presidency, and built after Alfred Ainger's design. The foundation of the College is generally attributed to Lord Brougham,—a scientific man amongst lawyers and a lawyer amongst scientific men,—though the exertions of Campbell, the poet, to the same end should not be forgotten. Its design,† by W. Wilkins, favourably compares with his later National Gallery in Trafalgar-square. The first stone was laid on Monday, April 30th, 1827, by the Duke of Sussex, under strong Whig auspices. The central portico, raised upon a lofty plinth and approached by flights of steps, has a fine effect.

The hall beneath the cupola constitutes a befitting resting-place for a priceless possession,—the original models of John Flaxman's chief works, which about ten years after his death were presented to the council by his sister-in-law, Miss Denman. Of these, as well as the not less interesting collection of Flaxman's sketches, we gave a full description some time ago.

The relaying of the roadway of Gower-street in recent times, partly with asphalt and partly with wood-paving, probably in an almost literal sense "paved the way" for the improvement and resuscitation of the street. In its former condition, with cobble paving of even unusually severe type, and with the rattle of vehicles was formidable, and, with the present development of traffic, the houses, had the old pavement remained, would have been almost uninhabitable for any sensitively-organised tenants. Following on this necessary alteration, great improvements were made some little time since in a number of the houses on the west side of the street, in regard to sanitary arrangements and additions necessary for modern ideas of comfort and decent living. The attempt made at the same time to give a more important appearance to the front of a good many of these houses, by framing the doorways with stone pilasters and architraves, has not been so successful; the additions thus made being, architecturally speaking, as ugly and badly-designed as they could well be; it would have cost no more to have made them agreeable and picturesque, had they been put into proper hands. Very recently some of the larger houses on the east side of the street have been taken in hand, and subjected to a thorough refitting internally, without any similar attempt at stone-casing the entrances, which, if it were to be done no better than on the west side, is certainly heter let alone. These more lately "revived" houses are excellent residences of their class, with a good deal of pleasing variety in the arrangement and planning of the principal rooms, and they have another attraction little suspected by the casual passer-by; for few who look at the long monotonous line of houses on this side of the street, would expect to find in their rear quite a plantation of

trees, some of them very fine ones. In the building alterations recently made, we are informed, the most religious care has been taken not in any way to injure these trees, which are a precious possession to the site.

#### A CLUSTER OF DECORATIVE ARTISTS.

BIRKENHULTZ—CARRAVAGGIO—FOLKEMA—PHILIP GALLE—JACQUINET—WENZEL JAMITZER—JANSSENS—PITTONI—VALCK—VISSCHER—WOERIOT.

We must commence by saying that the cluster of decorative artists whose work we propose to consider to-day, and whose names stand at the head of this article, are so grouped merely for our own convenience. They have no common country, no common period of work, and they produced designs which have nothing in common but, perhaps, excellence. We have lingered somewhat longer than we had intended over the work of the five artists we have specially considered, and for various reasons we



Fig. 1.

propose now to make a wide cast of our net. In some instances there are but few specimens of their work preserved,—at least, in the British Museum Collection. In some instances there is a good deal of very inferior work, relieved only at rare intervals by flashes of genius; and in others, again, there is an abundance of work, but little variety of style. We have, therefore, arranged their names in alphabetical order, and with our readers' permission will take them as they come.

Of Paulus Birkenhultz little is known save that he was at work in Germany about the year 1670. He worked like so many others for the jewellers, but his designs have mostly little merit. There is, however, one little panel in the midst of the pendants which cannot be passed over (fig. 1). To those who love the Renaissance and all its works without discrimination, the flapping of the bird's wings in the centre will seem a pretty incident; to those whose admiration is somewhat qualified and disturbed by such presence, it must seem a blot on the sculpture. But on this subject we have already spoken at sufficient length, and it will be unnecessary again to recur to it. "Barrin' the bird," however, the design is specially graceful, the main stem of the scroll splitting up the panel into six not too uniform subdivisions very pleasantly.

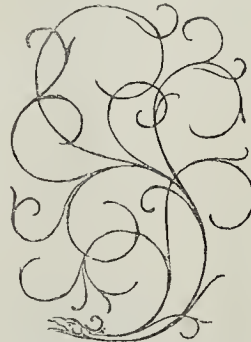


Fig. 2.

From Birkenhultz we go back more than two hundred and fifty years to Polidoro Caldara da Carravaggio, who was born in 1495. He was a disciple of Raffaele, and painted the friezes accompanying his master's work in the Vatican. His engraved decorative

work consists of a large series of designs for silver cups, which are remarkable for exquisite purity of form, and for the perfection of simplicity in the ornament put on them. One of these we will give an illustration of in our next.

The next name on our list, R. J. Folkema, probably worked at about the same time as Birkenhultz, or possibly even later. His work strikes one at first sight as mediocre, chiefly on account of a certain lack of fineness in engraving, and a want of freedom and firmness in the drawing of the curves; but it is not without merit. We should hardly, however, be justified in ranking him as a master of the art, but rather as a successful student. The want of freedom in his drawing suggests that a good deal of his detail was copied and applied rather than inspired, and the result is often ungainly: in one or two places he is, however, more successful. In fig. 2 we give the main structural lines of a really charming acanthus study, and in fig. 3 a more finished sketch of a fragment of the foliage, which, in spite of one or two obvious defects, is still not without a considerable amount of graceful feeling.

In the same rank with Folkema, we must (departing for the moment from our alphabetical arrangement) place Gerard Valk. He also seems to have been a not altogether unsuccessful student; but whereas Folkema mastered the art of construction of design, but lacked something of originality in his detail, Valk seems to have been quite successful in foliage detail, but to have missed the mark entirely with regard to general construction; fig. 4 is almost repulsive, with its uncouth and ungainly structural lines, but the acanthus-leaves are exceedingly well drawn and adapted to their places and purposes in and to which they are put.

Philip Galle is an artist of a very different order of merit. He was born at Haarlem in 1537, and afterwards became a print-seller at Antwerp. His name will not be entirely unknown to our readers, for some at least of his



Fig. 3.

Renaissance panels have been reproduced and serve as head or tail pieces in the illustrated magazines of the present day. But it speaks ill of the taste of those in whose hands the selection of designs for such objects rests, that they should have deliberately given prominence to Galle's worst work, and have passed by his best. For he worked in two very distinct styles. Although there is little to find fault with in the execution of his Renaissance panels, in design they are but a heterogeneous mass of ill-assorted and often unpleasing detail. But his best ornamental work is of a very different calibre, and it is difficult to realise that such good and such bad work can have come from the same hand. Of this second style we give an example in fig. 5; in it every canon of the art is observed with the greatest fidelity. First, as to its main structure. The curves are given off from the points above and below the little central medallion which does not enter into the design: from these points they flow with absolute freedom, adapting their volition without constraint to the form of the ellipse which has to carry them. There is not one inharmonious break or jar in their tangential flow. The longer scrolls from the bottom wind up to the right hand and the left, and meeting the shorter one from the top intertwine with them, and then fall back again; but there is no confusion, each has its own allotted space to fill, and each in due course fulfils the object for which it was created. And as the main structure is perfect in its way, so also is the detail in its way. The foliage is a very simple conventional form, a leaf with but few serrations, and only here and

\* Vide his statue, by Westmacott, in Russell-square.

† The northern wing was recently added, under the superintendence of Professor Hayter Lewis; but the buildings are yet uncompleted.

there a five or six petalled flower; but the whole surface is evenly covered, and there is no spot covered or uncovered which stands out above the rest with undue prominence.

From Folkema let us pass to one Jacquinet, a gunsmith, who ornamented the locks of the weapons he sold with pleasant devices. There is no extraordinary merit in them save one, but that one redeems every design he made from falling into commonplace: there is little compactness in their composition, the flowers are but slightly, if at all, conventionalised; there is not much originality in the detail, but,—and this is an important “but,”—the designs are in every instance perfectly adapted to the object they are intended to beautify. As in speech, action, its ornament, must be suited to the word; so in decoration the lines of which it is composed must be suited to the thing on which they are placed. It is Bourgnet’s “*ovales ronds*

It is difficult to decide to which to give the palm, the complicated outline or the elaborate detail which covers the surface. The latter can speak for itself, but the beauty of the outline demands some slight analysis. The beauty of an outline which is very much broken up depends on the beauty of the curve which is formed by joining the extremities of the most important of protuberances. Let us draw such a curve, starting from the topmost moulding, just underneath the pan which holds the candle-socket. It travels inwards past the second moulding till it reaches the little boss in the centre of the spheroid immediately below it; then it swells out, slightly touching the extremity of the wreath, touches the little bit of moulding which holds the little man’s head (which with the claws are but slight excrescences); still gradually swelling outwards it glides by the moulding underneath the arches

which is modelled to it, to be a thing of beauty also.

Our next illustration, fig. 6, is a fragment from one of the designs of a Flemish artist, Hendrik Janssens. Very few of them seem to have been preserved, but there is a singular grace and freedom in the curves of the fragment we have selected which seems to have been designed for some species of gold work.

In Battista Pittoni, born at Vicenza in 1585, and Claes Jansz Vischer, who flourished about 1640, we have two masters who worked almost exclusively on the revived classical models. The former produced endless variations on the acanthus scroll; the latter in addition to similar studies published a bookful of designs of festoons and fruit. These are not sufficiently interesting for reproduction, but we have reproduced one of the scrolls, and two of Pittoni’s. These are given in the separate plate of illus-



Fig. 4.



Fig. 6.

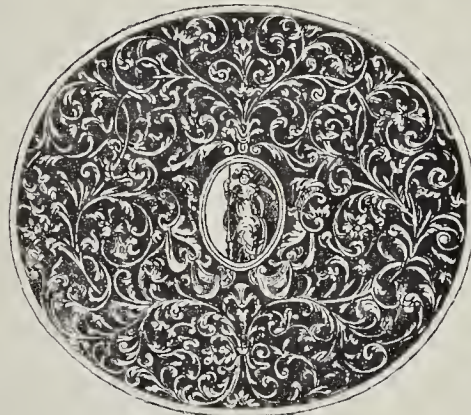


Fig. 5.

et curvds” principle over again; \* for harmonious effect the construction of the ornament must follow the construction of the thing ornamented. It is, perhaps, difficult to find an object that lends itself less to continuous and homogeneous design than a gun-lock, with its flint and steel, its hammer and spring, its bolts and its screws; but Jacquinet took it as he found it, embellished every part as it came under his hand with loving care, and, as we have said, produced at least some designs very pleasant to behold. There are a goodly number of these gun-lock designs evidently coming from an illustrated catalogue, and every one will bear its own witness to the truth of what we say.

The elaborate candlestick given on the separate plate of illustrations in this number comes from the hand of Wouzel Janitzer von Munch, sometimes called the Master of 1551. It is one of a considerable number of designs, most of which are for large and richly-embossed cups.

and figures, till, with bolder and bolder sweep, it passes the moulding beneath the medallions, and at length it meets the massive curves which form the base. We have drawn a beautiful curve. But why beautiful? We know not; perchance, by reason of its elaborate equation (which expression we might possibly, with some truth, hold to stand as the mathematical curve-tracing equivalent for the artistic suggestion of the infinite). But this we know, that one curve excels another curve in beauty; that an ellipse is more beautiful than a circle, a parabola than an ellipse, a hyperbola than a parabola, a catenary than all the others, and so on through all the mysteries of the tracing of curves to which no names can be given, so many legion are they. The bottom segment of the curve we have drawn has something of the spirit of a catenary about it; the upper segment runs into the lower at a perfect tangent to it, but is too short to indicate its ultimate destination. But the sum and substance of all this is that we hold it to be a line of great beauty, and the form of the candlestick

trations. It is needless again to enter upon the much-debated question of the artistic value and merit of this classical model; the general structure of the scroll is a fixed quantity, the only scope for the artist’s originality and individuality in the scroll itself being found in inventing new devices for the floral terminals and bud sockets; for the rest, the animals and children could be varied *ad libitum*, the designer’s liberty in this respect being absolutely unfettered and unconfined. With the elaborate sword-handle, also in the separate plate, one of a series designed by Pierre Woeriot, we close this article: the flowing lines of the guard are especially beautiful, as is also the treatment of the acanthus-leaves on the stem.

In this little cluster of decorative artists we have gathered only those whose work might justly serve as examples of merit of one kind or another. Even from the British Museum collection, which is the only one of its kind in England, but which from the nature of the case must necessarily be very incomplete, we would willingly have culled specimens of other

\* See our article on Jean Bourgnet, Jan. 1, 1887, p. 6.

masters; some of the many cups, for example, designed by Bernhard Zoo, about 1571, or of those which Hanns Christoff Loechin von Leutkirch published in 1594 in his "Buch mit xxvii. Stück"; or of the weaker designs for the same purpose by their contemporary Johann Stephens (1582); some of the ornaments for "argue-buzerie" from Pieter Schenck's collection, "tirées des premiers maîtres de l'Europe"; some of Daniel Mignon's gold work; but our series of articles would be mending, and we have still much ground to traverse before they are concluded. One eminent name our readers will have assuredly missed, De Bry; but we have reserved our next article for the study of the two artists who bore it.

#### THE TREATMENT OF SEWAGE.

In our previous article on this subject\* reference was made to the reports, only recently published in the Society of Arts Journal, of Dr. Tidy's paper on the subject read in the earlier part of last year. A reference to the opinions elicited in discussion on the same occasion, and also published in the Society's Journal, may be of interest as a supplement to the consideration of the subject.

The discussion was commenced by Lieut.-Col. A. S. Jones, V.C., who disposes of the sewage of Wrexham on his own farm, and is the author of the pamphlet published by Messrs. Spon, "Will a Sewage Farm Pay?" Dr. Tidy had said that the sewage mud accumulated on the surface of irrigated land, to which Colonel Jones replied that any farmer, or labourer even, could give the most positive and direct contradiction to that theory. He had applied large quantities of raw sewage, sludge and all, to fallow land every winter for fifteen years, and never found the pores of the soil clogged when it had been ploughed up for roots in the succeeding spring. Frost and heavy rain were also common hughears with indoor advocates of chemical precipitation, which the farmer knew how to combat without much loss of purification, as percolation goes on through the soil all the same under the sheet of ice, and it is quite unnecessary, as well as misual, to let the sewage run over frozen ground into a river.

Dr. Carpenter had seen the processes of sewage disposal in various forms and conditions, and he could say with the utmost satisfaction that the only arrangement which would fulfil all the requirements was the utilisation of the sewage by irrigation. The great point was not to let the land get water-logged or deprived of atmospheric air, and it must be broken up pretty often, so that the air would get in. He had seen cases where the sewage was allowed to go on the same plots for two or three days, or even two or three weeks, and then they wondered they could not get a crop. No sewage should go on to one plot for more than twelve hours, and then should be turned on to another, and the air must be allowed to get to the roots of the plants. Again, the land should never go beyond three years without being broken up, and it was the failure to do this which often led to difficulties. That was a fault on the part of the farmer, not of irrigation. Irrigation was the right thing, and it was even better to pump than to send the sewage into a river or the sea.

Apparently to strengthen his case, Dr. Tidy had said that "A precipitation scheme by itself has these two enormous advantages over irrigation, viz., its efficient working is totally independent of weather; and, if sufficiently large works be erected, any emergency of quantity can be met." This is contrary to all reason, and the facts of cases, unless special stress be laid upon the reservation that sufficiently large works be erected. With works of ordinary dimensions excessive quantities of sewage cannot be dealt with in tanks; and if tanks be made large enough to deal with these quantities in emergencies they become unnecessarily large for those of ordinary times. Dr. Tidy was attempting to show that with a tank system the separation of the hulk of the rainfall from the sewage need not be done, but Mr. Baldwin Latham said the first important point was that of separation; they were told that they were not to separate the rainfall from the sewage, and they were also told that in time of rain the sewers were flushed out, and the consequence was that at that time the sewage was much

fouler than at any other time. It seemed to him that that was the very strongest argument for separation. If as much rain as possible were kept out of the sewers the volume was considerably reduced; if it were not kept out, the average daily flow might be increased twenty to thirty times in one hour by a heavy shower; and instead of this being unimportant in chemical processes, it was far more important than in irrigation, because, to carry out such a process properly you wanted large tank space, and if in a limited time thirty times as much rain as the ordinary volume of sewage came down, as the tanks generally held only six hours' sewage, instead of having six hours for precipitation there would only be a few minutes, and consequently the sewage must go away in a polluted form.

As to the difficulty of disposing of the sewage to farmers Mr. Peregrine Birch said that in some parts of England the voluntary system had been found to be extremely useful; for instance, at Cheltenham, where precipitation tanks had been erected which did not efficiently perform their object, the Town Council had spent several thousand pounds in carrying the sewers further down the valley, and bought two farms of their own, and had made arrangements with the farmers on the route to take the sewage when they wanted it, and when they did not want it it was put upon the land belonging to the Corporation. They received from the farmers sums varying from 4s. to 15s. per acre for a dressing. When the farmers did not want the sewage the Corporation irrigated their own grass lands, and the result had been that instead of spending 6d., 9d., or 1s. per bead of the population on using the tanks ineffectually they had got out of the difficulty at the cost of 1½d. per head, paying off at the same time the cost of 300 acres of valuable land, so that at the end of forty or fifty years they would be possessed of a fine estate, instead of having a liability upon them to improperly deal with the sewage at a cost of 1s. or 9d. per head. The position taken up by Dr. Tidy was that precipitation, irrigation, and intermittent filtration had each its own advantages and disadvantages, which Dr. Percy Frankland said was a very safe position, and there was, no doubt, much truth in the statement; and that different processes were suitable to different places; but it should be clearly borne in mind what were the intrinsic capabilities of each process. People who had to select between the competing methods of purification ought to bear in mind what it was possible to accomplish by each process. There could be no doubt that sewage precipitation was adequate for some purposes, but it was an indisputable fact, which should never be lost sight of, that the best known processes of sewage precipitation could not accomplish such purification as it was possible to obtain by the best methods of irrigation and intermittent filtration. With regard to the precipitating material which the Metropolitan Board of Works were prepared to recommend for adoption, Dr. Dupré said that, in conjunction with Mr. Dibdin, he had made various experiments in the matter, and found that by using a larger quantity of precipitating material better results were not obtained. He thought very few people had any notion of the quantity of precipitating material necessary for the metropolitan sewage. One grain per gallon added to the London sewage represented ten tons of material per day; the total amount of material used in the A B C process was about five times that of the suspended matter in the sewage, or from 150 to 200 grains per gallon of London sewage per day, equal to 2,000 tons to be used daily, which came to 5,000 tons of pressed cake, chiefly formed of material which had been added. What was it added for? Not to produce any real benefit, because when this process was used the organic matter was 18·2 grains per gallon in the sewage, and 18·4 grains per gallon in the effluent. What was the object of adding 2,000 tons of material daily to sewage for the mere trouble of collecting it again and pressing it at a considerable expense? Professor Dewar took it that Dr. Dupré would admit now that the effluent ought to be oxidised, in order to make it anything like fit to be placed in a river. It was exceedingly surprising that there should be no limit to the amount of chemicals which could be used. It would seem that neither was there any particular substance which was better than another. The combination Dr. Dupré had selected, in conjunction with other

distinguished men, required explanation from a chemical point of view. He took it that the addition of lime and sulphate of iron gave rise to protoxide of iron, which withdrew a considerable amount of oxygen from the water. Subsequently he understood permanganate was to be added. He had not the slightest hesitation in stating that the samples of effluent that he had seen resulting from this process were the worst from any precipitation process whatever.

It is, therefore, plain that whether we regard the substance to be used, or the quantity, there is no agreement amongst chemists. Sir Robert Rawlinson pointed out, from his experience in this matter extending over thirty years, that to treat sewage by chemical deposition would not cost less than 1,000l. per annum for each million gallons per day. In some cases the cost would be double that. He thought that if there was any chance of dealing with sewage with the nearest result to profit, it was by irrigation, although neither this nor any other way of disposing of it could be looked upon as positively profitable. In some cases, where the land was in sufficient area,—where it was of an exceptionally good quality for sewage,—crude sewage might be put on the land without any previous tank process; and in cases where an area was less than 300 or 400 acres, expensive and permanent carriers of any kind were not required. Where the area was from 500 to 2,000 acres, then it might be necessary to construct certain leading, permanent carriers over the ground. A vast amount has been wasted by young engineers laying out small farms of 200 or 300 acres with costly permanent carriers, which had been an obstruction to the irrigation process. What was wanted in those cases was rough-and-ready carriers made with the plough or the spade. The crude sewage was to be taken to the highest point, and passed along contour lines gradually over the land. At certain sewage farms expensive depositing tanks had been made, but it was soon found that they became a nuisance.

The process of precipitating the sewage of the metropolis at the Barking outlet, and then carrying the residue down the Thames to the sea, was declared to be a monstrous proposition. Reasoning from small to great, about 10 tons of sludge per week are precipitated from the sewage of a population of 1,000. This quantity may be reduced by presses to 2 tons, or 104 tons of pressed sludge in one year from each thousand of the population. Taking the population of London at 4,000,000, there would be 40,000 tons of sludge per week, or 416,000 tons of compressed sludge per annum. If it cost 2s. per ton to produce it, the annual outlay would be 41,600l., besides the cost of the removal. To produce this sludge separate from the sewage, 165,000,000 gallons of sewage per day would have to be chemically treated, and each million gallons a day would cost 11,000l. per annum, or a total in one year of 1,650,000l. But if the sewage were raised by engine-power into a conduit which would convey it in the direction of Canvey Island or elsewhere, and if the conduit passed through an agricultural district, it could be disposed of on land, if the Board had power to purchase the land at its agricultural value for the purpose of letting it out for sewage irrigation, and so the crude sewage of the metropolis would be utilised between the present works and the sea, not only without any ruinous cost to the parties establishing the works, but with some chance of an income, and certainly not with the enormous loss which would have to be faced if the Board attempted to treat the sewage with chemicals. The Canvey Island scheme, with which Mr. Bailey-Denton's name is prominently associated, is based on the following particulars:—The population is assumed to be six millions; the quantity of sewage from the metropolis 200 million gallons daily; from the Lea Valley twenty millions, or a total of 220 million gallons per day.

The rateable value, including all places on the Lea south of Waltham, is set down at 32,162,864l. One penny in the pound raises 134,012l. The cost of the main conduit, with distributing conduits and appliances and the immediate formation of earthen basins to receive the solid portion of the sewage by settlement, and including also filtration beds to cleanse the liquid after its separation from the solid, and the purchase of the island (4,383 acres), and including compensations, would be 4,873,017l. The working and current

\* See p. 79, ante.

expenses would be 195,551. Three half-pence in the pound more than suffices to raise this amount.\*

"THE CONVERSION OF ENGLAND:"

A DRAMA WITH HISTORICAL COSTUMES.

The notices which appeared in anticipation of the performance of this play, stating that it had been in rehearsal for two years, were sufficient to excite the interest of any archaeologist, and although the statement proved to be an exaggeration of the fact that it had been performed two years ago, there was little room for disappointment.

The drama describes the mission of St. Augustine of Canterbury to Ethelbert, king of Kent, and the conversion of the Anglo-Saxons to Christianity; it is written by the Rev. R. H. Cresswell, whose name alone appears, the performers being announced as divers persons connected with the Church of St. Peter, Vauxhall, and the performance has taken place on Monday, Tuesday, and Wednesday evenings of this week, at the Boys' Parochial School, in Macaulay-road, Clapham. The tickets of admission had been eagerly secured, and the seats were all filled.

The drama is divided into ten scenes, each of which required elaborate setting, with the result that the intervals between them were long and the scenes themselves were so very short that the curtain seemed to fall almost before the scene had well begun; there was thus no time to make such careful notes of the scenery and costumes as they deserved, and, it is to be hoped, that the performers will allow themselves to be photographed in groups so as to preserve what has undoubtedly formed the subject of considerable study.

The first scene was the Forum of Rome, where the English children are sold as slaves, and gave Gregory the chance of making his three historical puns; but as we read that he was then a deacon, this may be held as an excuse for them. *Basilides*, the slave dealer, does business with *Theodora*, a Roman lady, who hands over her purchase to the Christians.

The second scene transports us to Heathen England, where Sebba, the priest of Woden, is officiating at an altar around which a troop of children dance various measures; their really bare legs and feet giving a very natural tone to the scene, and being a great relief from the meretricious effect of tights, though somewhat conducive to rheumatism. After the dance, Sebba tests the fate of a captive by mystic rites, which result in his condemnation, and Queen Bertha, who enters, pleads in vain for his life, she being a Christian.

In the third scene we find Augustine and his brethren of the Monastery of St. Andrew at Rome, seated at a table well supplied with food, of which they were apparently not hungry enough to partake. A messenger brings a letter from Gregory appointing Augustine to conduct the mission to England, and he accordingly chooses the four monks who are present,—Lawrence, Peter, Sergius, and Placidus,—to accompany him. The latter is the one laughable character in the piece, and, as the name suggests, should be the very opposite of a self-denying man; it was, however, taken by an actor so emancipated an aspect that one felt, all along, that he was regretting that he had left the food untouched.

The fourth scene is laid at the Monastery of St. Honorat, in the island of Lœnis, where the monks fall in with a Frankish count, whose gruesome accounts of England, which he has visited, go far to increase their despair, especially that of Placidus.

\* The letter of "Ferrometer," which we published last week (p. 132), conveys nothing to the point. Dr. Tidy did not refer to the area of land required for broad irrigation, as our correspondent supposed, but to the area required to set a river, as we pointed out; and this is, of course, very much less than that required for broad irrigation, about which "Ferrometer" gives some figures which we are not much concerned to dispute, although we may point out that he is wrong in saying that 30 gallons of sewage per individual per day is "the usual mean." Then, with regard to the effect of sewage passing through earth, the case of Edinburgh was not referred to, either by Dr. Tidy or by anybody who took part in the discussion of the subject. After a long examination of the facts of the case, the Rivers Commission reported that "the Edinburgh experience, therefore, must be quoted not as a successful example of sewage cleansed by irrigation, but rather as an instance of the largest produce raised by means of it from a limited area of land." Therefore, while we do not dispute our correspondent's statement that the effluent water of the Edinburgh sewage "contains 64.94 grains of foreign matter per gallon," yet we must say that it does not affect the question of the proper treatment of sewage.

The fifth scene brings matters to a worse pass, for the monks are attacked in a forest near Pont-de-Gé, and become separated; however, they manage to find one another, and then divide themselves into two parties, one to watch and sing psalms, and the other to sleep,—which, by the way, they do without previously saying their prayers.

The sixth scene is at the Palace of King Ethelbert at Canterbury, and is, in the matter of costume, the most ambitious of all. The simple dress of the king, without a mantle, was remarkable. A messenger brings word of the arrival of the monks, and the king takes counsel of his nobles whether they should be admitted to his presence,—a point strongly urged by the queen, but overruled by the nobles,—and the king decides that he will go and meet the monks instead.

The seventh scene is, therefore, on the Downs above Minster, in the Isle of Thanet, where the king, accompanied by his court, hears what the monks have to say. These enter, duly preceded by acolytes, who are not accounted for in the previous scenes and are presumably, recent converts. The monks stand behind Augustine, who is seated, and observes the effect of his appeal conveyed to the king by an interpreter. In doing so the actor committed the little forgetfulness of listening to the interpreter, whom he presumably could not understand, instead of only watching the face of the king. The pious fervour of this character was, however, beyond all praise, especially when he received the king's permission to convert his people, for which the queen comes forward to render heartfelt thanks.

In the eighth scene, in St. Martin's, Canterbury, the king is baptised and duly clothed in white, and a grand procession files out of the church, taxing the limits of the stage.

The ninth scene transports us to the porch of the cathedral at Arles, inside which Augustine is being consecrated Archbishop of Canterbury. In due time he issues forth, preceded by a crozier, and wearing the mitre, of loose material, indented along the centre, but not the pallium.

The tenth scene, laid near St. Augustine's oak, is a supplementary one, in which is represented the fact of the ultimate valuable co-operation of the British and Scotch churches in the conversion of the Anglo-Saxon races. Augustine's death is announced by his successor, Lawrence, one of his four companions.

This closed a performance which one would like to see repeated on a larger stage to a larger audience, if only as a means of archaeological instruction in a pleasant form.

SALT FOR REMOVING SNOW.

THE recent snow-storms have, as we have already observed, aroused the indignation of the British ratepayers, many of whom, especially in the metropolis, have been heaping contumely on the devoted head of all officialdom by means of letters to the *Times* and other journals. The use of salt for removing snow has occupied a prominent place in these outbursts, and has been awarded a full share of abuse. Under these circumstances it will be interesting to note what has been done in our sister capital of Paris, where the trouble from snow-storms is often greater than in London.

In the *Annales des Ponts et Chaussées* are given some particulars of the first efforts made by M. d'Ussé in 1850, to thaw the compressed snow caused by the passing of vehicles. During the winters of 1879-80 and 1880-81, nearly 200,000 l. was spent in the by no means successful efforts to remove the snow from the Parisian streets. At that time there was a heavy tax on salt, but in order that it might be used for the removal of snow this tax was remitted on the common kinds of salt, which would be unsuitable for culinary and table purposes. About 4,000 tons of salt were accordingly provided for last winter, and a regular service was organised for clearing away the snow before it became trodden down by pedestrians or compressed by the wheels of carts and carriages. This is an important point, as the ice formed by the compressed snow is much more difficult to get rid of than the virgin snow. The salt is scattered on the streets as soon as the snow begins to fall fast, about 1 dram per square foot for each 4-10ths of an inch of snow fallen being used, provided the temperature is not much

below freezing. The traffic, in place of causing the snow to stick to the ground, only helps to mix it and the salt together, producing a liquid that will not freeze at a temperature above 5° Fahr. In countries where the thermometer is apt to fall so low as this the system would be inadvisable. The cold liquid should be swept into the drains as soon as possible, but it is said to do no harm to asphalt-paved and wood-paved roads. On macadamised roads, however, it causes disintegration, and should not be used.

It is said that there is no method so cheap as this for the removal of snow. Steam has been tried but does not compare with it in the matter of cost. Formerly in Paris each centimètre, or 4-10ths of an inch, of snow that fell cost the city about 2,400 l. to remove it, but by the use of salt about two-thirds of this sum would be saved, the expense being only about 800 l. for the same result. With regard to the point, so much stressed has been laid on, in this country lately, the injurious effects of the "freezing mixture" on the boots of pedestrians and the hoofs of horses, it is claimed that the latter disadvantage can be obviated by greasing the inside of the hoof, and if the liquid be promptly swept into the drains, by sweeping-machines on the roads and "squeegees" on the pavements, the discomfort to pedestrians will be very small and of short duration.

Details of this method of removing snow by salt may be found in the eighty-seventh volume of the "Proceedings of the Institution of Civil Engineers," p. 47, *et seq.*, in which there is an abstract of a paper by Mr. Brahaud. It is said that possibly the system may not be confined to the clearing of streets of towns, but be extended to all paved roads, tramways, approaches to railway stations, and large factories. It might be also used for dealing with snow-drifts in railway cuttings, by spreading it in sufficient quantities and sweeping off thin layers. "The small cost of the system," it is said, "and the advantages to traffic are sufficient reasons for an early and wide extension of the use of salt for removing snow."

COMPETITIONS.

*Schools, Milverton.*—At a meeting of the School Board, on Monday last, to consider the competitive designs for the proposed new Board schools, it was decided to accept those of Mr. Geo. H. Cox, architect, Birmingham.

*Sewerage, Cleethorpes.*—An open competition was invited by the Cleethorpes Local Board amongst sanitary engineers for the best scheme of sewerage and sewer outfall for the district of Beacontorpe, which lies between Grimsby and Cleethorpes. The plans and report sent in by Mr. W. H. Radford, Assoc. M. Inst. C.E., of Nottingham, have been accepted as the best, and he will be appointed Engineer for the works. As the district is likely to increase considerably in population, pipe sewers of the largest sizes will be laid down. The sewage will be conveyed out to low-water mark by large iron pipes, and delivered on the ebb tide, which will take it straight out to sea. Storage accommodation is provided for the sewage during high tide, and flushing and ventilation arrangements are made.

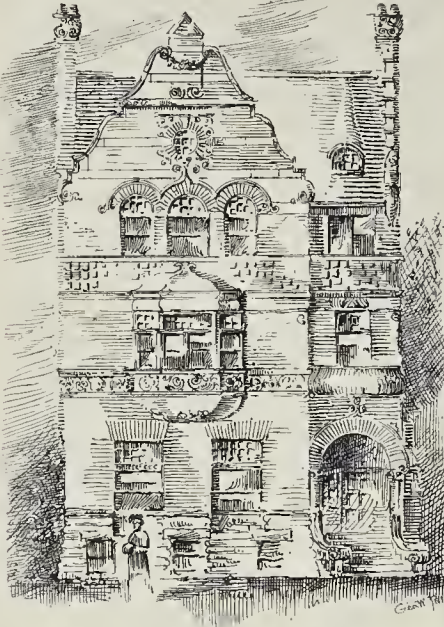
MAP OF LONDON SHOWING THE BOUNDARIES OF SURVEYORS' DISTRICTS.

We publish this week the fourth and concluding section of this map.

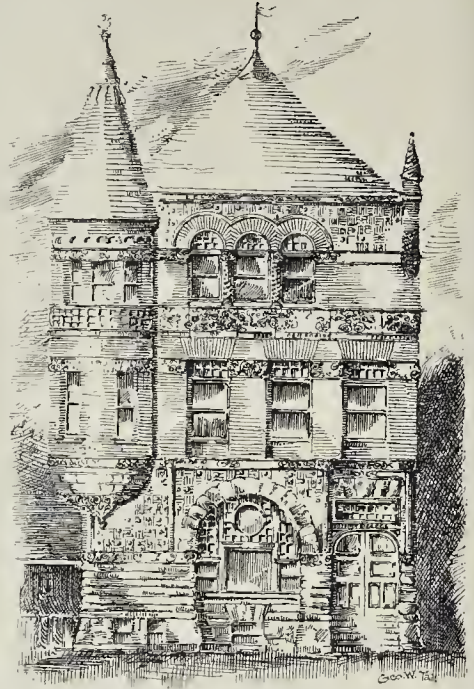
Illustrations.

AMERICAN HOUSE ARCHITECTURE.

WE give, in one of our phototype plates this week, two characteristic examples of recent American domestic architecture,—a town house and a sea-side house, the first being the Art Club at Boston, designed by Mr. R. W. Emerson; the other, a sea-side house designed by Mr. Arthur Little. Each of these illustrates, in its way, the reactionary tendencies of modern American architecture. For a long time the great defect of American architecture was that not only did it attempt no originality, but it was tame and commonplace even in its reproduction from European



DESIGN FOR HOUSE IN CHICAGO.



HOUSE, CORNER OF OGDEN AVENUE AND ADAM STREET, CHICAGO.

Houses in Chicago.—Designed by the late Mr. S. G. Beaumont.

materials. A persuasion of this, coupled with the influence of one or two architects of genius (of whom the late Mr. Richardson was the chief), seems to have led, of late years, to strong resolution to be original, and even with that object to return to the first simple beginnings of architecture, and reduce houses to the roughest and most unworked materials and design, in the hope of, apparently, striking out from this new beginning into some original path. The "seashore cottage" illustrates this latter tendency. The architect appears to have studiously avoided everything like "architectural treatment," even putting unguaranteed tree poles to carry the balconies and overhanging eaves. This appears to us an absurd affectation of rusticity which is at variance with architectural principle and true good taste. In other respects the house is certainly picturesque, especially so the octagonal turret with its simple windows, which forms the outworks, so to speak, of the residence.

The Boston Art Club illustrates the manner in which some able American architects are endeavouring to develop hints from Romanesque forms of architecture into a style, or at least a manner of their own. The various details of this new American style seem still to require harmonising and refining, but there is force and picturesqueness in it, and it undoubtedly promises further possibilities of development.

The two illustrations are reproduced by the phototype process from photographs.

The sketches above given of houses recently erected in Chicago came into our hands while we were arranging the publication of the two photographs. We add them as marginal notes in further illustration of this move of American architecture in the direction of the rudely picturesque. Please to observe the random rustication of the basement portion (a "note" of much recent American house architecture), and the equally random, though effective, style of sketching. These houses were designed, oddly enough, by an architect (Mr. S. G. Beaumont) who went out from England, but appears to have contrived thoroughly to indoctrinate himself into the "new American" style. We regret to add that Mr. Beaumont,

who was formerly in the office of Messrs. Banks & Townsend, in London, died not long after he commenced practice in Chicago.

#### TANAGRA TERRA COTTAS.

The illustrations given are photographed from three of the reproductions of these charming little Greek toys, as they may be called, which are being made and offered to the public by Messrs. Bellman & Ivey.

Every one who has seen the numerous examples of these statuettes in the British Museum and at Berlin must have been charmed with the combined grace and natural simplicity of their pose and expression, and the very pleasing arrangement of the drapery in most of them. The copies are exceedingly good reproductions, and form very graceful household ornaments.

There is a great general similarity in the design and pose of many of these statuettes, though, as far as we have observed, all the examples in the British Museum differ in detail. What is not generally known, however, is that these figures show evidence of having been cast in moulds, and only partially touched up by hand afterwards. A good many replicas have been found; indeed, a German authority says they have been found "by the dozen"; but what strikes one is that there should be so much variety as there is, and so many different moulds made for figures which, after all, differ so little in character.

Mr. A. S. Murray writes from the British Museum,—“I can show you in some of our terra cotta here that the front of the figure has been pressed into a mould; you can see in the interior the marks of the fingers of the *keroplastes*, and you can see where he has joined on the clay that forms the back of the figure; the marks of his modelling-stick where he has roughly sketched in the folds of drapery which had to be carried round from the front are obvious enough. We have a mould of the front of a figure and several moulds of faces.”

The figures have apparently all been coloured; the colour is visible on the hair of nearly all of them, and in many parts of the drapery.

Messrs. Bellman & Ivey seem to have arrived at reproducing the effect of the statuettes as they are now, giving touches of colour in the same way, and leaving other parts clay colour. We should have thought it more reasonable to endeavour to reproduce them as they would have been when new, or else to omit the colour altogether, and give the form only; as the reproduction of the actual state has no archaic value in a copy; but it is possible they would have been less generally attractive than by the present treatment.

Part of the interest of these figures arises from their obviously realistic character, and the picture they give of the Greek lady as she looked and dressed. It may be observed that the dress-reforming ladies, who write letters in the papers urging the noble example of Greece in the freedom of woman's dress, are entirely contradicted in their assumptions by these heavily-draped figures, in the costume of which not a suggestion of the "dual skirt" is to be seen.

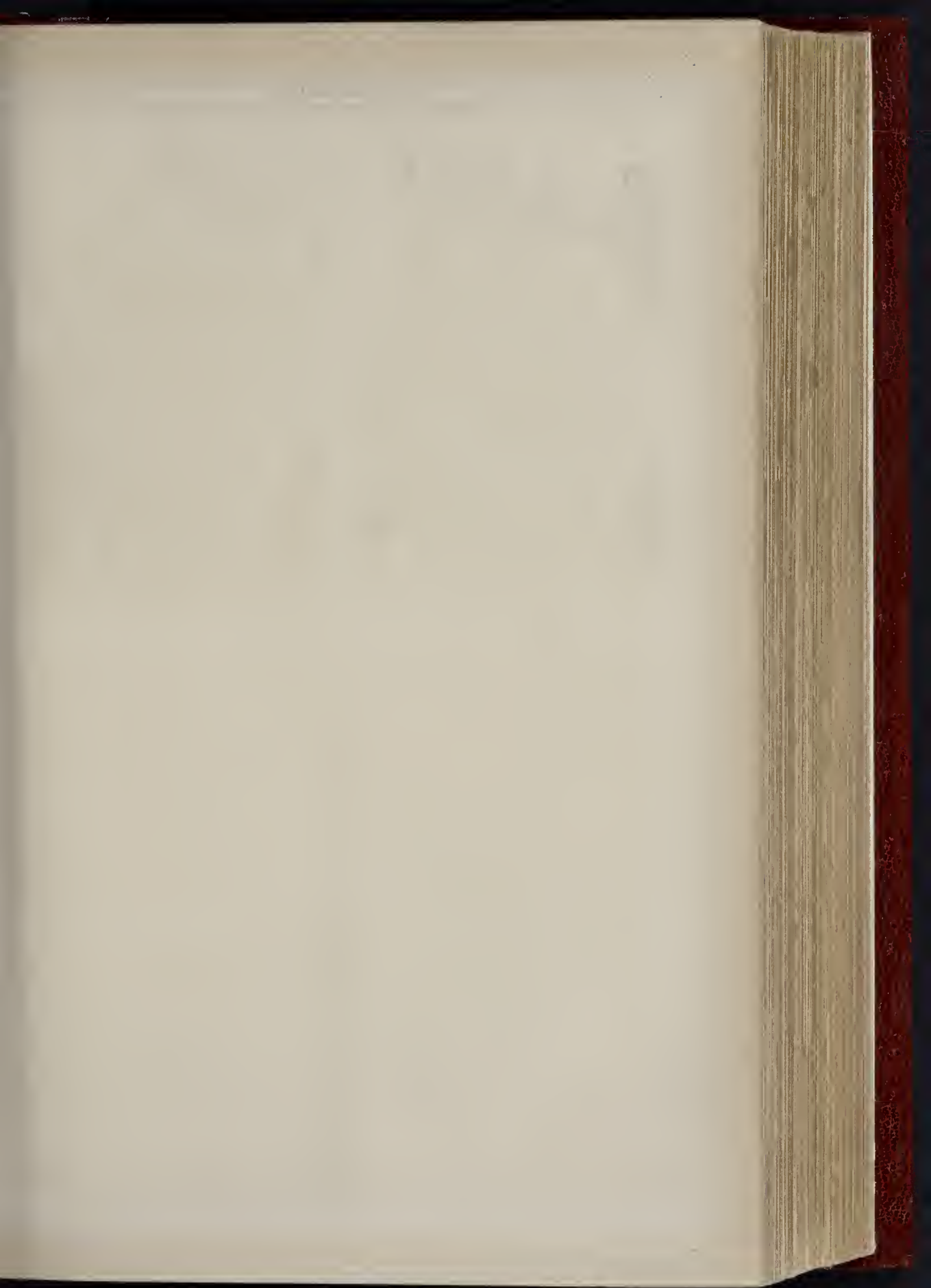
#### DESIGN FOR ASSIZE COURTS.

This design, by Mr. S. B. Russell, gained the Royal Academy Schools Prize for an original design for Law Courts for a small town. The plan is effectively arranged, and has good practical points about it: the witnesses' rooms are, however, inconveniently far from the courts.

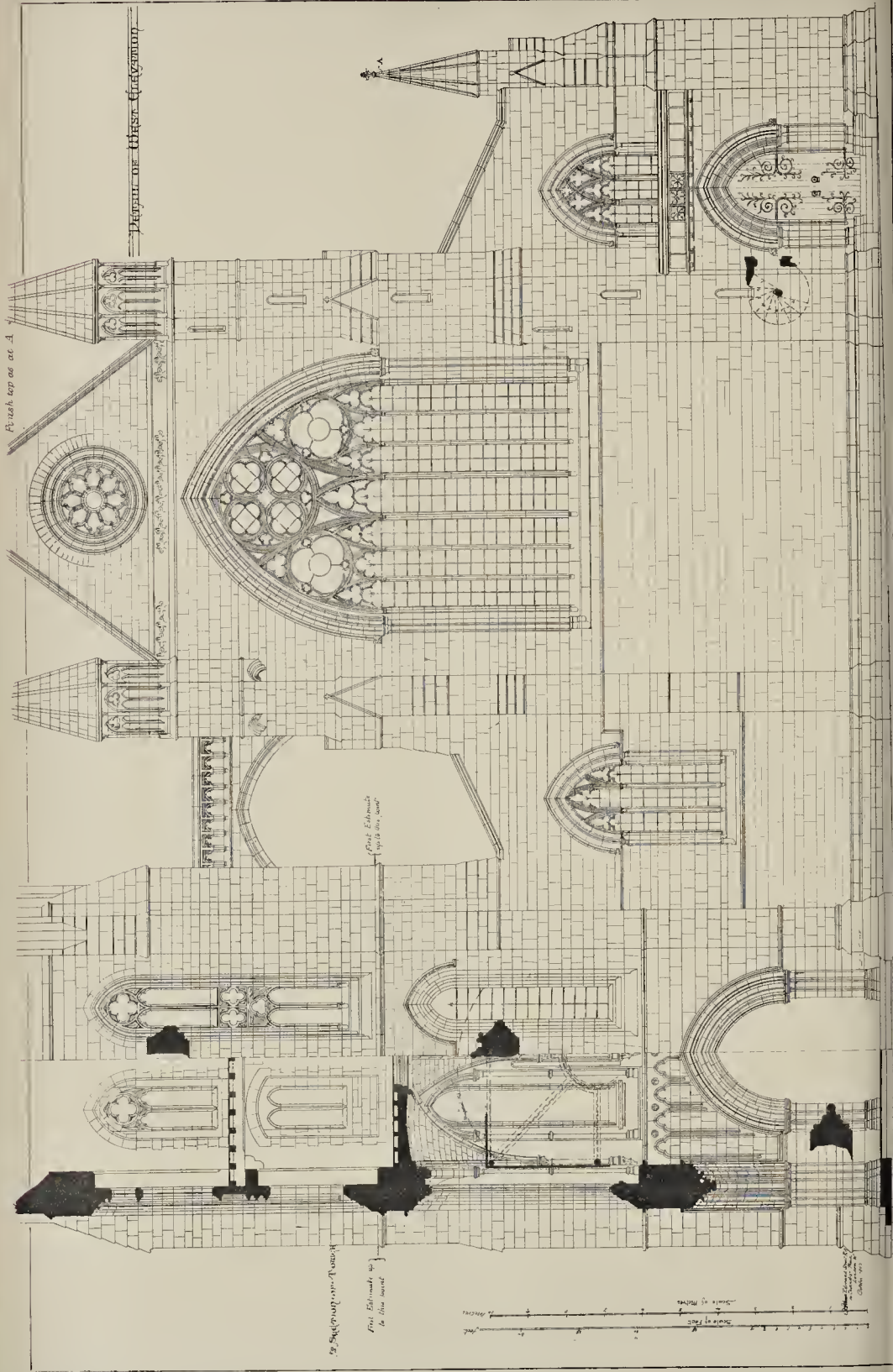
#### AMERICAN CHURCH, PARIS.

We give some more of the working drawings of this building, designed by the late G. E. Street and completed under the direction of his son, Mr. Arthur E. Street, believing that they will be of interest to a good many students and designers of modern Gothic church architecture.

**Northallerton Waterworks**—The Northallerton Urban Sanitary Authority have appointed Mr. A. M. Fowler, C.E., of Manchester, engineer for the preparation of a scheme for supplying the town with water. There were seventy-two applicants.



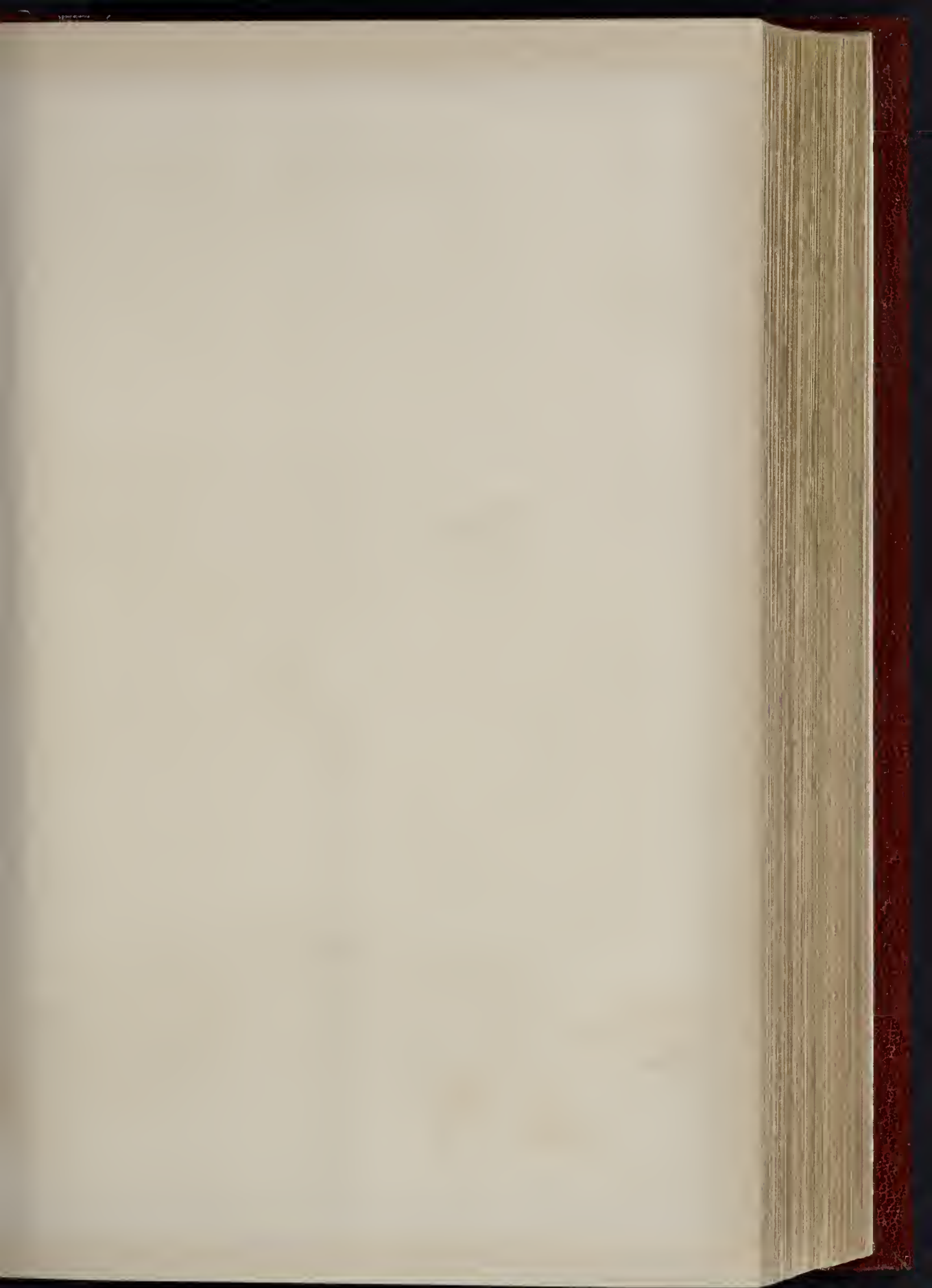
THE BUILDER, JANUARY 22, 1887.



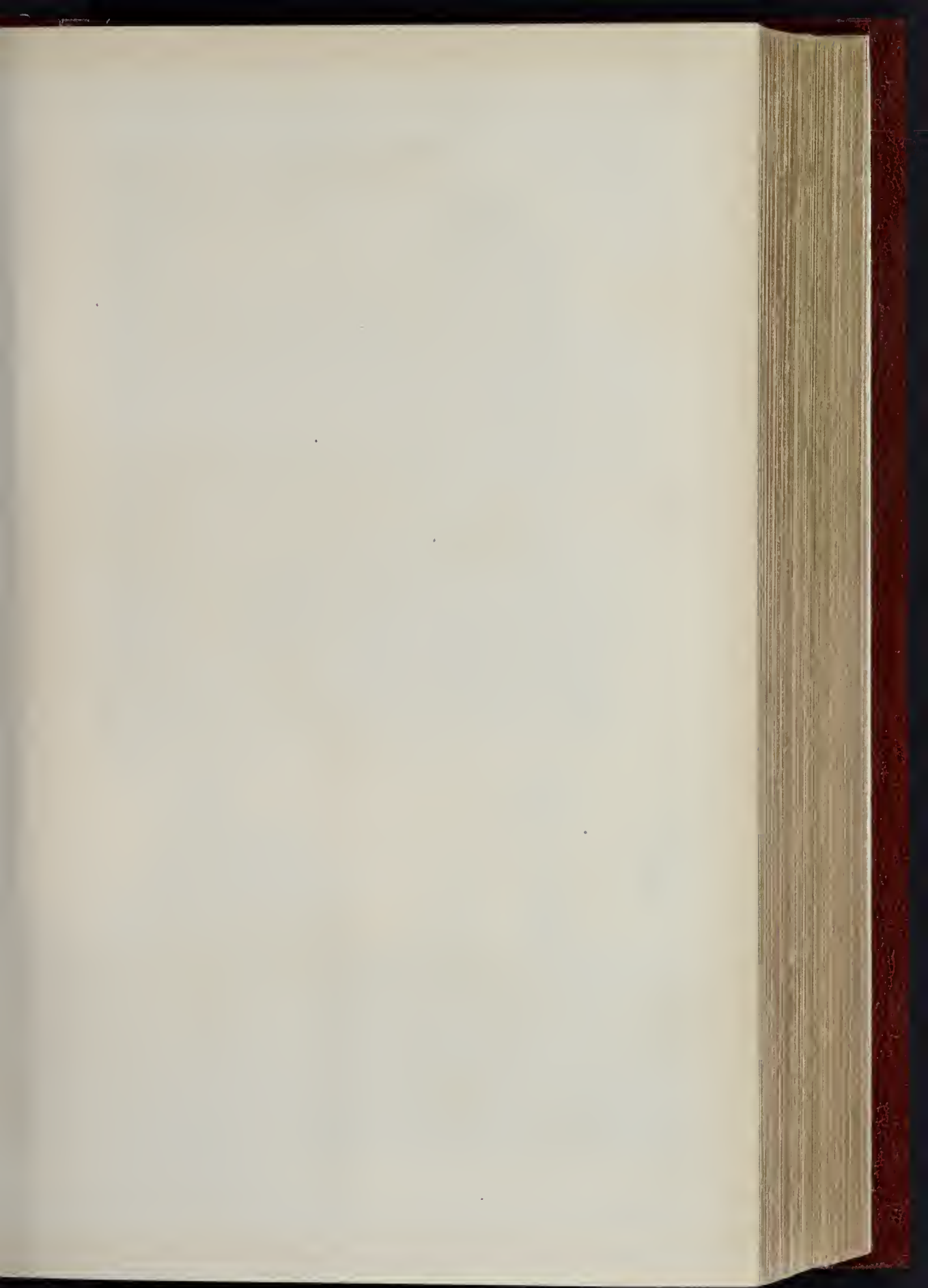
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THE ART CLUB, BOSTON. MR. W. R. EMERSON, ARCHITECT.



SEA SHORE COTTAGE, MANCHESTER, MASSACHUSETTS. MR. ARTHUR LITTLE, ARCHITECT.



TWO SCROLLS. PITTONI.



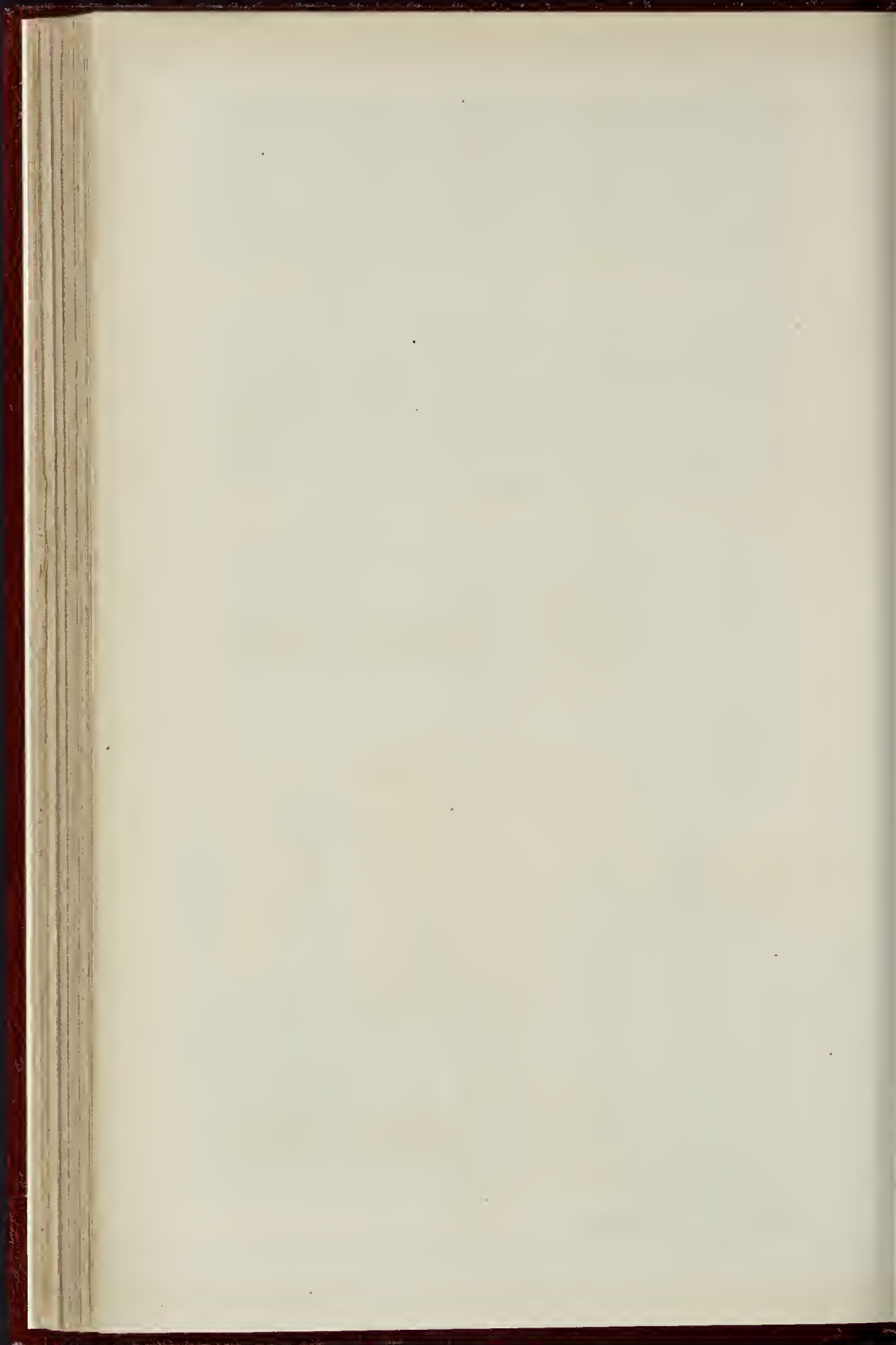
SCROLL. VISSCHER.

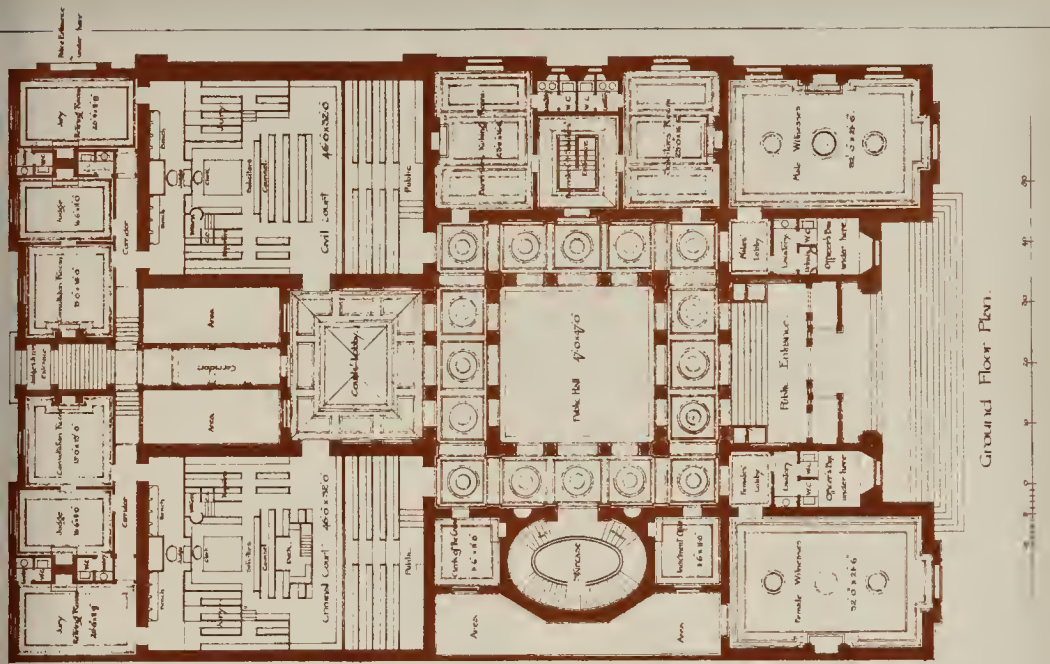


CANDLESTICK. W. JAMITZER, OF MUNICH.



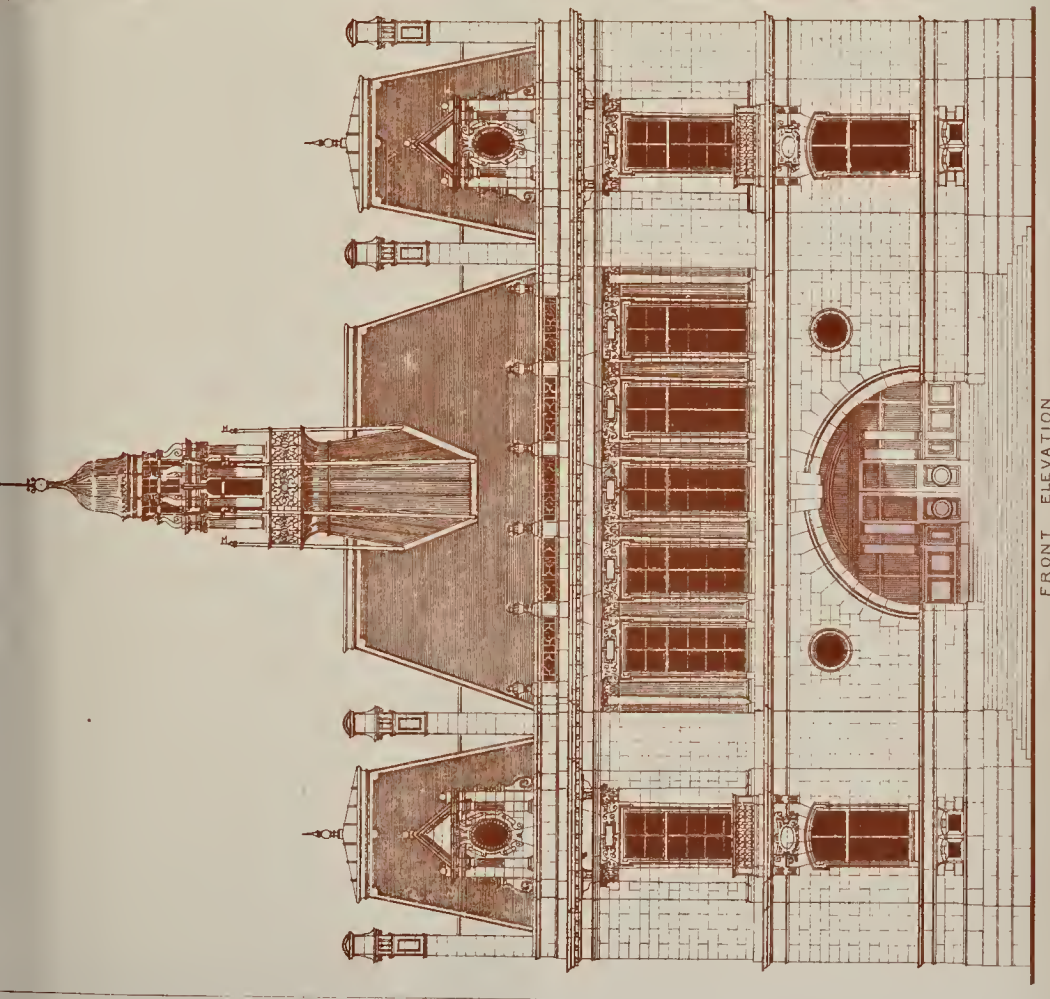
SWORD HANDLE. WOERIOT.





Ground Floor Plan.

PHOTO. LITHO. SPRAGUE & CO. 28, MARTIN LANE, LONDON, E.C.



FRONT ELEVATION

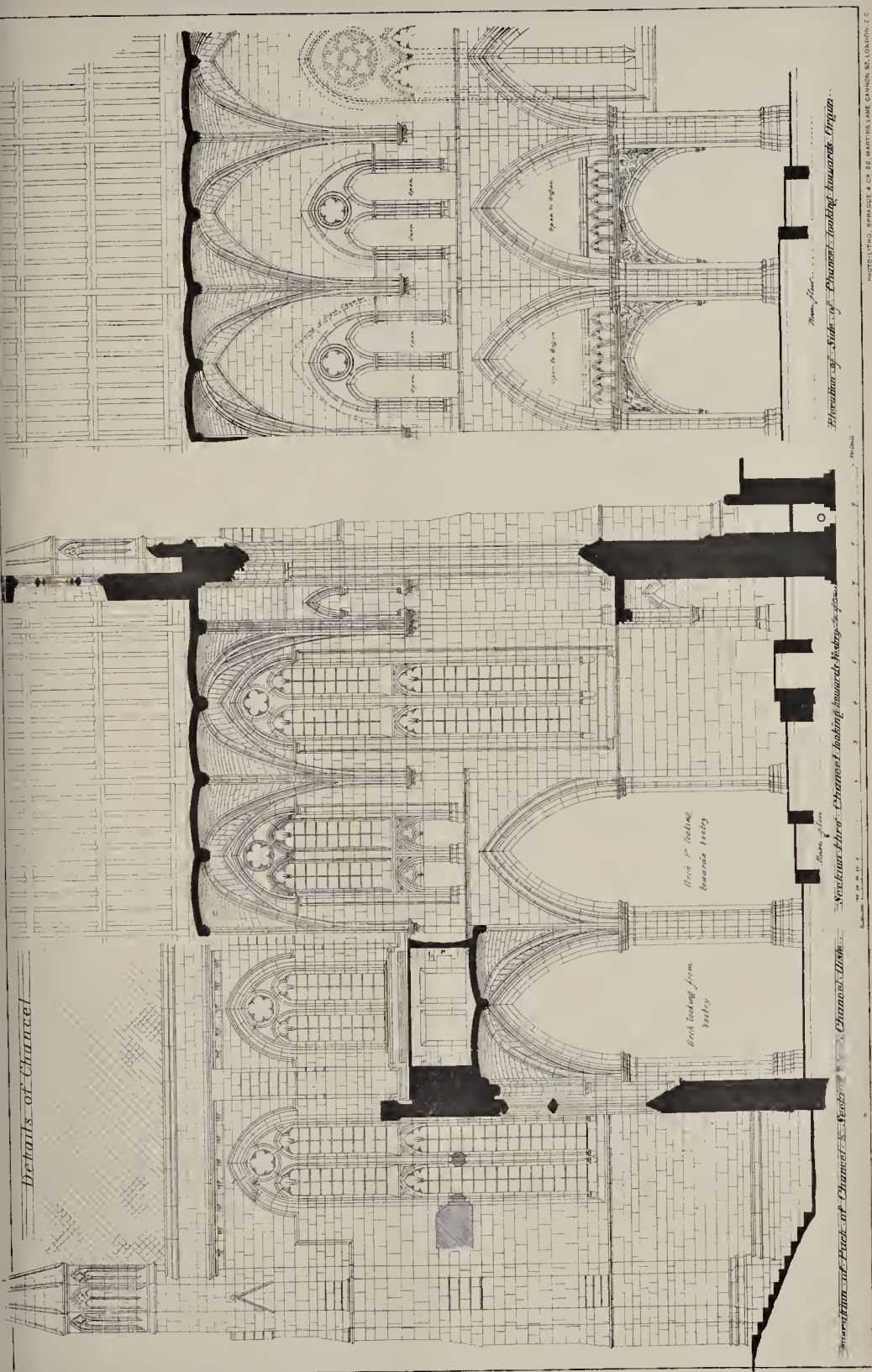
DESIGN FOR ASSIZE COURTS FOR A COUNTRY TOWN.—BY MR. S. B. RUSSELL.

Royal Academy Upper School, Price, 1886.





Details of Chancel



AMERICAN CHURCH, PARIS, (FURTHER DETAILS.)—THE LATE G. E. STREET AND MR. ARTHUR E. STREET, ARCHITECTS.

PHOTOGRAPHED BY E. MARTIN, LANE GANSON, 85, LONDON, E.C.



ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AWARD OF STUDENTSHIPS, MEDALS, AND PRIZES.

The following is the report of the Council on Medals and Prizes, which was submitted to and adopted by the Special General Meeting on Monday evening last,—

*Owen Jones Travelling Studentship.*—Of the eight candidates of varying excellence who have entered for the Owen Jones Studentship this year,—the first year of its award,—Mr. Sydney Vacher has been awarded by the Council the first place. The work he has submitted shows that he has made a diligent study of colour decoration, and with this, as well as a natural love for and appreciation of colour which he seems to possess, he will be enabled to make good use of the opportunities afforded by this Studentship by his own and the general advantage. The Council have placed Mr. Gerald Horsley second, and they have awarded him the Special Prize offered in connexion with this year's Studentship by Mr. G. A. Audsley, namely, a copy of the magnificent work, entitled "The Ornamental Arts of Japan," as a recognition of the excellence of Mr. Horsley's numerous and beautiful drawings.

*Pugin Travelling Studentship.*—Ten candidates have this year submitted drawings for the Pugin Studentship, and the majority have attained a high standard of merit. Many of the pencil drawings especially show unusual clearness and delicacy of touch. The Council consider that the drawings and sketches submitted by Mr. Maclaren are the best, and they have awarded him the Studentship. The Council have placed Mr. Arnold B. Mitchell second, and Mr. E. H. Selby third, recommending that a Medal of Merit should be awarded to each by the Royal Institute. The fourth place has been fairly won by Mr. R. W. Paul, whom the Council recommend for a Certificate of Honour, and whose careful drawings are entirely of English subjects. Before concluding this portion of their Report the Council wish to direct the members' attention to the fact that Mr. Maclaren is a Royal Academy Gold Medallist and the holder of the Foreign Travelling Studentship of that body; while Mr. A. B. Mitchell is the Soane Medallist for last year. The best work which they have submitted for this, the Pugin Studentship, has been executed principally while fulfilling the conditions of travel attached to the prizes they had gained. The Council have consequently adopted a recommendation of the Medals and other Prizes Committee to the effect that, in future, there will be excluded from consideration in the Pugin Studentship all measured drawings and sketches which have obtained either the R.A. Cold Medal or the R.I.B.A. Soane Medallion, or which have been submitted as work done by the R.A. Cold Medallist or the R.I.B.A. Soane Medallist in fulfilment of the conditions of foreign travel attached to the two prizes referred to.

*The Godwin Bursary.*—The Council regret that no applications have been received this year for the Godwin Bursary, founded for the encouragement of the study of works of modern architecture abroad, and one of the requirements of which is that the candidate, who must be a British subject, should know at least one foreign language. The great importance of the subjects for which this Bursary was founded should in itself be sufficient to insure a good competition.

*The Tite Prize (value 30l.).*—The Council have awarded the Tite Prize, for which there are fourteen competitors, to the author of the design (a Classical Church) bearing the device X.P. They have placed the design bearing the device of a triangle in a circle second, and that bearing the motto, "St. Luke," third; and they recommend that the former be awarded a Medal of Merit, and the latter a Certificate of Honour. It is gratifying to the Council to be able to report that so many designs have been submitted for this competition, and that they are characterised by much excellence.

*The Grissell Gold Medal and Ten Guineas.*—Only three designs have been sent in for this Medal, offered annually for the encouragement of the study of Construction. The Council have awarded it to the author of the design bearing the motto "Interested," which is far in advance of the two others as regards a just appreciation of wood construction; and it is one in which the equalisation of strains and the

distribution of pressure appear to have been carefully studied. The sum of ten guineas to be awarded with the Medal is the gift of the Royal Institute, and the Medals and other Prizes Committee have advised the Council to recommend that this sum should be also awarded to the author of this design.

*The Soane Medallion and (under conditions) 50l.*—The Council recommend the award of the Soane Medallion to the author of the design (City Police Courts and Police Station) bearing the motto "Paulatim." Of the seven designs submitted it has the best plan, and its architectural character is good. The Council also recommend that the authors of the designs bearing the mottoes "Broadshire" and "Nene" be each awarded a Certificate of Honour for their architecture.

*The Institute Silver Medal and Ten Guineas (Measured Drawings).*—Five sets of measured drawings have been received, namely:—1. ("Foot-rule"), Stokesay-Castle; 2. ("Honoris"), Gate of Honour, Cambridge; 3. (Manners makyth Mann"), Haddon Hall; 4. ("Opus Amoris"), Gate of Honour, Cambridge; and 5. ("Spes mea"), Oakwell Hall, Bristol. The Council recommend the award of the Institute Silver Medal and Ten Guineas to the author of the drawings bearing the motto, "Foot-rule"; and the award of a Medal of Merit, with five guineas, to the author of the drawings bearing the motto, "Manners makyth Mann."

*The Institute Silver Medal and Twenty-five Guineas (Essays).*—Four essays have been submitted on the subject of "Attached Wall Piers, Pilasters, and Buttresses," bearing respectively the mottoes,—(1), "Expression"; (2), "Evolution"; (3), "Non enim tam auctores, &c."; and (4), "Palma non sine pulvere." Of these the Council recommend that the author of the essay bearing the motto "Evolution" should receive the Silver Medal and the sum of twenty-five guineas. They wish to add that the sub-committee who reported on the essays state in their report that in this essay the theory and construction of problems relating to the subject are well treated; the history of the development of wall-piers and buttresses is carefully traced; and the system of buttressing, both internal and external, has been fully considered.

The following is extracted from the minutes of the special general meeting on Monday evening last, Mr. Edward P. Anson, F.G.S., President, in the chair:—

*The Studentships.*—The Honorary Secretary announced that the Council had awarded the Owen Jones Travelling Studentship for the current year to Sydney Vacher, Associate, and the Special Prize offered in connexion with this Studentship by G. A. Audsley, Fellow, namely, a copy of the "Ornamental Arts of Japan," to Mr. Gerald Horsley, of 1, High-row, Kensington, W. Also that the Council had awarded the Pugin Travelling Studentship for the current year to Mr. Thomas Maclaren, of 27A, Old Bond-street, W. The Hon. Secretary further announced that the Council recommended the award of Medals of Merit to Mr. Arnold Bidlake Mitchell, of 36, Pembury-road, Clapton, E., and Mr. Edgar Harry Selby, whom they had placed second and third respectively; and a Certificate of Honour to Mr. Roland Wilmot Paul, whom they had placed fourth. Whereupon it was resolved that the recommendations be adopted.

*The Tite Prize (value 30l. and a certificate; subject, a Classical Church, to seat 700, without galleries, and on an isolated site).*—The Hon. secretary announced that the Council had, under the terms of the bequest, awarded the Tite Prize to the author of the design bearing the device X.P. [There were fourteen designs sent in.] The name and address of the successful candidate were found to be, Frank W. Simon, 5, Moston-terrace, Edinburg. The hon. secretary further announced that the Council recommended the award of a medal of merit to the author of the design bearing the device of a triangle in circle, and a certificate of honour to the author of the design bearing the motto "St. Luke." Whereupon, the recommendations having been considered, it was resolved that the same be approved and adopted. The names and addresses of these gentlemen were found to be:—John Keppie, 42, St. James-street, Hillhead, Glasgow; and William Stirling, 8, Upper Chadwell-street, E.C.

*The Grissell Gold Medal with Ten Guineas.* (Subject: A roof over a railway station, 100 ft.

by 60 ft., without floor supports; wood construction, without iron ties; central lantern light; height of walls, 40 ft.)—[Three designs submitted.] The Hon. Secretary announced that the Council had, under the terms of the bequest, awarded the Grissell Gold Medal to the author of the design bearing the motto "Interested"; and that they further recommended that the sum of ten guineas offered with the medal should also be awarded. Whereupon it was resolved that the recommendation be adopted. The name and address of this gentleman was found to be:—James Strong, 29, Queen-holdings, Dale-street, Liverpool.

*The Soane Medallion and Fifty Pounds* (Subject, City Police Courts and Police Station, for a provincial town).—The recommendations of the Council respecting the award of the Soane Medallion, and (subject to the usual conditions) the sum of 50l., were:—The Medallion, &c., to "Paulatim," a Certificate of Honour to "Broadshire," a Certificate of Honour to "Nene." [Seven designs submitted.] Whereupon it was resolved that the Soane Medallion, and (subject to the usual conditions) the sum of 50l. be awarded to the author of the design (No. 5) bearing the motto "Paulatim." The name and address of the successful candidate were found to be, Francis Edward Masey, 18, Gordon-street, Gordon-square, W.C. It was further resolved that the remaining recommendations in respect of Nos. 1 and 4 be adopted. The names and addresses of these gentlemen were found to be, Alfred Whitehead, 1, Olluda-place, Bagby-fields, Leeds; and Arthur Sykes, 16, Brnnswick-square, W.C.

*The Silver Medal and Ten Guineas—Drawings* (Measured Drawings of actual Buildings).—The recommendations of the Council respecting the award of the Institute Silver Medal and ten guineas (drawings) were:—The silver medal and 10l. 10s., "Foot-rule"; a medal of merit and 5l. 5s., "Manners makyth Mann." [Five designs submitted.] Whereupon it was resolved that the silver medal and ten guineas for measured drawings be awarded to the author of No. 1, bearing the motto, "Foot-rule," for drawings of Stokesay Castle. The name and address of the successful candidate were found to be James H. Cook, 12, St. George's-crescent, Liverpool. It was further resolved that the remaining recommendation in respect of No. 3, for drawings of Haddon Hall, be adopted. The name and address of the gentleman were found to be Frank Bellis, 6, Abbey-square, Chester.

*The Silver Medal and Twenty-five Guineas* (Essays: subject, Attached Wall Piers, Pilasters, and Buttresses).—The recommendation of the Council respecting the award of the silver medal and twenty-five guineas (essays) was, the silver medal and twenty-five guineas to "Evolution." [There were four competitors.] Whereupon it was resolved that the silver medal and twenty-five guineas be awarded to the author of the essay (No. 2) bearing the motto "Evolution." The name and address of the successful candidate were found to be, R. Elsey Smith, The Knoll, Upper Richmond-road, Putney.

The subjects for medals and other prizes, 1888, were then considered. These we will give next week.

ARTESIAN WATER SUPPLY IN LONDON.

The Commissioners of Sewers for the City of London, actuated by a spirit of resistance to the enhanced charge for water levied by the New River Company, have resolved on an experiment in well-boring. The increased levy on the City by the water company is simply due to the fact that the right is claimed to charge on the annual value, now defined under the Torrens Act to mean rateable value. As the value of property in the City goes up, the sum chargeable on the householder for his water-supply increases *pro rata*, the result being that in the case of large business premises, where little water is consumed, the price of the water actually drawn from the main is about equal to that of beer. The fate of the City, with a decreasing population and an increasing value, is that of consuming less water and paying more for it. Of course there is another side of the question, but this is the one which more especially engages the attention of the Commissioners, and it is on this that their action is founded. There is water in the chalk under the City, and the Commissioners intend seeking

for it with the immediate object of getting a supply for the Artisans' Dwellings which they have erected in Petticoat-square. At that spot a boring is to be made, and the cost is estimated at about 2,100*l.*, including engines, pumps, and buildings, and laying on the services for the supply of the dwellings. The rateable value of the premises to which the water is to be laid on is 2,25*l.* The New River Company make certain extra charges for water-closets, and it is stated that the present cost of the supply is about 100*l.* per annum. As the proposed artesian well will not be exactly what the name implies, but will require the aid of a pump worked by engine-power, it is not clear that the Commissioners will gain any immediate pecuniary advantage by their enterprise. But their object lies farther ahead, and they are going on in the avowed hope that the experiment will be "of considerable value in determining the mode of proceeding best calculated to advance the Commissioners' efforts towards providing the citizens with a cheaper supply of water."

The first thing is to get the water, and we will pass by for the present certain considerations as to what may best be done with it when obtained. Deep wells are not new things in the City, and of this the Commissioners are aware. There is a well of this kind at the Bank of England, sunk in 1851, and the Commissioners have been informed by the authorities of the Bank as to its character. It enters the chalk at a depth of about 230 feet from the surface, and descends into that stratum to a further depth of 100 ft. For several years the supply yielded by the well was good and plentiful, but more recently the supply has been less satisfactory, and the cause of the change has not been ascertained. On data furnished in respect of this and other wells the Commissioners expect to reach the chalk at a depth of between 200 and 300 ft. from the surface. The subject has been carefully gone into by Mr. J. Voce Moore, the Chairman of the Commission, who has collected a mass of information on the subject, which has materially assisted the Commissioners in deciding as to the course they shall pursue. Concerning the well sunk by Mr. De Keyser at his hotel at the eastern end of the Victoria Embankment, it appears that the flow of water is large, although the well is not so deep as that at the Bank of England, and the water itself is softer than that generally obtained from the chalk.

Few persons, perhaps, are aware of the extent of the supply drawn from the chalk in the metropolitan area, independently of the water companies. A single firm of engineers, Messrs. Tilley & Son, of Walbrook, have sunk or bored more than fifty wells into the chalk in London. These operations have extended over a long series of years, but one of the latest examples is that of a deep well just finished at the Grosvenor Hotel, where the yield amounts to about 30,000 gallons per day. It is said that where the consumption is not less than 10,000 gallons per day, it is cheaper to take water from a deep well than to take a supply from a company. For small works gas engines are generally employed to actuate the pumps. We have heard of a brewer at Chelsea who reckons that he saves 600*l.* per annum by having his supply from a well, the cost of which was only 1,000*l.* Most of the metropolitan workhouses have wells in the chalk, and the supply to the prisons is generally obtained in the same manner. Government offices, clubs, and public baths come into the same category. But the grand principle at stake is, that the water companies monopolise the right of selling water. Anybody may supply himself, but if he attempts anything more he will be entering on debatable ground, bristling with litigation. If it is possible to dislodge the companies from the position they claim, the City Commissioners will do it. But the hydro-geological facts are not altogether in favour of the Commissioners. Apparently there is no hope of finding the lower greensand under London, and the chalk itself is so compressed under the superincumbent strata that its efficiency as a water-bearing stratum is diminished. Another circumstance is that the level of the water in the chalk wells of London suffers a gradual decline. The Rivers Pollution Commission of 1853 in reporting on the domestic water-supply of Great Britain, expressed their opinion that "the strata beneath London would not be found to be an available source for any important part of the metropolitan water-supply." That chalk wells in the metropolis

are nevertheless useful is a matter of daily experience, and the City Commissioners can hardly fail to meet with some measure of success in the task they have undertaken.

#### THE UNITED ARTS CLUB.

THE inaugural dinner of the United Arts Club, which has been formed for the accommodation of architects, painters, sculptors, and engineers, was held at the Club-house, 27, Dover-street, Piccadilly, on Wednesday evening last. The President of the Club, Mr. E. P. Anson, President of the Royal Institute of British Architects, was in the chair, and he was supported by three of the Vice-Presidents (Mr. Lewis H. Isaacs, M.P., Professor Kerr, and Mr. Edmund Woodthorpe), as well as by several members of the committee and a representative body of the members at large, it having been deemed desirable to limit the number of guests rather than to hold the dinner off the club premises.

The Chairman having in felicitous and graceful terms proposed "The Health of the Queen," Mr. Lewis H. Isaacs, M.P., proposed "Success to the United Arts Club," in a very appropriate and well-turned speech. He spoke of the difficulty of election to the Athenaeum Club even by candidates of eminence and great attainments; and of the fulness to repletion of the Arts Club and the Hophart Club (the latter being for painters only). Upon these grounds he thought there was ample room for the United Arts Club, and that there were good reasons for congratulating the members on the good auspices under which they had succeeded in obtaining. The opportunities of social intercourse which the Club would afford between senior and junior members of the architectural profession, and between them and painters, sculptors, and architects, could not but be promotive of great good, and he felt warranted in believing that, if judiciously managed, the Club would grow in strength and usefulness. He therefore heartily wished "Success to the Club," and begged to couple with the toast the name of Mr. Robert Walker, who had been most active and zealous in promoting the successful starting of the Club. The toast was very heartily received.

Mr. Robert Walker, in replying, dwelt on the advantages which the Club was capable of offering to the members of the several professions for whom it was intended. Members meeting in common under its roof would get to know each other better, the asperities and misunderstandings incident to professional work would be softened down or explained away, and the disadvantages attendant upon the inevitably increasing tendency of the age towards specialism in the professions would, by means of free and pleasant intercourse between specialists in various walks of professional life, meet with a corrective. All would meet there on the broad ground of art, and the members would be pleasantly but wholesomely reminded that the profession of architecture, or of art or engineering, was a wider and grander thing than they might be sometimes apt to think it when their view was honed and limited by the work of their own offices or studios. Another way in which the Club might be of advantage to the professions would be to appoint, by-and-by, a competent standing committee to watch the progress of legislative and other proposals likely to in any way affect the interests of art or of the members of the artistic professions. In these and various other ways *esprit de corps* among professional men would be promoted.

Professor Kerr, in proposing the health of the President, alluded in graceful and well-merited terms to the professional and social fitness of Mr. P. Anson to be the President of the Club. Mr. H. R. Gough proposed "The Vice-Presidents," coupled with the name of Mr. Edmund Woodthorpe, who made a characteristically humorous reply.

Mr. H. L. Florence proposed the last toast, "The Honorary Secretary, Mr. A. L. L. Forrester," to whose untiring labours, he said, it was mainly due that the Club had been started on such a satisfactory basis.

Mr. Forrester briefly replied, and the formal part of the proceedings terminated.

We may add that the club-house, No. 27, Dover-street, is well adapted for the purpose,

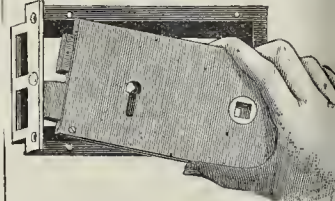
and its proximity to the Royal Academy of Arts and the Royal Institute of British Architects will make it particularly convenient for members of those institutions. The Club will also be found to be of great advantage to gentlemen practising in the country who occasionally visit London. The premises contain dining-rooms, reading, writing, billiard, card, and smoking rooms, and are fitted with telephone and telegraphic tape, &c. The reading-room will be supplied with the usual papers and periodicals, including the professional journals, and it is proposed to form a reference library as soon as possible. Bedroom accommodation for the members has also been arranged for. Three hundred members have already been elected, and the committee propose to admit 200 more, without entrance-fee, at an annual subscription of three guineas for town, and two guineas for country members, after which the subscription will be raised.

We wish the Club every success.

#### A REVERSIBLE RIM-LOCK.

MR. JAMES HILL sends us a simple and very ingenious lock which he has contrived to act as either a left-hand or right-hand, left reverse or right reverse lock; the same lock can be used in all four positions, thus getting rid of all the difficulty about selecting and supplying right or left hand locks of this pattern. The four variations of "hands" are obtained, as may be understood on reference to the accompanying cut, by separating the body of the lock from the frame and by having latch and locking bolts the same size.

The illustration represents a left-hand lock, but it can be instantly converted to a right-hand by reversing the latch bolt (when out of the frame) and turning the lock right over. The "reverse bevels," for doors opening inwards, are obtained by simply turning the latch-bolt the reverse way round.



A lock which adapts itself to every door is a great boon to buyers at home, but must be a still greater boon to those abroad, because the "hands" are seldom known when requisitions are sent home: hence the doors have either to be hung to suit the locks, or the locks have to be fixed upside down!

The question of "hands" for locks has long been an international puzzle. On the Continent, in the colonies, and in America, what we term "lefts" are known as "rights"; and even at home the trade is constantly at variance in the matter of hands.

Mr. Hill's lock obviates all these difficulties. We have examined a specimen of the lock, which is perfectly simple in its working, and appears a really good and useful invention.

**The Last of the Kensington Exhibition Building.**—By order of the Royal Commission, the sale of the materials comprising the galleries, courts, annexes, and other structures lately used for the Colonial and Indian, Inventions, Health, and Fisheries Exhibitions at South Kensington was begun by public auction under the hammer of Messrs. Horne, Son, & Eversfield, within the Exhibition, on Wednesday last. The catalogue, which is very lengthy, comprises upwards of 823 lots. The chief items under notice on the first day were the Old London Street, and the Indian Palace, Durban Hall, and the Prince of Wales's Pavilion. The Old London Street was put up in eight lots. Mr. Humphreys, Knightsbridge, securing the entire block for a total sum of 160*l.* 15*s.* The brickwork forming the Indian Palace was sold to Mr. W. Linsley for 25*l.*, while the Durban Hall found a purchaser in Mr. Sharpe for 51*l.* The Indian or Prince of Wales's Pavilion fell to the bid of Mr. Martin for 30*l.*, and the Nats Tea-room was secured by Mr. Humphreys for the low figure of 8*l.* 10*s.*

A NEW METHOD OF STREET-PAVING.

OUR attention has been called to some improvements in street-paving which are the subject of a patent taken out by Mr. William White, of Abergavenny, well-known for his "Hygeian-Rock Building Composition," a material which is proposed to be used by the patentee for paving in lieu of asphalt, or in combination with granite, wood, or other materials in the manner hereafter explained. Or these materials may be used in conjunction with asphalt, the patent being applicable to the method rather than to the material used. The main object of the invention, which is applicable to footpath or roadway pavements, is to facilitate the laying-down and taking-up of the pavements, as well as to obtain a good foothold and to reduce cost. We cannot do better than quote the inventor's description of the mode of procedure:—

"I make a flat block of cement concrete, of a square, oblong, or other shape, and of any suitable dimensions. Through this block I form several apertures, larger on the one face than on the other, of a dovetailed shape. [The lower part of fig. 1

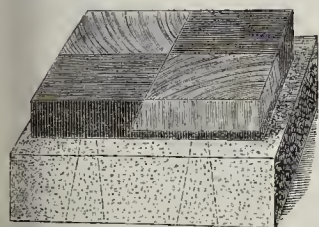


Fig. 1.

shows one of these blocks, with the conical apertures indicated by broken lines.] I then make a mould slightly smaller than, but similar in plan to, this block, and of a suitable depth. The concrete block is laid with the larger parts of the apertures uppermost, through which I pour into the mould, in a liquid state, the Hygeian Rock composition, or any kind of asphalt. The compound block, when set, can be removed from the mould, and the two parts will be firmly attached together. To provide a foothold, the upper surface of the mould can be ribbed, grooved, or otherwise [as shown in fig. 2,

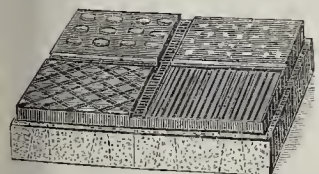


Fig. 2.

which shows four of the said concrete blocks, with their covering of composition or asphalt, the one at the top right-hand corner showing granite chippings embedded in the surface], so that the imprint is left on the face of the pavement slab. On a good foundation, I lay a layer of sand or fine ashes, duly levelled. I place the slabs, bringing the concrete part of the blocks close together, but as the asphalt or composition part of each block is smaller in plan than the concrete part, a series of grooves is formed, into which I pour composition or asphalt, which binds them firmly together, producing perfectly impervious pavements. For footways I propose that the surface shall be ribbed or corrugated, and laid with a fall to the roadway, thus forming a series of small open drains to run the water into the gutter, thus keeping the pavement clear of water, &c., and giving a pleasant foothold. When it is necessary to take up and relay, or repairs to drains or pipes, &c., or to replace new slabs, the joint or groove can be cut out and easily removed. If required, the composition can be taken off, and the same slab can be replaced again. A combination may be made of wood and composition (see fig. 1); this also would be impervious. Pavements on this principle will only take hours to lay, whereas the present system takes days. The work can be done in sections, and the blocks prepared in the yard or workshop, and brought ready for laying, instead of making the street the workshop, and blocking the roadways. The blocks can be made any size, shape, or thickness; 14-in. concrete block faced with 3-in. composition would be sufficient for footways. Thicker ones would be required for roadways."

It should be added that the detached concrete blocks in the figures are laid on, but are not cemented or attached to, a firm and smooth

foundation-bed of concrete, such as is already used beneath asphalt and wood pavements of the ordinary type. The blocks are laid as shown, with butt-joints, but they are not cemented together, the asphalt or composition above, however, being continuous. The great merit of the invention seems to be that by its use a street could be re-paved in sections of a few yards in length night by night until completed, without interruption to the ordinary traffic. If the concrete blocks are evenly bedded, so as to prevent rupture of the connecting strips of asphalt or composition which are put in *in situ*, the pavement will remain impervious,—a very desirable thing both from constructive and sanitary considerations. Whether the new method of paving will answer all the expectations of its inventor (as we hope it may) experience of its use alone can show.

ARCHITECTURAL SOCIETIES.

**Birmingham Architectural Association.**—The fifth ordinary meeting of the current session was held at Queen's College on Tuesday evening last. The Vice-President (Mr. John Cotton) was in the chair. A paper was read by Mr. Whitworth Wallis on the "Streets, Shops, Houses, and Baths of Pompeii." The lecture was illustrated with some fine lantern views, and exhibited very clearly the characteristic peculiarities of Pompeian art and architecture. A vote of thanks, proposed by Mr. J. Cossins, accepted by Mr. Hanman, and supported by Messrs. J. Cotton, T. W. F. Newton, and Victor Scoulen (hon. secretary), was unanimously accorded to the lecturer for his able paper.

**Manchester Architectural Association.**—At the ordinary fortnightly meeting of this Association, held on the 11th inst., at the Diocesan Buildings, Mr. W. Parry in the chair, Mr. W. H. Littlewood, A.R.I.B.A., read a paper entitled "Recollections of a Tour in Italy," illustrated by photographs and water-colour sketches. The Cathedral of Milan, he said, is supposed to be the largest church in Europe after St. Peter's at Rome. It was commenced in 1386, and is not yet finished. An important competition is being contemplated at the present time for restoring some portions of it. The interior is grand by its simplicity and absence of ornament. In Venice, the most noteworthy place is the Piazza de San Marco, with the arcades surrounding it on three sides, and St. Mark's, with its towering campanile. The undulating floor of this building has often been under discussion, the late Mr. Street being under the impression that this was symbolical, and designed to represent the waves of the sea, but there can be little doubt that Signor Saccardo's theory is the correct one, viz., that the depressions arise from the settling down of the *débris* used in filling up the crypt, which formerly existed under the structure, the old piers having been left in, thereby preventing any settlement where they occur. The Loggiatta at the base of the Campanile is a fine piece of architecture, by Sansovino, and is now used as an auction-room and office for the sale of lottery tickets. After St. Mark's Square, perhaps the Piazzetta is the most important, flanked on the left by the Doge's Palace, and on the right by the Library, which forms a portion of the Royal Palace. In Rome, it might be noticed that what was characteristic in the costumes of the people was passing away. This is rapidly becoming the same all over Europe. St. Peter's takes precedence of all other churches in Europe, both in its architectural beauty\* and size, as will appear from the following dimensions (comparative lengths marked on the floor):—St. Peter's, 609 ft. in length; St. Paul's, London, 521 ft.; Milan Cathedral, 439 ft.; St. Paul's, Rome, 415 ft.; St. Sophia, Constantinople, 356 ft. Mr. Littlewood then described the principal features of the Vatican, Pantheon, Temple of Vesta, and the Colosseum, and concluded by detailing the chief objects of interest in Naples, giving a very interesting description of Pompeii.

**Edinburgh Architectural Association.**—At the last meeting of this Association, held in the Professional Hall, 20, George-street, the President, Mr. Hippolyte J. Blanc, occupied the chair. After the usual preliminary business was disposed of, a paper on "Ancient Medieval and Modern Locks and Keys" was read by Mr.

Harry W. Chubb, A.M.I.C.E. The interesting ethnological comparisons supplied by the discoveries of keys of similar shape and use in ages and countries far apart were first referred to. The paper then described the growth of the rudimentary lock, which was actuated by a sickle-shaped key, tracing its origin from the plain bar sliding in staples. Further development was stated to have resulted in the Egyptian lock, the sliding bar appearing in this lock, but in a hollow form, the means of retention when in its locked position being afforded by pins, which dropped into it from its staple when shot home. A lock of this kind is indicated on the wall sculptures of the Temple of Karnac, and is in use in Egypt at the present day. The wooden locks of the northern isles were shown to be analogous to the Egyptian locks. It is in the Roman locks that traces of the system of "warding" first appeared, combined also with the falling pins already alluded to. Seven varieties of Roman keys attached to finger-rings were exhibited in diagrams, and it was pointed out that in one of these the barrel was bored through from end to end, thus allowing accumulated dust to be pushed out. *Après* of this, it was curious to note that within recent years four patentees had applied for protection of the same idea in England. Padlocks were treated as forming a distinct branch, and being specially connected with travel, the English kinds had become widely distributed. The same mechanical arrangement that was used in the Roman padlock was seen at the present day in those of China. The absence of any distinctive Byzantine locks and keys was commented upon, and the gradual growth of ornament upon this form of metal was sketched from the beginning of the twelfth century, as it advanced through the various developments of the Pointed style. The various stages of this advance were illustrated by crayon drawings, in which all the details were artistically elaborated, together with those of the Transitional and Renaissance periods. Up to the commencement of the present century the only security attained was by complex systems of "warding," excepting the still well-known puzzle padlock, which was probably invented in the earlier part of the seventeenth century. The state of perfection of modern knowledge and practice in lock-making was briefly touched upon, special reference being made to locks not commonly known in England. A Chubb lock was exhibited, which showed that a variation of only the two-hundredth part of an inch in one of the steps of the key was sufficient to render the key useless. At the close of the paper a vote of thanks was awarded Mr. Chubb for his paper, and also to Mr. C. S. Wimbush for the drawings with which it was illustrated.

OBITUARY.

**Mr. George Bell, F.R.I.B.A.**—The death of Mr. George Bell, F.R.I.B.A., of Glasgow, was announced by the Secretary of the Royal Institute of British Architects at the special general meeting of that body on Monday evening last.

**Sir Francis Bolton, R.E.**—The death was recently announced of Col. Sir Francis Bolton, R.E. He was born in 1831. In 1868, in consideration of special military scientific service, he was given an unattached majority. He retired in 1881 with the rank of colonel. Sir Francis was the inventor of the system of telegraphic and visual signalling which was introduced into the Army and Navy in 1863. For these services and other improvements and inventions in regard to warlike material the Queen, in 1883, conferred upon him the honour of knighthood. Sir Francis, who was a civil engineer, founded, in 1870, the Society of Telegraph-Engineers and Electricians. Since 1871 he had been Water Examiner under the Metropolitan Water Act. His recent services in connexion with the South Kensington exhibitions will be fresh in the memory of the public, especially his direction of the illuminated fountains.

**Mr. Stephen Tucker, F.S.A., Somerset Herald,** died at his residence in the Albany, Piccadilly, on the 6th inst. Mr. Tucker, who was in the fifty-second year of his age, was the youngest son of the late Mr. Edward Tucker, of King's Nympston, Devon. Having previously held the office of Rouge Croix Pursuivant, he was appointed Somerset Herald in the year 1880 in succession to the late Mr. J. R. Planché.

\* We need hardly say that we entirely dissent from this opinion, which does not say much for Mr. Littlewood's judgment as a critic of "architectural beauty."—Ed.

## CEMENT TESTS.

SIR,—In your issue of the 8th inst. you give in "Notes" [p. 74] a summary of the results of the tests and examination of German cement made during the last year by the German Cement Makers' Association.

The information is of great value to the cement industry and to all interested in the subject in this country, but I am sure I am not singular when I say that we who are interested in the industry here feel a little jealous, not to say nettled, at having the quality of German cements put before us in such a lucid and clear manner, while the successes of our own manufacturers and the quality of the cement manufactured by them is more or less ignored.

This is, no doubt, the manufacturers' own fault, for, not having a trade association, they are unable to lay the result of tests before users and buyers here. I am, however, to a limited extent in a position to give such information as will place the English manufacturer on his proper footing, and I trust, therefore, you will find room in your columns for this letter.

The following is a short summary of results from my testing hooks for the year ending December 1886. It must, however, not be forgotten that many of the cements are sent to me for testing because, in some way or another, they have not complied with the terms of a specification, and may therefore be considered more or less damaged, and it would therefore be manifestly unfair to take the lowest results obtained as an indication of the quality of the manufacture of the country. The results given are from about 250 samples representing a bulk of, perhaps, one to two hundred thousand tons.

Fineness of grinding, taken on a sieve having 4,900 holes to the square inch. The sample having the greatest fineness left a residue of only 1 per cent., and 16 per cent. of the samples left less than 10 per cent. residue, while the coarsest left 29 per cent.

The time of setting varied from three-quarters of an hour to 24 hours; but only about 3 per cent. of the samples took more than 12 hours to set, the usual time being from 1 to 5 hours.

The greatest tensile strength shown by any sample on an average of five briquettes was:—

At seven days from gauging ..... 706 lb.  
At twenty-eight days from gauging... 850 lb.

And the highest individual briquette at twenty-eight days broke at 890 lb. Ignoring these cements that were absolutely damaged, the lowest results were:—

At seven days from gauging ..... 352 lb.  
At twenty-eight days from gauging... 399 lb.

The average strength of the whole being:—

At seven days from gauging ..... 468 lb.  
At twenty-eight days from gauging... 508 lb.

Comparing these with the German results, the German highest at twenty-eight days was only 702 lb., not equal to the English highest at seven days; and the lowest English at seven days is 30 lb. higher than the German lowest at twenty-eight days.

The results obtained with the sand test, i.e., briquettes gauged of one part cement to three of standard sand, was, at twenty-eight days from gauging, average of ten briquettes in each case:—

The highest ..... 806 lb.  
The lowest ..... 139 lb.  
Average of the whole ..... 231 lb.

While the highest individual briquette broke at 330 lb., as compared with the German highest 333 lb., and their lowest 94½ lb.

The cement in my testing room is all gauged in a machine which allows of the minimum amount of water being used, and which greatly expedites the process, but it is rammed into the moulds by hand, the moulds being formed in nests of five, and the strain is applied to the briquette when being tested at the uniform rate of 100 lb. per fifteen seconds, i.e., 400 lb. per minute.

With respect to the matter of adulteration, which it seems our neighbours think it necessary to allude to, I should like to say that I have never yet met with an adulterated sample of English cement.

HENRY FAIR, M. Inst. C.E.

4, Great Queen-street, Westminster,  
January 11, 1887.

**Tunbridge Wells.**—It is proposed to build a campanile and form a reading-room to St. Augustine's Church, Tunbridge Wells. Mr. Brett A. Elphicke, architect, is preparing the design.

## TAXATION OF CHIMNEYS AND SMOKE PURIFICATION.

SIR,—A few years ago a paragraph in the newspapers gave an account of a new system of smoke purification which had been adopted at a factory in one of the North of England manufacturing towns. The method of treatment was to conduct the smoke into a chamber, where revolving paddle-wheels dipping slightly under the surface of water in a tank threw up a constant cloud of spray, which washed all the impurities out of the smoke, the spent air from the furnace then passing up the flue in the usual manner. The report affirmed that the purification was entirely successful, did not cost much, and hinted at a saleable product from the "lamp black" washed out of the smoke. Reports of new ventures of this kind are apt to be optimistic, but assuming a fair measure of success in this attempt to deal with the smoke nuisance, we might reasonably have expected to have heard more about it. Possibly it was nobody's business to make the matter known, and no special economy to manufacturers generally to adopt the system. The general advantage of a purer atmosphere does not count much with the average smoke-producer, as against his personal trouble and expense in preventing impurities. Hitherto the attempt to secure purer air in towns has taken the shape of an appeal to the smoke-producer to reduce his coal output by "smoke-consuming" grates and furnaces which give the greatest possible heat with the smallest amount of smoke. This has not been successful. The smoke nuisance is worse than ever. The great increase of the "block" system of houses, both for residences and offices, all over London, is one reason for increased smoke. The domestic fire is not smokeless. The tall "model" dwellings and "mansions," or "chambers," where every two or three rooms are a separate household, usually mean about three times the number of fires and smoky chimneys to the same superficial space as compared with the smaller houses of former years. Practically very little, if anything, can be done by means of improved fireplaces to prevent smoke. There remains the alternative to wash the smoke, as has been suggested above. Smoke purification is now much more practicable than formerly. The very increase of block dwellings that has caused an increase in the smoke nuisance makes smoke purification comparatively easy. The roofs are mostly flat, and their numerous chimneys are close together. Some hundreds of chimneys could easily be conducted into one central smoke-chamber on the roof and purified. In the same way those streets of houses all wall to wall, and exactly the same height, would be treated. In the case of the factory referred to it was found that the purifying paddle-wheels could be made to regulate the draught at the furnace. In applying the purifier to domestic blocks and hotels, therefore, its good effects would be useful in preventing smoke in the rooms as well as smuts in the streets.

The next question that arises is how are people to be made to purify their smoke? To secure the public benefit of a cleanly atmosphere it is out of place to try and get it indirectly by a bribe of a smaller bill for coals. The public, as represented by the authorities, have no concern with the amount, large or small, of any one's coal account. They are concerned with civic comfort and cleanliness. It is not the creation of smoke in a fireplace, but its liberation into the air, that has to be taken notice of. The best notice to take of it is simply to tax every smoky chimney; that is, every chimney, domestic or manufacturing, that simply conducts the smoke from the fire and delivers it into the air without purification. Some standard of purity must be determined upon. To do this, as well as for the general purposes of legislation on the subject, a number of experiments must be made to ascertain the conditions under which a general smoke purification is reasonably possible. Perhaps this initial work may have to be done by some unofficial body, such as the National Health Society. It might even be worth while for some enterprising landlord or "Dwellings Company" to do it as an inducement to tenants. They could then tempt tenants with the offer of "splendid roof gardens and skittle grounds; no smoke; special facilities for children's playgrounds; and the cleanly drying of clothes." In any case it must be demonstrated that a general

purification of smoke is fairly practicable. Then tax every smoky chimney and grant exemption to all who purify their smoke up to a required standard. The tax should be heavy enough to make purification and consequent exemption the preferable alternative. The sum need not be much per fireplace or chimney to secure this. The result would likely be the gradual adoption of purification by all hotels, Dwellings Companies, and large owners of house property in general, with great advantage to the cleanliness of city life.

D. McE.

## "SANITARY INSTITUTE OF GREAT BRITAIN EXAMINATIONS."

SIR,—I think your correspondent, "J. A. A.," in your issue of the 8th inst. [p. 100], attaches altogether too much value to the certificates, or "diplomas," of the Sanitary Institute of Great Britain when he imagines that local authorities, in the choice of a surveyor, would be likely to be influenced by the candidate being possessed of one, or otherwise. There are probably few local authorities in the country who know anything about that body, if they have as much as heard of its existence; and when they find that a certificate of "competency to perform the duties of a local surveyor" is awarded, as "J. A. A." so aptly remarks, to "any young man who possesses, as evidenced solely by his answers to a given number of questions, a fair knowledge of municipal law and sanitary engineering, as extracted from books, . . . notwithstanding the absence of proof, or, may be, with proof to the contrary, of even a day's experience in the actual work of a surveyor's office," and that "he may be unable to use a level or theodolite, make a survey, or get out a drawing, may never have seen a sewer laid, nor appreciate the importance of 'girt' in mortar"; in fact, in office parlance, not know how to draw to a straight line; utterly ignorant of the preparation of specifications, estimates, and reports, measuring-up and valuation of works; maintenance of highways, keeping accounts; and the every-day routine of a surveyor's office, saying nothing of such things as arbitrations and provisional orders,—local authorities are not likely to treat such certificates with much consideration; and the bare fact that of about 1,000 Borough and Local Board Surveyors in England and Wales, not more than about a dozen possess the certificate of the Sanitary Institute speaks for the little importance with which they are regarded by the profession.

A person otherwise competent to act as local surveyor would have little difficulty in satisfactorily answering the few comparatively simple questions prescribed by the Sanitary Institute, while, on the other hand, a person holding their certificate, if not otherwise qualified, would be quite incompetent to undertake the duties of an office.

That the granting of such certificates is likely to be productive of some mischief, however, there can be little doubt, as the way in which they are so readily obtainable cannot but tend to facilitate the admission to public offices of incompetent persons, who do not hesitate, whenever a vacancy occurs, to become competitors along with legitimate candidates, a many of us are already painfully aware, and with whom, on account of their being in a position to accept appointments at low salaries, men who have received a professional training frequently cannot compete. Nor is it to be expected that gentlemen who have been regularly articulated in the offices of civil engineers and gone through the whole course of a professional training, would submit to the anomaly of being technically examined by an amateur society.

It would be not a little interesting to know what are "the obligations which the profession owe to the Sanitary Institute," the constitution of whose Examining Board is, in the opinion of your correspondent, "a sufficient indication of the high-class nature of the examinations," and when the Sanitary Institute became "a semi-official body of great repute." "J. A. A." must have overlooked the fact that voluntary examinations are held periodically by the Association of Municipal and Sanitary Engineers and Surveyors, whose Committee of Examiners are exclusively professional men, holding some of the most important public appointments in the kingdom, and who

are themselves authorities on municipal and sanitary engineering.

ROBERT S. SCOTT, C.E.  
*Ventnor Club, Isle of Wight,*  
 12th January, 1887.

Sir,—May I plead, through the medium of the *Builder*, that the suggestion of "J. A. A." in your issue of the 8th inst. be not adopted by the Board of Examiners. On p. 18 of the handbook issued by the Council under the heading of "Objects of the Institute, Rules, &c.," we read the following:—"To examine and to grant certificates of competence to local surveyors and inspectors of nuisances, and to persons desirous of becoming such, or of obtaining the certificate." From this, I think, it is quite clear that the certificate is intended not only to be used in an official capacity, but also in private practice, as in the event of a sanitary engineer wishing to obtain the certificate, and succeeding, he would then be designated as "Certificated by the Sanitary Institute of Great Britain," as provided in their rules above referred to. Surely this would be an advantage in private practice.

I have been in a surveyor's office for some years, and hope some day to gain the Local Surveyor's Certificate; but my plea is that any man working hard in qualifying himself to pass the examiners may still be able to obtain the Certificate without regard to his present position. I would respectfully suggest in answer to "J. A. A.'s" objections that when the *red-voice* examination is taking place, a level might be at hand, and the candidates questioned upon it; the practical experience of the examiners would soon be satisfied as to whether or not he had ever used one. The candidate might also be called upon to produce drawings of sections he had taken, and of surveys he had made and plotted.

HISTORIC CITY BUILDINGS.

Sir,—Those of your readers who are interested in the preservation of memorials of demolished buildings having historical associations may be glad to know that, as architect for the new warehouses on the former site of St. Matthew's Church, Friday-street, Chapside, I have placed the following inscription upon one of the pilasters:—

"The site of these buildings was formerly occupied by the Parish Church of St. Matthew, Friday-day-street, founded before the year 1322, destroyed by the Fire of London, 1666; rebuilt by Sir Christopher Wren, and taken down in 1885, when the parish was united with that of St. Vedast, Foster-lane."

I may also add that, as architect for the six warehouses occupying the larger portion of the former site of St. Paul's School in St. Paul's Churchyard, I am arranging for the erection of a small tablet, in the centre feature, bearing the following inscription:—

"On this site, A.D. 1512 to A.D. 1884, stood St. Paul's School, founded by Dr. John Colest, Dean of St. Paul's."  
 DELISSA JOSEPH.

CLASS OF MASONRY, CITY AND GUILDS TECHNICAL INSTITUTE.

Sir,—As the large class of masonry will soon be engaged on exercises requiring some amount of knowledge in descriptive geometry, I advise students who intend to join the class, as well as the present members, to study, in the "Student's Column" of the *Builder*, year 1885, the following figures:—175, 165 (Sept. 19, Oct. 2); 71, 12, 18, 14, 15, 16, 17, 18, 19 (Feb. 28); 30, 31, 32, 33 (March 14); 36, 37, 38, 39, 40 (March 21); 96, 102 (June 13); 105, 107 (June 20); 123 (July 18).

The two first figures are examples of the general method for finding the intersection of any two surfaces. It may be summed up as follows:—"There are certain surfaces, the intersections of which are known, such as planes, spheres, cones, &c., under certain conditions. These must be mastered by the mason as his multiplication table. Then, to find the intersection of two surfaces, we cut them by a third, the intersections of which with each of the two surfaces given are readily known. The points where these intersections meet belong to the intersection of the two surfaces given."

The above is the method of finding intersections of surfaces, on which the whole art of masonry rests; all the other figures indicated are applications of this method to special cases.

The next meeting of the large class of masonry will take place, Tuesday, the 25th inst. in the Examination Hall on the upper floor of the City and Guilds of London Central Institute, South Kensington.

LAWRENCE HARVEY,  
 Director of the Class of Masonry.

COLONIAL.

Sir,—I should be very much obliged if any reader of the *Builder* could give me any information about Colonial architects' associations. Are there such associations? If so have they any office here to which I could write for information?

ARCHITECT'S ASSISTANT.

"MASONS' WAGES."

Sir,—Although reluctant to answer the question of your correspondent "A. B." in your last [p. 132], I feel it a duty to state, in the interest of our trade and the men so unmercifully dealt with in this case, that such was a fact. Such information will, I am sure, be received by your readers with astonishment and disgust, when so many of our fellow men are at this moment begging for employment. It is heart-rending, I can assure you, sir, to those in the position of engaging our skilled and unskilled workmen to hear the pitiable truths related of suffering and want occasioned by this lack of work, the earnest desire and endeavour of men to obtain even the means of existence. What must we think of this cruel demand made by the enemy of our trade, our independence, and our very livelihood at such a time as this? God forbid that any injustice should be used by employers at this critical period of depression towards our working-classes. But, I ask, how many hundreds free from the lash of the Society Union would and are eager at this very moment to supply the void occasioned through the black-halling of these men, whose only fault was their fortunate and happy lot of being able to provide the means of sustenance for their wives and families?

A. B. & C.

CHURCH-BUILDING NEWS.

Burley.—The parish church of St. John the Baptist, Burley, Hants, was reopened on Christmas Day, after enlargement. Built fifty years ago, it is described by the *Hampshire Independent* as a bad example of the debased church architecture and faulty work then so prevalent. As originally built, it consisted of a nave only, no chancel, no vestry, no accommodation for a choir, no arrangement for warming the building. Moreover, it was in a very dilapidated condition when the present vicar entered upon his duties last Easter. The vicar at once moved in the matter, and the following works were found to be necessary:—1, the erection of a chancel to comprise choir sanctuary, and of a small south transept for harmonium organ; 2, a vestry; 3, new porch in the door to the north; 4, an efficient heating apparatus; 5, partial re-flooring with tiles, and entire re-seating; and 6, general repairs of the structure. Mr. Butterfield was consulted, and under his supervision these works have been carried out, at a cost of about 1,500l.

Cannes.—The *Morning Post* of the 29th ult. contains a letter from a correspondent at Cannes describing the Memorial Church there. He writes:—"High up among the trees which cover the heights of California, and overlook the Isle of St. Marguerite, is to be seen an unfinished column which stands in front of the villa in which the Duke of Albany breathed his last. When finished, this is to be crowned by the figure of St. George; and a little lower down, by the road which leads to the large hotel (California), a church spire, not yet completed, calls the attention of the traveller to one of the most perfect specimens of English Church architecture in France. It is the Memorial Church which is being erected among the English villas which circle around the winding road, and are hidden among the trees and gardens of the English retreat. The church is practically complete, except for the internal fittings, and Mr. William Conradi, an old pupil of Sir Gilbert Scott, and Mr. Blomfield's deputy, having ascertained what my intentions were, gave me permission to enter, and acted as my *cicerone*. The church is from the designs of Mr. A. W. Blomfield, and every portion of the interior ornamental work is sent out from England, and has been executed under his personal supervision. The builder is Mr. George Russell, of Cannes, and the stone employed is from the neighbourhood of Grasse, and, for the first time, this stone has been polished, and used for purposes of ornamentation as well as for the rougher work of building."

Dingley.—The little Church of All Saints, Dingley, has recently been reopened after what the *Northampton Herald* describes as "complete restoration" of the exterior and interior. The amount of the contract for the restoration was between 2,000l. and 3,000l., and the expense has been generously borne by Lord and Lady Downe, the rector (Rev. H. B. Upcher), and others. The work was entrusted to Messrs. Cornish & Gaynor, of North Walsham, and it has been carried out under the superintendence of Mr. J. Bell. The high-backed pews have been superseded by modern chairs of unvarnished beech, which stand on a floor composed of pitch-

pine blocks, and the aisles are relaid with stone. New hases have been added to the pillars, which have been pieced and restored. The walls have received a new coat of plaster, and new braces to the principals of the beams have been put in, and new rafters where required. The chancel is paved with Dorsetshire stone, and the Griffin Chapel on the right of this with oak blocks. The chancel and chapel roofs are quite new, the former being a copy of the original design, and the latter being panelled. Half of the chapel will in future be used as a vestry, and will be partitioned off by means of curtains. Externally, the porch has been restored, and new roofs of Colley-Weston slates put on both chancel and chapel. The walls have been pointed where required, and a channel dug round the chancel and nave (which are below the adjoining soil) in order to prevent damp.

Holme-next-the-Sea.—The restoration of the chancel of St. Mary's Church has just been completed through the exertions of the vicar and churchwardens, assisted by Mrs. Nelson, senior, who has been most energetic in getting up concerts and other entertainments in aid of the funds. Mr. Le Strange, the patron of the living, has subscribed very liberally. It is proposed to re-seat and complete the restoration of the nave in the spring, which was left unfinished about two years ago for the want of money. The works in the chancel have been carried out by Mr. Ducker, of Lynn, under the direction of Mr. Wm. Adams, architect, of King's Lynn.

Irechester.—At the annual meeting of the Architectural Society for the Archdeaconries of Northampton and Oakham, held recently, plans for the restoration of Irechester Church, prepared by Mr. Pearson, were laid before the committee and approved. It is stated that the restoration "is to be carried out in a thorough manner." The chancel will be restored by Lord and Lady Wantage.

London.—At Christ Church, Lancaster Gate, a new baptistery, the gift of a member of the congregation, has been formed under one end of the south gallery, by adding an extra granite shaft. The stone capitals have been removed, and new carved ones substituted, with angels on the inside portion. These support the moulded stone ribs above, which terminate in a carved boss in the centre. The roof-pannels are fitted with emblems in Venetian glass mosaic, representing various Christian symbols, and on the back wall is a panel of Christ blessing little children, in glass mosaic, with gold ground. The mosaics have been executed in Venice, by Dr. Salvati. In the centre of the baptistery stands the font, which is of alabaster and marble. The lower step is of Purbeck marble. Above this is a base of rouge royal, which supports a model base of Ippelen. The centre is of grey Devon, and is surrounded with green marble shafts. These support a bowl, which is in light alabaster, of octagonal form, with carved cornice on top. The panels are inlaid in marble, in floral and geometrical designs,—the rose, lily, passion-flower, vine, and wheat being all represented. The basin is of polished Carrara marble. On two sides a metal screen, picked out in gold, is fixed, and the floor enclosing the lower step is in ceramic mosaic. The work has been designed and carried out by Messrs. Underwood & Sons, Duke-street, Grosvenor-square, who have also made the new pulpit, which is the gift of Lady Brabazon, and is composed entirely of alabaster and marble, highly polished. It is of hexagonal form, with winding stairs.

Northampton.—The structural alterations to the interior of the Church of the Holy Sepulchre are now completed. An organ-chamber, choir-vestry, and an enlarged clergy-vestry have been added to the church. The additional buildings have been carried out in precisely the same style as former renovations, and are strictly in keeping with the other portions of the church. The plans for the alterations were prepared by Mr. Townsend, the diocesan surveyor, and have been carried out by Mr. Reynolds, builder and contractor, of Margaret-street. The tender for the vestry and organ-chamber was 375l., but this amount does not represent the whole of the outlay on the interior. Mr. R. Lee Bevan, of Brixworth, has intimated his intention to place a stained-glass window in the church to the memory of his deceased wife.

Petrockstow (North Devon).—On Christmas Eve a memorial reared was unveiled in the parish church of St. Petrock. It has been executed by Mr. Harry Hems, of Exeter, from a design by Mr. Horace L. Field, architect,

London. It is of oak. The five main panels are filled with carved figures.  
**Ruddington.**—There is a scheme on foot for building a new church in Ruddington, on the site of the present inconvenient structure. Nearly 4,000*l.* have already been subscribed, and plans are being prepared.

**The Student's Column.**

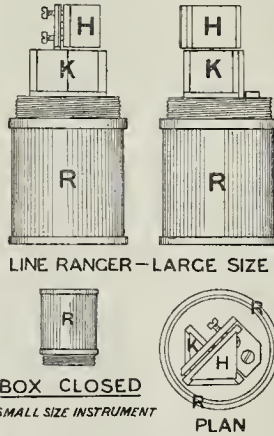
**FIELD WORK AND INSTRUMENTS.—IV.**  
*Surveying Instruments.*  
 III.—THE BOX SEXTANT (continued).

**T**HE mathematical proof given upon the plate showing figs. 1 to 5 of our last article (see pages 134, 135, ante) will be seen to depend chiefly upon the facts stated at the commencement of that article, and upon the principles enunciated in Euclid, that the exterior angle of a triangle is equal to the two interior and opposite angles, also that when two straight lines cut one another, the opposite angles contained by those lines are equal. Thus, we prove that the angle, A E B, is double the angle, A F B. Now, if the mirror at A be placed parallel to the mirror at B, the angle M A F will equal the angle A F B, and, therefore, the angle A E B will be double the angle M A F. Hence, if the vernier stand at zero upon the plate shown in fig. 3, when the mirrors are parallel to one another, the angle at E will be double the angle over which the revolving mirror will travel. Fig. 1 supposes a case in which this angle is 52½ degrees, and hence the vernier in fig. 3 reads 105 degrees. The angle thus indicated in fig. 3 is not exactly vertically over that in fig. 1, but is made to depend upon it, the graduated silver arc being fixed in the most convenient position upon the top plate for recording the angles. A small magnifying glass is attached, as shown in fig. 3, which glass can be raised or lowered to suit the eye-sight, enabling the subdivisions upon the vernier to be clearly defined. The surveyor selects the line which comes on his left hand when about to take an angle between two given directions, or to set out an angle in a required direction, and holds the instrument in his right hand by the box which has been screwed on to its underside after lowering the darkening glasses by means of the side levers as described in our last article. He then observes a pole marked D in figure 1 through the unsilvered portion of the glass marked B, and with his left hand he turns the milled screw R until the pole marked C upon his right hand is reflected from the mirror at A to the silvered portion of the mirror at B. When these two poles appear in line one over the other in the glass B, as shown in fig. 2, the desired angle is obtained and read off the upper plate; or, when the angle is given, the surveyor directs his assistant to move the pole C right or left as required until set out to the given angle, as will be proved by the coincidence of the poles in the glass at B. To observe the pole D the instrument is moved slowly by the right hand until its face is in the plane passing through the eye and the two objects between which the angular distance is being taken. When, therefore, altitudes are to be observed, the instrument is held in a vertical plane; when horizontal or oblique angles are to be measured it is held in a horizontal or oblique plane. Unless the objects lie in the same horizontal or vertical plane its use for surveying purposes, where horizontal or vertical angles are alone required, can only be approximate. To ensure accuracy in the position in which the instrument is held the same precaution as to the use of double poles or ranging rods in a line, is necessary to be observed, as was explained in our article upon the optical square. This will be clear upon reference to figure 10. The adjustments of the mirror are effected by the key marked K in fig. 3, which, for safety, is screwed into the top plate, as shown in section in fig. 4. These adjustments are usually made by the manufacturer, and when once effected seldom need repetition, but may be tested by the surveyor in the following manner. As shown in fig. 6 a distant object is observed with the vernier set to zero. If the sun be that object then the reflected image of the lower part of the sun will or can be made to appear vertically in line with the upper part of the sun by means of the key K slowly turning the bar L in the side of the instrument fig. 1, which acts upon the spring

connection shown in fig. 2. By this means the two mirrors are placed horizontally parallel; then by turning the instrument on its side and repeating the operation, but this time placing the key K in the spindle marked N in the top plate (fig. 3), the mirrors can be set also vertically parallel. With constant use the mirrors will after some time get very dirty. The best way to clean them is by the use of a small light brush.  
 The parallelism of the line of the sight in the telescope to the plane of the instrument is tested by placing the index glass so as to produce the apparent coincidence of two distinct objects whose directions make an angle of 90 degrees or thereabouts, and observing whether any slight motion of the plane of the telescope about an axis traversing the object seen by reflection disturbs the apparent coincidence. If the adjustment of the telescope is correct, no such disturbing influence should appear. We have mentioned this adjustment of the telescope to complete the subject, but as in ordinary land surveying the telescope is dispensed with, its accuracy when supplied by reliable makers can be trusted, and it is only necessary for the surveyor to test the adjustments described by fig. 6. For further explanation we must refer our readers to the notes upon the plates shown in our last article (pages 134 and 135).

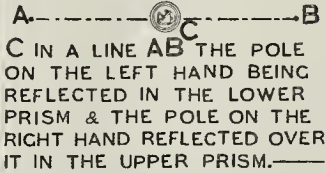
IV.—THE LINE RANGER.

This instrument, the use of which is explained in our illustration, enables the surveyor to find



**NOTE**

**THIS INSTRUMENT IS USED AS A LINE RANGER FOR DETERMINING THE POSITION OF ANY INTERMEDIATE POINT**



an intermediate station upon a given base line, and is useful where great accuracy in the determination of any required point in a line is essential.

**The Paving, Lighting, and Cleansing of the City.**—The accounts of the Commissioners of Sewers for the last year have just been issued. The cost of paving the streets was 28,987*l.*; lighting, 13,422*l.*; cleansing and watering, 39,685*l.*; sanitary works, 3,070*l.*; legal and parliamentary expenses, 2,361*l.*; contractors and artificers, 4,749*l.*; stoneyard, 4,972*l.*; collectors' commission, 5,705*l.*; officers' salaries, 9,347*l.* The Commission paid during the year, for interest on moneys borrowed, 64,824*l.*; and to the School Board for London, 138,263*l.*—*City Press.*

**Books.**

**Vauban; Montalensbert; Carnot; Engineers' Studies.** By E. M. LLOYD, Major R.F. London: Chapman & Hall, 1887.

**T**HIS is a very interesting handbook of the lives of three eminent military engineers, preceded by an introduction giving a brief sketch or outline of the general history of fortification, the growing power of artillery, and the modifications of construction to which its employment and improvement gave rise. In the course of this the author notes the prevalence in the sixteenth century of what may be called the "draughtsman engineer," which the thing became a kind of fashionable profession, and, as a contemporary critic observed,—"Sundry persons being able to make the draught or portraiture of a thing, give themselves to the making of plates of fortresses without number, not understanding or knowing how to prosecute or to discourse from the foundations of the matter with lively reasons"; a kind of thing, that has happened in other professions time and again. It is curious to find that about this time, or at the beginning of the seventeenth century, the work of making the lines of approach to a besieged town was almost purely a matter of money, being contracted for and paid for in proportion to the danger and probable loss of life. Heuss's "Hexham recommends the besieged to use their cannon freely against the approaches, for then the enemy must either raise the siege or it will cost them dear, because no men will undertake this work but such as will be soundly paid for it."

The life and character of Vauban are graphically sketched; and whatever moralists may think of the business in which he was engaged, and the merits of the combatants he worked for, there was no doubt that he both thoroughly understood his business, and was ready to expose life and limb in its prosecution, without regard to his own safety or comfort. Indeed, it seems to have been thought necessary at last to endeavour to keep some kind of control over him, and keep him out of danger, as too valuable a possession to be lost.

Vauban's special merit, besides his close attention to details of an attack, was that "he was the first engineer who considered fortresses collectively as units in a general scheme of defence." The special principles of attack and defence favoured by the three men who are the chief subjects of the book are clearly stated, and the volume closes with a short essay on "modern forts," showing how the modern adoption of "extended order" in the line of men in battle has also, under the influence of modern long-range fire, been adopted in fortification. The book, we presume, is addressed to the general rather than the military reader, and of interest in this light as giving, under the guise of a biographical treatise, a good deal of information as to the nature of the problem of fortification and attack in past and present times.

**How I managed my Estate.** London: George Bell & Sons, 1886.

This very pleasant and readable little book containing many suggestions and much good sense, is a reprint, we perceive, from the *St. James's Gazette*. The author's practical claims to be listened to on the subject are set forth in the first paragraph. He gave 14,000*l.* for an estate in Sussex; farmed and managed the lands almost entirely himself; sold a thousand pounds' worth of timber; spent about 5,500*l.* on improving houses and land; and, within fifteen years, parted with the place which he had "made too grand for him," for 27,000*l.*—the whole transaction leaving him 9,500*l.* richer in money, as well as in a great deal of pleasant experience and country knowledge. The experience of any one who has made such a practical success must be worth having. The heads under which this experience is given are "Choice of an Estate," "Underwoods," "Timber," "Building and Quarrying," "Making Grounds," "Farming and Shooting," &c. In the chapter on "Building and Quarrying," however, the author does not explain to us why newly-faced walls should have involved a new roof, or why a new roof involved "new walls right through the middle of the house is order to support it." This is the sort of nonsense that gets written in daily papers by people who think it clever to laugh at the architect who told them it would only cost so much



and then do without him and find themselves running into all kinds of expense which he might have shown them how to avoid. Some shrewd remarks about labour occur in this chapter. The London workmen, who received 8s. a day seemed, he says, to have a certain standard of their own as to the amount of work which might be turned out, and "the country masons who received half that sum, and when alone did twice the work, seemed under some tacit compulsion not to do more than their fellows did, so long as they worked with them, so that 18s. a square of walling before the London men came, cost about 3l. during their stay, though it fell again to the lower rate as soon as the country workmen laboured by themselves." This is telling, but, we suspect, exaggerated. A device by which he saved 300l., the writer tells us, was that of having the dams of a series of fishponds puddled by horses instead of men; "I found that one heavy horse would do the work of ten or twelve men, and a great deal better, the weight of his hoof being vastly more powerful than the stroke of the usual puddling-rod." All horses, however, may not be equally manageable in this way. "One man may bring a horse to the clay, but twenty cannot make him puddle"; and, query, does it improve the horse to be paddling about in wet, stiff clay for many hours together?

We are interested to notice in the chapter on watering grounds, that the author, in laying out his lawn, applied the practice of the Greek architects, as discovered by Mr. Penrose (to whose work he refers), laying out the lawn with an almost imperceptible rise in the centre, and which was much more satisfactory to the eye (as we can well believe) than a perfectly level turf.

*The Conversion of English Timber (Timber Trade Handbooks, No. 1).* London: Timber Trades' Journal Office.

A VERY useful little treatise on the methods of cutting up and clearing timber for use, on things to be sought and things to be avoided. Young architects would do wisely to possess themselves of it; they will get a good many practical hints in a small compass.

*Model Dwelling-Houses. With a Description of the Model Tenement erected within the Ground of the International Exhibition, Edinburgh, 1886.* By SIR JAMES GOWANS, Architect, Lord Dean of Guild of the City of Edinburgh. Edinburgh: T. A. Constable & Co.

THIS is mainly a description of a block of "flat" tenements erected in the grounds of the Edinburgh Exhibition by the joint and gratuitous efforts of architects, engineers, manufacturers, and artificers. The idea was a good one, and has been well carried out. The author prefaces his description by a few remarks on the history of the typical Scottish flatted tenements, and some not undeserved strictures on their insanitary condition. His object is to show that they may be improved in plan and construction, and be at once healthy and remunerative, and such as should, he thinks, be built in the suburbs of large towns, for the accommodation of the working classes. The plan is very convenient and complete, and the construction quite in accord with the latest lights on the subject. We find little or nothing to criticize, except, perhaps, the extreme smallness of the third bedroom, which has a cubic capacity of only 567 ft. It would be in all probability occupied by more than one person, and even if they were children, and although there is a fireplace in the room, it is not enough for a "model" dwelling.

In the case before us the building is only two stories in height, and has light and air on all sides. It would have been more generally useful if Sir James Gowans had shown by plans and diagrams how the lofty street tenement with its narrow frontage could be brought into something like a sanitary condition, and to this task we hope he will on a future occasion address himself. As at present built, "the central staircase, with no well in the centre, surrounded on all sides by rooms, lighted by side windows, reminds one more of a vault than anything else." The high fen duty is of course the root of the evil, and one which is not likely, we fear, to be soon destroyed. From the peculiar circumstances attending the erection of the block of buildings illustrated, its cost cannot be given, and although cost is of the essence of the problem, Sir James Gowans does not touch upon it. The book is

an interesting record of a practical experiment in tenement building; it is well written, illustrated, and printed.

*Horticultural Buildings: Their Construction, Heating, Interior Fittings, &c. With Remarks on some of the Principles Involved, and their Applications.* With 123 Illustrations. By F. A. FAWKES. New edition. London: Swan, Sonnenschein, Le Bas, & Lowry.

THE author of this useful little book covers an astonishing amount of ground, ranging from astronomy and solar physics to the Metropolitan Building Act, and the familiar analysis of a rod of brickwork. Much of the information has been collected from well-known sources, but much is original, and based upon personal experience, and all is useful. The author recommends the old-fashioned panty glazing for horticultural buildings, and the old-fashioned system of heating with hot water at low pressure, and this after reviewing all modern substitutes for both. We find ourselves in accord with almost all his views, and especially agree with him that architects have too much neglected the design of the class of structures of which he treats, and that therefore the purely horticultural interest has prevailed over what he aptly calls the horto-architectural, — a new word, for which we thank him. He writes with enthusiasm, as all authors worthy of the name should write, and endeavours to press home the high importance of his subject by the following amazing syllogism:—"Contact with, and a proper contemplation of, God's works has a refining influence on mankind. A greenhouse enables both contact and contemplation to be intensified. Therefore, a person cannot but be ennobled who thoroughly appreciates and properly uses a greenhouse. Upon social, hygienic, moral, and even religious grounds, horticultural buildings may justly claim advantages of a solid and superior character!"

We cannot agree that the summer-house which is figured at p. 100, and looks like a carman's shelter, is all that the author claims for it on the score of beauty, and prefer the "usual rustic thatched" affair, insects notwithstanding. But, horto-architecture apart, we can honestly recommend this little book for its practical wisdom and vast store of useful information.

*The Art of Architectural Modelling in Paper.* By T. A. RICHARDSON, Architect. London: Crosby Lockwood & Co.

THE very book for the amateur modeller of architectural subjects, containing wise cautions as to the true principles of the art, and warnings against the temptations which beset the inexperienced modeller to give his work the character of a mere toy. We are not sure the author goes quite far enough in this direction, and doubt whether the trees made of gummed twigs covered with moss, and flower-heads of cork, burned to give the appearance of rich mould, and diversified with moss and bits of scarlet paper, do not verge on the toy-like. The architectural subjects selected for illustration and experiment are simple and suitable, and the instructions are conveyed with clearness and precision.

*Practical House Decoration: A Guide to the Art of Ornamental Painting, &c. With some Remarks upon the Nature and Properties of Pigments.* By JAMES WILLIAM FACEY. London: Crosby Lockwood & Co.

THIS is evidently written by one who has some acquaintance with the practical side of the subject, and only falls short of the desirable standard on the side of art. The illustrations show how not to do it, and are anything but satisfactory. If it be true, as the author says of fig. 8, that arrangements of the kind are often "adopted in the quaint mansions which are so rapidly increasing in the fashionable quarters of the metropolis," all we can say is we are sorry for it. The example of "ecclesiastical ornament" given is grotesque, and the "grotesque" simply shocking. The book is not to be recommended as a guide in matters of design; but it may be consulted on practical questions; although we take exception to the directions for the preparation of "ivory white" with burnt sienna,—yellow ochre being, in our opinion, by far the more suitable pigment, and, indeed, the only suitable one.

*Constructive Geometry of Plane Curves.* With numerous Examples. By T. H. EAGLES, M.A., London: Macmillan & Co.

WITH so vast an accumulation of text-books on geometry, it might be supposed that within the ordinary bonnds of study nothing new remains to be placed before the student, but the author of this work is amply justified, both by his matter and method, for adding one more to the number. Perhaps in no subject more than in geometry has evolution been harder at work during recent years, and, as a natural consequence, the text-books of our earlier days have to be discarded for their newer rivals. We now demand more conciseness in our analytical work and a better adaptation to practical purposes of our geometrical methods. The main feature of this volume is the systematic treatment and actual delineation from given data of some of the more important straight-line figures, together with various plane curves, as the circle, parabola, ellipse, hyperbola, and all the useful miscellaneous curves, such as the cycloid, catenary, tractory, &c. As a compendium of the subject it will be found of considerable value to the scientific draughtsman, and to the candidates for honours at South Kensington it should be almost indispensable. The extensive use of graphic methods in the present day has greatly tended to popularise the use of such books, but some of them unfortunately presuppose a distinctly mathematical education, and have consequently a chilling effect upon the ordinary mind. In the present work the construction of the problems is as clearly elucidated as in any of the simple introductory text-books to practical geometry, while the proof follows for those who desire to master it. The concluding chapter upon the graphic solution of equations will be found both useful and interesting, as showing the possibilities of the method when applied to ordinary requirements.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

2,070, Cowsls or Caps. J. Watson.

THE cowsls made in accordance with this invention are constructed with two or more concentric cylinders. The two cylinders are both supported by and fixed to an annular plate, the plate being supported by the flue to which it is applied, and the central opening in the annular plate is made to fit that of the flue. Vertical plates divide the cylinders, and the inner cylinder has a number of perforations to permit the rising air from the flue to gain access to the annular spaces between the cylinders. Where necessary, the cylinders are stayed and strengthened, and are finished off with a suitable ornamental cover.

2,199, Closet-Basin Joints. W. H. Tylor and W. B. H. Drayson.

THIS improved joint is applicable to all sorts of metallic sanitary jointing, and to water connexions. The kind of joints in general use for such purposes are usually made by cementing the lower or outlet part of the basin into the socket or outlet box. This, however, is unsatisfactory, as the cement is liable to become disintegrated and loose. A self-adjusting split-ring is therefore used in this invention, and rings of india-rubber or other compressible material are used to make the joint tight and compact.

2,309, Mixing Concrete. H. Faija.

ACCORDING to this invention, in place of passing the materials in a continuous manner to the mixing vessel, they are fed in separate and distinct portions, and are taken up by rotary stirrers, so arranged as to give the maximum of mixing. A compound movement of these stirrers effects a thorough admixture of the materials.

4,224, Ornamenting Panels, &c. A. E. Ryles.

THE process which is the subject of this invention somewhat resembles the process of marbling paper. Into a shallow trough is put water in which is dissolved size, glue, or glycerine. On this is dropped or sprayed the colours that are to appear on the ornamental object. These colours spread out in views and shades; when they are too thick they may be thinned by blowing on them, or if this is insufficient the thick parts may be touched with a brush holding a little turpentine, and then with a feather or light stick. The surface to be ornamented is prepared with a suitable ground colour, and then placed face downwards on the liquid. It is then taken off and dried, when the surface may be flattened with pounded pumice and varnished, and afterwards polished with rotten stone. Several dippings and dryings may be arranged if necessary.

2,310, Pigments. D. Swan.

THE object of this invention is to utilise a by-product of galvanising,—proto-chloride of iron. The solution of this substance is mixed with carbonates, and when air is forced into the mixture

It will form a chloride of a yellow or red colour, which is the pigment.

14,434, Decorating Wood. G. Howard. By this invention, a pattern is cut out of a polished wooden block by means of a sand blast; then the interstices are filled with suitable adhesive stopping, previously coloured as required, the whole surface showing the natural colour of the wood on a ground the colour of the filling. It has been smoothed over. The most delicate and intricate patterns may be reproduced.

NEW APPLICATIONS FOR PATENTS.

Jan. 7.-235, S. Shields, Laying or Fixing Wood-block Floors.-267, J. Gamble, Warming and Ventilating Dwelling-rooms, &c.-268, Cebury and Lamm, Drain Traps.

Jan. 8.-291, E. Phillips, Automatically Sharpening Saws.-296, Francis and Carey, Combined Latch and Bolt for Doors.-315, G. Hardingham, Iron Cement.-325, A. Boulton, Adjustment of Saw Blades in Saw Mills.

Jan. 10.-366, T. Sterne, Ventilating Rooms or Buildings.-375, E. Sycers, Sash Fastener Securers.-383, A. Beaubais, junior, Automatic Bolt for Double Doors.

Jan. 11.-414, T. Whalley, Water-closets.-424, W. White, Roads and Pavements.-437, J. Thompson, Ventilators and Chimney Cows.-440, G. Butler, Window Sash Fasteners.-442, J. and S. Stott, Rendering Buildings Fireproof and Water-proof.-456, Underwood and Dobie, Door Locks.

Jan. 12.-480, J. Buckle, Flushing Syphon for Water Closets, Cisterns, &c. Jan. 13.-538, J. Mitchell, Joiner's Bench, Stop, and Cramp combined.-547, J. Wilesmith, junior, Ornamenting Wooden Panels, &c.-577, P. Justice, Manufacture of Cement.

PROVISIONAL SPECIFICATIONS ACCEPTED.

14,680, H. Perry, Machine for Sizing and Varnishing Paperhangings.-15,233, C. Perrot and Others, Making Tile-Grates with the Tile-frames in one Piece with the Front.-15,815, George Martie, Hold-fast for Pipes, &c.-16,284, H. Bassett, Window-sash Fastener.-16,452, F. Crittal, Open Stoves for Warming and Ventilating.-16,525, C. Brasier, Door-locks.-16,637, E. Milson, Mantel-board.-16,705, A. Clarke Chimney Caps and Ventilators.-16,911, J. Hunter, Signboards.-14,755, T. Dewsbury, Ventilator.-16,007, J. Deddon, Fastenings for Window-sashes.-16,437, T. Malling, Fuel-supplying Apparatus for Fire-grates.-16,480, W. Joy, Manufacture of Portland Cement, &c.-16,752, J. Honeyman, Ventilators.-16,809, E. Hughes, Circular Saw Benches.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

2,630, B. Mills, Electrical Indicators.-3,520, F. Biggs, Locks and Latches.-7,455, J. Kaye, Automatically Latching and Bolting Doors.-1,852, H. Owens, Secure-locking Casement Stays.-4,603, J. Rawlings, Bench Plugs and Cams for Cabinet-makers, &c.-12,333, J. Weatherhead, Making Cowl-heads for Ventilators.-13,730, R. Crane, Water-supply System.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

Table with columns for property address, area, and price. Includes entries for Lambeth-230 and 232, Kensal New Town-1 to 7, Clapton-85, Holland Park-41, West Ham, Mergerly Park-road, Peckham, and Chester Square.

MEETINGS.

Monday, January 24. Royal Academy of Arts (Lectures in Sculpture).-Mr. A. S. Murray on "Greek Sculptures Expressive of the Emotions: before Pheidias." 8 p.m. Society of Arts (Contar Lectures).-Dr. Thudichum on "The Diseases of Plants, with special regard to Agriculture and Forestry." 1. 8 p.m. Leeds and Yorkshire Architectural Society.-Sketch Club Exhibition. Tuesday, January 25. Institution of Civil Engineers.-8 p.m. Manchester Architectural Association.-Mr. Phytian on "Mr. Ruskin's Writings on Architecture." 7.30 p.m.

Wednesday, January 26. Society of Arts.-Mr. J. Traill Taylor on "Photographic Lenses." 8 p.m. Thursday, January 27. Royal Academy of Arts (Lectures in Sculpture).-Mr. A. S. Murray on "Greek Sculptures Expressive of the Emotions: etout the time of Pheidias." 8 p.m. National Society for Preserving the Memorials of the Dead.-1) The Rev. W. J. Loftie, F.S.A., on "Epitaphs." 2) Mrs. Danvers Taylor on the "Fetichion Monuments in Stanford-le-Hope Church, Essex," and on the "Tyrell Monuments, in Downham Church, Essex." 4 p.m. Society of Telegraphic Engineers and Electricians.-Professor Silvanus P. Thomson on "Telephonic Investigations." 8 p.m. St. Paul's Ecclesiastical Society.-Annual Dinner (First Avenue Hotel, 7 p.m.).

Miscellaneous.

Lectures on Sculpture and Architecture at the Royal Academy.-The following lectures are announced:-In Sculpture: by Mr. A. S. Murray, Keeper of the Greek and Roman Antiquities in the British Museum: -Jan. 24, "Greek Sculptures expressive of the Emotions: before Pheidias"; Jan. 27, Ditto, "about the time of Pheidias"; Jan. 31, Ditto, "after Pheidias." By Professor C. T. Newton: -Feb. 9, "Archaic Greek and Italian Terra-cottas"; Feb. 15, "Terra-cottas of the final period of Greek art"; Feb. 24, "Terra-cottas of the Roman Period." In Architecture: -By Professor J. H. Middleton: -Feb. 7, "Methods of Decoration, as applied to Greek Architecture"; Feb. 11, Ditto, "as applied to Roman Architecture"; Feb. 14, Ditto, "as applied to Medieval English." By Mr. G. Aitchison, A.R.A.: -Feb. 28, "Doorways"; March 3, "Windows"; March 7, "Balustrades." The Stables of "Olympia." -With reference to the mention made by us a fortnight ago [p. 90] of the opening of the National Agricultural Hall, Kensington, we are asked to mention that the stables of "Olympia," both as regards the stalls and centro promenade, are entirely paved with Candy & Co.'s vitrified Devon buff paving bricks.

The New Exchange Station, Liverpool. Referring to our notice last week (p. 132, ante) of the opening of a portion of the New Exchange Station, Liverpool, erected from the designs of Mr. H. Shelmerdine, we are asked to mention that the floors of the hotel and of the cab-approach in connexion therewith have been laid with Mr. R. L. Lowe's patent wood block flooring and pavement respectively.

The Russian Petroleum Industry.-During the last few months several cargoes of Russian petroleum have arrived in Europe, the oil being said to be equal in quality to the American "water-white," whilst at present six steamers are in course of construction in this country for the purpose of carrying on this trade. Every autumn the producers at Baku now hold a conference in order to consider what steps should be taken for improving the industry, especially as regards transport, it being their determination to respond to every demand of the European market, and it will be of interest to watch the competition now in progress between the Russians and Americans. Since 1876 the number of petroleum wells in the Caspian has increased by 300, whilst the annual production of raw oil has risen from 30 million to 875 million gallons. There are in Russia now 136 refineries, which yield annually 125 million gallons of oil. The cisterns for raw oil are capable of containing 60 million gallons, and the iron reservoirs at Tschjornji, Gorodk, 20 million gallons of refined oil. On the Russian railways there are 1,000 reservoirs, capable of holding 3,000 gallons each. The number of steamers engaged in conveying the oil on the Caspian Sea is thirty, with a tonnage ranging from 250 to 1,000 tons. There are, besides, a number of smaller steamers and sailing vessels engaged in this traffic.

The Archbishop of York and the Churchwardens of St. Mary's, Beverley.-A somewhat acrimonious dispute has been going on for some little time between the Archbishop of York and the Churchwardens of St. Mary's, Beverley, in reference to the seats in the church. The Vicar and Churchwardens having determined that all appropriation should be abolished, copies to that effect were put up in the church. Notices of the notice, with an explanatory letter, were sent by the Warden to His Grace, who, however, instead of giving the step his approval, told them in reply that by law "their duty was to assign the seats to the parishioners according to their degree"; that, therefore, their notice was "quite illegal," and he must "request and direct that it be withdrawn and

cancelled." The Churchwardens, in reply say:—"If the Warden are wrong in their view of the law, it is important that their error should be corrected; but if, on the contrary, your Grace's statement of law is wrong, and your claims illegal, it is much more important that error and illegality should be shown." Between the two statements, viz. your Grace's, 'The law is quite clear. The churchwardens are the officers of the bishop of the diocese, and their duty is to assign seats in the church to the parishioners according to their degree,' and the Warden's, viz. 'The churchwardens are not the officers of the ordinary, but of the parish and Vicar, being appointed by them respectively.' 'The body of every parish church belongs of common right to all the parishioners, and this right cannot lawfully be defeated by any permanent appropriation of particular places' ('Report of House of Lords Committee, 1885,' p. 181) lies the gist of this unfortunate disagreement and scandal. As to which is the true one the Warden have no shadow of doubt. The Vicar seems to have yielded to the Archbishop, but the Churchwardens are obdurate, and seem to challenge the ordinal of legal proceedings.

East India Teak.-Messrs. C. Leary & Co.'s "Annual Circular on Ship-building, Furniture, and other Hard Woods" gives the following statistics for the last three years:-

Table with columns for year (1886, 1885, 1884) and categories (Imports, Deliveries, Stock, Dec. 31). Values are in thousands of tons.

The present stock of timber is composed of 7,866 loads of Moulmein, 2,264 loads of Rangoon, 2,789 loads Bangkok, and 19 loads of other sorts. The course of the market has been favourable throughout the year; the visible demand, and the accumulation of large stocks in this, as in all the other markets of the United Kingdom, having had a very serious influence on values. The depression eventually became so pronounced that importers decided about June, to make large concessions in price, in order that their stocks, then in course of increase by further supplies, afloat and loading, should not assume unmanageable proportions. This policy has enabled them to effect extensive sales, and seeing that the quantity now afloat is only 5,395 tons, as compared with 17,180 tons at the beginning of 1886, and the additional tonnage now under charter is only 11,329 tons, against 16,015 tons at the same date last year, we may fairly expect an improving market. Cargo quotations for Burmah wood have declined from about 13s. at the opening of the year, to from 10s. to 10s. 10s. its close, Siam wood standing at about 30s. per load less.

The Projected Nicaragua Canal.-A report which was recently read at Washington by the Senate Committee relating to the B. incorporating the Nicaragua Canal has been received with general approval, and has revived public interest in the scheme. According to the report the canal can be constructed for about one-fourth of the estimated cost of the Panama Canal. Various estimates have been submitted varying from 75,000,000 (15,000,000) to 150,000,000 (30,000,000). The Bill restricts the tolls to a maximum of 10 dollars fifty cents per ton. It is calculated that the net income from the canal, when completed, will amount to 12,000,000 (2,400,000) per cent. on the highest estimated cost. The canal, if executed, will in all probability be ultimately connected by a through railroad with the United States.

The Sahara Lake Scheme.-The old proposal for making the Desert of Sahara an inland lake appears to be again on the tapis in France, M. de Lesseps having dwelt on it at recent meeting of the Academy of Science. It is, however, now proposed, instead of effecting the cutting of the ridge on the Atlantic side, previously, to sink artesian wells along the Tunis border on the Sahara and then to form cities, so that by the time the desert had been converted into a lake there would be a population ready to trade upon it. Various other engineering works are then also contemplated. According to M. de Lesseps, this plan has found much support among engineers and others interested in the scheme. It is, however, maintained by some that the scheme is useless, as the lake will be dried up again, and that railways would answer the purpose in view far better.

**Liverpool Engineering Society.**—The annual fortnightly meeting of this Society was held at the Royal Institution, Colquitt-street, Liverpool, on the 12th inst.; Mr. J. J. Webster, f. inst. C.E., President, in the chair. A paper by Mr. R. W. Brightmore, M.Sc., entitled "The Flow of Water," was read by the author. The author commenced by pointing out that the present theory of hydrodynamics is only applicable to one form of motion of water, and that the least prevalent in nature from an engineering point of view. After explaining under what circumstances this was the case, and, on the other hand, the conditions of motion to which it did not apply, he went on to describe the motion of water under three conditions which most commonly present themselves to the engineer,—viz., the motion of water in streams, in pipes, and the motion of ships in water. With regard to the first of these three, the theory was of but little use, and empirical laws of various degrees of complexity had been proposed, of which he mentioned the one of easiest application, and giving results probably as accurate as the others. In describing the motion of water in pipes, he pointed out that when the velocity was slow enough the motion came under the present theory, but after attaining a certain critical velocity, depending *ceteris paribus* inversely on the size of the pipe, the motion became sinuous, and an empirical law had been found to express the flow under these conditions. This law, owing to the more restricted conditions under which the flow took place, was of a more definite nature than in the case of streams.

**Fire at New Cross.**—Messrs. Clark, Bunnell, & Co., Limited, ask us to mention that the fire that took place at their New Cross Works on Sunday morning last was confined solely to that section of the building occupied by the foundry, and that beyond the stoppage of that portion the works are proceeding as usual.

**The Tin-Plate Trade.**—Messrs. Arthur Bird & Co., in their January circular, say—"The course of the trade for the first six months [of 1886] at least was somewhat uneventful, the over-production which we dwell upon in our last Report, and demonstrated by figures, effectually preventing remunerative prices from being obtained by makers. While, therefore, exports and consumption continued to increase, notwithstanding a shrinkage of prices all round in general trade, values steadily declined until they reached a point when several works were compelled to cease operations. The majority of the manufacturers were then forced to demand from their men a reduction in wages, and in a good many instances succeeded in obtaining certain concessions. These, however, were by no means general, and several large makers, failing any satisfactory arrangements with their workmen, have during the last two months closed their works altogether until better trade and more remunerative prices may enable them to re-start, with a prospect of being able to keep their men and themselves regularly and profitably employed. The course of last year's trading may be gauged very closely by the fact that while the exports in 1886 show an increase over those of 1885 of about 37,000 tons, or nearly 12 per cent., the price of coles has fallen from 11s. to 12s. 9d., a decrease of nearly 10 per cent. The prospects of the trade in 1887 are now what we would particularly call attention to, and to form any reliable estimate of future prices we must look closely at the present productive power. This is still perfectly able to supply the present visible requirements of those markets of the world which are exclusively our own, though we always hope that progress and development, aided by a long continued range of moderate prices, may so stimulate consumption as to ultimately benefit the producer. With the opening of the year 1887 one most important feature has shown itself which is not at all unlikely to have a very serious effect upon the values of tinplates. We allude to the somewhat sudden rise in the prices of nearly all the materials used in their manufacture, and, more especially, of hematite pig-iron, as affecting the price of steel. The advance already amounts to about 10 per cent. without any corresponding improvement in tinplates, and should this rise continue,—and in the opinion of those best qualified to form a correct judgment market appearances favour this view,—prices must advance in proportion, quite irrespective of the relation of demand to supply."

**Carbonic Acid in the Ground.**—The amount of carbonic acid in the ground has been lately shown by Professor Wollny (we learn from *Naturforscher*) to depend, on the one hand, on the factors of decomposition of organic substances (heat, moisture, porosity), as affected by the physical nature of the ground and its covering; on the other hand, on the resistance which the ground presents, according to its mechanical state, to the escape of the gas. Ground-air seems to have most carbonic acid when the ground is at a slope of about 20 deg. Slopes facing south have most carbonic acid; those facing north least, though the difference is not great, as the two principal factors, heat and moisture, largely counteract each other. In drought, ground facing north has more carbonic acid. With equal quantities of organic matter there is more carbonic acid, the more finely granular the ground; and such ground hinders movement of the gas downwards as well as into the atmosphere. The air in ground shaded by living plants has considerably less carbonic acid than that in the bare ground, and in the latter it has less (in dry years, not in wet), than in ground covered by dead parts of plants.—*Nature*.

**Building on the Clock House Estate, Clapham Common.**—The Clock House Estate, on the east side of Clapham Common, is at present the scene of active building operations. The estate, which occupies about twenty acres, and which for many years was the residence of the late Mr. J. Kemp-Welch, was, with the mansion, sold about two years since for upwards of 50,000l., with the view of its being laid out for building purposes. A few months since the materials of the mansion were disposed of, and the building having been cleared away, the estate has been laid out for building upon. It has a frontage to Clapham Common nearly 600 ft. long, its south boundary being Cavendish-road. Three new roads have been formed through the estate, running parallel with Cavendish-road, eastward, and already several new houses have been erected facing these various roads, and also in Cavendish-road, whilst fronting the main road, overlooking the common, several residences are in course of erection. The area of the estate will admit of the erection of about 400 houses of the "villa" class.

**Registration of Plumbers.**—A few days since, plumbers from Folkestone, Salisbury, Cardiff, Colchester, Leeds, and various districts of London, attended at the City and Guilds Technical Institute, Finsbury, to undergo practical examination in order to qualify themselves for registration. The examination included pipe-bending, joint-making, the formation of roof-gutters, cisterns, &c. After practical examinations in these branches, the candidates were required to answer questions prepared by the Board of Examiners, and directed to testing the candidates' knowledge of materials, construction, and sanitation. The Examiners in attendance included Mr. George Shaw, Chairman of the Registration Committee, and Messrs. Nurse, Gilbert, Timas, Webb, Smeaton, R. J. Syne, and Ashdown, nominated representatives of the United Operative Plumbers' Association and of the Plumbing Trade of London. The candidates on this occasion were chiefly journeymen.

**New Reservoir for Wallasey.**—The increase in the population of this rising suburb of Liverpool has necessitated a greater supply of water; and with that view, some time ago, the Local Board of Wallasey decided to construct a new reservoir in the upper portion of New Brighton. After competition, the works were entrusted to Mr. J. Etheridge, contractor, Manchester. A few days since the water was turned on by the Chairman of the Gas and Water Committee (Mr. John Joyce). These works were designed by Mr. H. Ashton Hill, the Gas and Water Engineer to the Local Board. During the luncheon the contractor presented the Chairman of the Water Committee (Mr. J. Joyce) with a gold key, the facsimile of that used in turning on the water.—*Liverpool Journal of Commerce*.

**Raffety, Thornton, & Co. (Limited).**—We are informed that the directors of Messrs. Raffety, Thornton, & Co. (Limited) will, at the general meeting of shareholders on the 1st prox., recommend the payment of a dividend at the rate of 7 per cent. per annum (free of income-tax) for the half-year ended the 31st of December, 1886, making a dividend of 7 per cent. for the year, and carrying forward 1,098l. 19s. 5d.

**CONTRACTS AND PUBLIC APPOINTMENTS.**

*Epitome of Advertisements in this Number.*

**CONTRACTS.**

| Nature of Work, or Materials.                 | By whom required.      | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|-----------------------------------------------|------------------------|-----------------------------------|--------------------------|-------|
| Cooking Apparatus and Boiler                  | Barnet Union           | Official                          | Jan. 26th                | xix.  |
| Earth Drying and Storage Sheds                | Met. Asylums Board     | J. Wallace Peggs                  | Jan. 29th                | ii.   |
| Wood Pavement                                 | Folkestone Cor.        | A. W. Conquest                    | do.                      | xix.  |
| Sewers, &c.                                   | New Malden Local Bd.   | P. L. Heward                      | Jan. 31st                | ii.   |
| Construction of Reservoir                     | Northwich Local Board  | H. Bancroft                       | Feb. 1st                 | ii.   |
| Making-up and Paving Roads                    | Wandsworth B.d. of Wks | Official                          | do.                      | ii.   |
| Town-Hall and Offices                         | Fulham Vestry          | G. Edwards                        | Feb. 2nd                 | ii.   |
| Stoneware and Fireclay Pipes, Cement, &c.     | Southgate Local Board  | C. G. Lawson                      | do.                      | xix.  |
| Road Materials                                | Bexley Local Board     | E. B. Boulter                     | do.                      | ii.   |
| Basement and Restoring Oak Panelling          | Dor. of Exeter         | E. L. Parsons                     | do.                      | ii.   |
| Silencing Echo in Drill-Hall                  | 18th L. R. V.          | Official                          | Feb. 4th                 | ii.   |
| Construction of R. ad                         | Met. Board of Works    | do.                               | Feb. 6th                 | ii.   |
| Miscellaneous Repairs, &c.                    | Tottenham Local Board  | do.                               | do.                      | ii.   |
| Hospital for Infectious Diseases              | Sunderland Cor.        | Official                          | Feb. 10th                | ii.   |
| Road Materials                                | Com. of H.M. Works     | do.                               | do.                      | i.    |
| Restoration & Completion of College Buildings | Wales University Coll. | Seddon & Carter                   | Feb. 14th                | ii.   |
| Steel Dock Gates and Caulson                  | Barry Dock, &c., Co.   | Barry & Brunel                    | Feb. 18th                | ii.   |
| Erection of Hotel, High Beach, Essex          | do.                    | D. Burnett                        | Feb. 23rd                | ii.   |
| Enlargement of Board School                   | Schl. Board for London | Official                          | Not stated               | ii.   |
| Horse Repository, New Kent-road               | do.                    | Inkpen & Stallard                 | do.                      | xix.  |
| Addition to Cottage Hospital, Bromyard        | do.                    | F. R. Kempson                     | do.                      | xix.  |
| Erection of Villa Residence, Norbiton         | do.                    | J. T. Tabrum                      | do.                      | xix.  |
| Works, Repairs, and Materials                 | War Department         | Official                          | do.                      | ii.   |

**PUBLIC APPOINTMENTS.**

| Nature of Appointment. | By whom Advertised.   | Salary.    | Applications to be in. | Page. |
|------------------------|-----------------------|------------|------------------------|-------|
| District Surveyor      | Met. Board of Works   | Not stated | Jan. 28th              | xvi.  |
| Surveyor and Inspector | Braintree Local Board | do.        | Feb. 8th               | xvi.  |

**PRICES CURRENT OF MATERIALS.**

| TIMBER.                      | £. s. d. | £. s. d. | TIMBER (continued).                   | £. s. d. | £. s. d. |
|------------------------------|----------|----------|---------------------------------------|----------|----------|
| Greenheart, H.G. .... ton    | 6 10 0   | 7 0 0    | Wainscot, Riga ..... log              | 2 15 0   | 4 0 0    |
| Teak, E.I. .... load         | 9 0 0    | 14 0 0   | " Odessa, crown .....                 | 3 5 0    | 3 7 6    |
| Ask, Canada ..... load       | 2 4 0    | 2 7 0    | Deals, Finland, 2nd and 1st, std. 100 | 7 0 0    | 8 0 0    |
| Sequoia, U.S. .... foot cube | 3 0 0    | 4 10 0   | " " 4th and 3rd .....                 | 6 0 0    | 6 10 0   |
| Birch " " " " " "            | 2 5 0    | 3 10 0   | Riga " " " " " "                      | 5 10 0   | 7 0 0    |
| Elm " " " " " "              | 3 10 0   | 4 10 0   | St. Petersburg, 1st yellow            | 8 10 0   | 13 0 0   |
| Hir, Danisic, &c. ....       | 1 10 0   | 4 0 0    | " " 2nd " " " "                       | 7 0 0    | 8 0 0    |
| Oak " " " " " "              | 2 10 0   | 4 10 0   | " " white " " " "                     | 7 0 0    | 10 0 0   |
| " " " " " "                  | 3 0 0    | 6 0 0    | Swedish " " " " " "                   | 6 0 0    | 15 0 0   |
| Pine, Canada red .....       | 2 0 0    | 3 10 0   | White Sea " " " " " "                 | 7 0 0    | 17 10 6  |
| " " " " " "                  | 2 5 0    | 4 0 0    | Canada, Pine, 1st .....               | 17 0 0   | 23 0 0   |
| " " " " " "                  | 3 0 0    | 5 0 0    | " " 2nd .....                         | 11 0 0   | 17 0 0   |
| Lath, Danisic " " fathom     | 3 0 0    | 5 0 0    | " " 3rd, &c. ....                     | 6 0 0    | 8 0 0    |
| St. Petersburg " " " "       | 4 0 0    | 5 10 0   | " " Spruce, 1st .....                 | 8 0 0    | 11 0 0   |
|                              |          |          | " " " " 3rd and 2nd .....             | 5 0 0    | 7 10 0   |

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like TIMBER (continued), Deals, New Brunswick, &c., Flooring Boards, Second, Other qualities, Cedar, Cuba, Honduras, &c., Mahogany, Cuba, St. Domingo, cargo average, Mexican, Tobasco, Honduca, Maple, Bird's-eye, Rose, Rio, Bahis, Box, Turkey, Satin, St. Domingo, Porto Rico, Walnut, Italian.

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like METALS, IRON—Bar, Welsh, in Wales, Staffordshire, London, Sheets, single, in London, Hoops, Nail-roads, COPIERS—British, cake and ingot, Best selected, Sheets, strong, Chill bars, YELLOW METAL—Silesian, special, LEAD—Pis, Spanish, English, common brands, Sheet, English, SPELTZER—Silesian, special, Ordinary brands, TIN—Straits, Australian, English ingots.

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like OILS, Lined, Cocoon, Ceylon, Palm, Lagos, Rapeseed, English pale, Cottonseed, refined, Tallow and Oleine, Lubricating, U.S., reduced, TURPENTINE—American, in casks, TAB—Stockholm, Archangel.

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like TENDERS, BARKING (Bessy)—For the construction of precipitating and sludge settling channels, a pier and jetty, the erection of engine and boiler houses, workshops, stores-sheds, superintendent's house and workmen's cottages, and the execution of numerous other works in connexion with the foregoing, for the purpose of the intended sewage precipitation works at the northern main drainage outfall, Barkling-creek, for the Metropolitan Board of Works. Sir J. W. Bazalgette, engineer.—Perry & Co., Lucas & Aldred, John Jackson, Williams, Son, & Wallington, Whittaker Bros., W. Webster, J. Mowlem & Co. (accepted).

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like BROCKLEY.—For kerbing and making up Comerford-road, Brockley, for the Lewisham Board of Works.—Woodham Bros., Farthing & Co., Adams, Marshall, Mowlem & Co., Kelsey, Woodham & Fry (accepted).

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like CARDIFF.—For erecting a residence at Llanishan, for Mr. P. H. Thompson. Mr. F. Baldwin, architect, Cardiff. Quantities by the architect.—Theo. Gough, Turner & Sons, D. J. Davies, Shepton & Son, G. Smallbridge, John Haines (accepted). [All of Cardiff.]

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like HEREFORD.—For the erection of new premises, Eign-street, Hereford, for Mr. F. T. Boulton. Mr. W. W. Robinson, architect, King-street, Hereford.—Partington, B. B. Nightingale, C. Wall, Callis, Hiles, Bower & Co., T. Lewis (accepted). [All of Hereford.]

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like LAMBETH.—For reconstructing the old Workhouse, Princes-road, Lambeth, for the Guardians of the Poor. Mr. Thos. W. Aldwinckle, architect, East India-avenue, Leadenhall-street. Quantities supplied.—B. B. Nightingale, J. Tyerman, Mowlem & Co., Holloway Bros., J. T. Cuspell, F. R. Tuttle, G. Stevenson, W. Johnson, H. Quennell, C. Wall, Tuttle & Appleton, G. Stevenson, F. & H. F. Higgs, W. Downs, Holaday & Greenwood, Stephens, Buttery, & Co., E. C. Howell & Son, J. Mills, Balam Bros., R. M. Friedley, E. Lawrence & Sons, Kirk & Randall, Prestige & Co., W. Smith, C. Cox, H. L. Holloway (accepted).

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like LONDON.—For rebuilding on the sites of Nos. 397, and 399, Oxford-street. Messrs. T. Chatfield Clarke & Son, architects.—Hall, Beddall, & Co., Cubitt & Co., Nightingale, Clarke & Bracey, Holland & Hannen, Brown, Son, & Blomfield, A. Bush, Bywaters, Clarke & Sons, C. Cox, Morter, E. Lawrence & Sons.

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like LONDON.—For rebuilding on the sites of Nos. 391 and 393, Oxford-street. Messrs. T. Chatfield Clarke & Son, architects.—Cubitt & Co., Holland & Hannen, A. Scott, Clarke & Bracey, Hall, Beddall, & Co., Bywaters, Nightingale, Colle & Sons, A. Bush, C. Cox, Morter, Brown, Son, & Blomfield, E. Lawrence & Sons.

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like LONDON.—For engineering works at the old Workhouse and Infirmary, St. John's Hill, New Wandsworth, for the Guardians of the Wandsworth and Clapham Union. Mr. Thomas W. Aldwinckle, architect, East India-avenue, Leadenhall-street.—Jeakes, Davis, May, Goddard & Massey, Berry (accepted).

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like LONDON.—For rebuilding 73 and 75, Lower Thames-street. Second contract. Mr. Banister Fletcher, architect.—J. O. Richardson (accepted).

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like PONTYCYMMER (Wales)—For erection of school at Pontycymer, for the Llangenor School Board. Messrs. Seddon & Carter, architects, Westminster and Cardiff. Quantities by Mr. Norman Whit.—E. Thomas, Neath, Jenkins, Bros., Swansea, D. C. Jones & Co., Gloucester, N. Francis, Pontycymer, J. Ratray, Pontycymer, G. James, Bridgend, C. Jenkins & Co.,\* Biscanaw, \* Accepted subject to certain modifications.

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like READING.—For a detached block of eight cottages to be erected in Weston-street, Reading, for Mr. J. Bligh Monck. Messrs. Cooper & Son, architects, Biscanaw-street, Reading. Quantities supplied by the architects.—W. Goodchild, Patience & White, H. Higgs & Sons, G. Werham, T. Pilgrim, G. Pilgrim, J. C. Cooke, D. Taylor (accepted). [All of Reading.]

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like ST. MARY CHAY (Kent)—For alterations and decorations at a private residence, near St. Mary Chay, Kent. Mr. St. Pierre Harris, architect, Basinghall-street, E.C.—W. R. Taylor, Orpington, H. Stangerford & Son, Clapham, Thos. Knight, Sidcup, F. W. Wood, Chislehurst, Taylor & Son, Bromley (accepted).

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like WILLESDEN.—For making and draining with sewers and surface water drains, a new road on the Pleasantfield Estate, Willesden, for the Imperial Property Investments Co., Limited, Moorgate-street. Mr. G. H. L. Stephenson, surveyor.—Bell, Felton, Cooke & Co., Walker, Jackson, Wilson (accepted).

Table with 4 columns: Item, £. s. d., £. s. d., £. s. d. Includes categories like WORKING (Surrey)—For constructing a new road 1,600 feet in length and 36 feet wide joining Palmerston-road and Horsell Common, for the Directors of the National Liberal Loan Company, Limited. Mr. George Pockley, surveyor, Charing Cross.—Stephen Kavanagh, Surbiton, Samuel Chislen, Rotherhithe, William Carter, Leytonstone, Jesse Williams, Woking, William Nicholls, Wood-green, Alfred & J. Gale, Woking, James C. Trueman,\* South Hackney, \* Accepted. [Surveyor's estimate, £800.]

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### Mechanics of the Girder.



THE majority of English bridges were erected at a time when there was but little theory to guide the engineer; the principle of leverage and a simple application of the parallelogram of forces were all he had to direct him in proportioning his material, and it is doubtful, even if the more complete methods of the present day had been available, whether he would have been able to find the time requisite for their use. Accordingly, with such precautions as were deemed necessary to "keep on the safe side," approximate formulæ founded upon very limited experiments were considered to be amply sufficient. Now, however, that we have time to look around us, a "learned" education is a *sine qua non* for an engineer, and he finds ready to his hand the investigations of mathematicians into the structures for whose practical design he is responsible. Applying the general principles of the mathematician to specific cases, the engineer occasionally presents us with an elaborate record of his research, and such a work is that before us,\* by J. D. Crehore, a recently deceased United States engineer.

Commencing with a simple examination into the action of pressures and forces in a plane, he proceeds to an enunciation of the principle of moments, and shows the application of it to the external forces upon beams and girders variously loaded and supported. The descriptions are accompanied by a concise table of the formulæ for the moments at any section, which must be resisted by the internal forces of the beam; numerical examples illustrate each case, and every care is taken to so arrange the matter that the elucidation of the subject shall be continuous with the explanation of the principles. The most modern terminology is not adopted, but the meaning is nevertheless perfectly clear. With regard to the strains in framed or built girders, the author truly remarks that the published results of trustworthy experiments for determining the ultimate resistance of materials to shearing, are very meagre; those recorded by Rankine and Stoney are given in a table, and show considerable variations. The conditions of experiments

are frequently such as do not arise in practice, e.g., in punching a hole through a wrought-iron plate or bar we have a true shearing force, but the support afforded by the surrounding material makes the result useless as an indication of the shearing strength for structural purposes. A large number of diagrams typical of framed trusses for roofs and bridges are given, and their corresponding formulæ, either by the method of moments, or that of shearing forces, or both combined. We are then presented with the mode of estimating the moment of resistance offered by the cohesion of the particles of the material composing a rectangular beam, followed by the moments of resistance of the internal forces of a girder with continuous web, and various hollow and solid forms. As the investigations assume throughout a knowledge of trigonometry and the integral and differential calculus, the use of this book will, no doubt, be limited, but many young engineers who have not yet rusted up will hail it as a very thorough and complete work upon an important subject, leaving no part to guess-work but having everything, so far as may be, mathematically demonstrated. The plane of the neutral axis is generally considered to pass through the centre of gravity of a section under all conditions of strain, although the author confines this position, and we think rightly so, to cases where the elastic limit is not surpassed. He then gives us a very complete table of the ultimate resistance to compression, tension, and cross-breaking, together with the modulus of elasticity, of various materials. This is most useful for reference as a compact summary of all the best known and most important experiments. In the next chapter, which is a long one, the deflections of all the various forms are rigorously deduced from the equation of the elastic curve, and it is then shown that for open girders of the same central height, same length, and of uniform strength, the total deflection is nearly in the inverse ratio of the areas of the figures of the girders.

In connexion with the theoretical dimensions of oak beams for supporting given loads, attention is called to one of the causes for the popular opinion that theory and practice are sometimes at variance. "In order to simplify the work of calculation the equations which determine the dimensions do not pretend to take into account all the conditions affecting the sufficiency of the beam for its purpose, and hence the theory is not complete until the modifying conditions are introduced." The different modes of producing camber, and their effects upon trussed beams, are briefly discussed. The strength of pillars, including all cases of thrust is next considered by rational

formulæ compared with the empirical formulæ of Hodgkinson, Gordon, and Rankine, and afterwards with experiments of Hodgkinson, Lovett, &c., but although these are very carefully collated, they only serve to show that we are still very much in the dark as to the true theory of the strength of pillars. The United States Government have a special testing-machine in the Arsenal at Watertown, Mass., and it is hoped that they will shortly contribute a set of values for the constants to be used in formulæ more in agreement with the capabilities of the actual members of the structures than any values hitherto determined. The next chapter of the book deals with the proportions and weights of all the members of a bridge excepting the girders proper, and following this the stresses are determined in various girders, together with their weight and the effect of wind-pressure. The effect of varying the number of bays or panels is followed out in the calculations to present a tabular view of the comparative advantages and disadvantages, and, owing to the mass of calculations, the method appears rather more cumbersome than it really is, considering the value of the results. The author then gives a copy of the general specification for iron bridges issued in 1879, by the New York, Lake Erie, and Western Railroad Companies, containing much useful information for designers. We have only space for a few extracts:—

"The following modes of construction shall preferably be employed:—Spans up to 17 ft., rolled beams; 17 ft. to 40 ft., riveted plate girders; 40 ft. to 75 ft., riveted lattice girders; over 75 ft., pin-connected trusses. In calculating strains, the length of span shall be understood to be the distance between the centres of end pins for trusses, and between centres of bearing-plates for all beams and girders. . . . Variations in temperature to the extent of 150 degrees shall be provided for. . . . All parts of the structures shall be so proportioned that the maximum strains produced shall in no case cause a greater tension in pounds per square inch than the following:—On lateral bracing, 15,000; on solid rolled beams used as cross floor beams and stringers, and on bottom chords and main diagonals, 10,000; on counter rods and long verticals, on bottom flange of riveted cross girders net section, and on bottom flange of riveted longitudinal plate girders over 20 ft. long, net section, 8,000; on bottom flange of riveted longitudinal plate girders under 20 ft. long, net section, 7,000; on floor beam hangers, and other similar members liable to sudden loading, 6,000. . . . In beams and girders, compression shall be limited as follows:—In rolled beams used as cross floor beams and stringers, 10,000; in riveted plate girders used as cross floor beams, gross section, and in riveted longitudinal plate girders, over 20 ft. long, gross section, 6,000; in riveted longitudinal plate girders under 20 ft. long, gross section, 5,000. . . . The rivets and bolts connecting all parts of the girders must be so spaced that the shearing strain per square inch shall not exceed 6,000 lb., nor the pressure upon the bearing surface exceed 12,000 lb. per square inch of the projected semi-intrados

\* Mechanics of the Girder: a Treatise on Bridges and Roofs, in which the necessary and sufficient Weight of the Structure is calculated, not assumed; and the Number of Panels and Height of Girder that render the Bridge Weight least, for a given Span, Live Load, and Wind-pressure are determined. By John Davenport Crehore, C.E. New York: John Wiley & Sons. London: Trübner & Co. 1886.

(diameter by thickness of piece) of the rivet or bolt hole. Pins shall be so proportioned that the shearing strain shall not exceed 7,500 lb. per square inch, nor the crushing strain upon the projected area of the semi-intrados of any member connected to the pin be greater than 12,000 lb. per square inch, nor the bending-strain exceed 15,000 lb. per square inch when the centres of bearings of the strained members are taken as the points of application of the strains. . . . The compression flanges of beams and girders shall be stayed against transverse crippling when their length is more than thirty times their width. The unsupported width of any plate subjected to compression shall never exceed thirty times its thickness. . . . The iron in the web-plates shall not have a shearing strain greater than 4,000 lb. per square inch, and no web-plate shall be less than  $\frac{1}{4}$  in. in thickness. . . . When the least thickness of the web is less than one-eighth of the depth of a girder, the web shall be stiffened at intervals not over twice the depth of the girder. The pitch of rivets in all classes of work shall never exceed 6 in., nor sixteen times the thinnest outside plate, nor be less than three diameters of the rivets. . . . The rivets used will generally be  $\frac{3}{4}$  in. and  $\frac{1}{2}$  in. diameter. The distance between the edge of any piece and the centre of a rivet-hole must never be less than  $\frac{1}{4}$  in., except for bars less than 2 $\frac{1}{2}$  in. wide; when practicable it shall be at least two diameters of rivets. When plates more than 12 in. wide are used in the flanges of plate or lattice girders, an extra line of rivets, with a pitch of not over 9 in., shall be driven along each edge to draw the plates together and prevent the entrance of water. . . . The pins shall be turned straight and smooth, and shall fit the pin-holes within one-fiftieth of an inch. . . . All bed-plates must be of such dimensions that the greatest pressure upon the masonry shall not exceed 250 lb. per square inch. All bridges over 50 ft. span shall have at one end nests of turned friction-rollers formed of wrought iron, running between plated surfaces. The rollers shall not be less than 2 in. diameter, and shall be so proportioned that the pressure per lineal inch of rollers shall not exceed the product of the square root of the diameter of the roller in inches multiplied by 500 lb. Bridges less than 50 ft. span will be secured at one end to the masonry, and the other end shall be free to move by sliding upon plated surfaces. . . . In riveted work all surfaces coming in contact shall be painted before being riveted together."

In chapter x. we have a section of 100 pages devoted to a practical illustration of the author's method in working out all details of a Brunel girder bridge, consisting of two equal parabolic double-bow girders, with top and bottom chords of same curvature. It was the intention of the author to carry out similarly an example in each of the twelve classes of girders which he delineates; but his death in 1884 left the work unfinished, and we have at present only one other example worked out, viz., the parabolic bowstring girder, of double triangular system, with which the book closes; the method of working is, however, fully set forth in the earlier pages, and we are promised the completion of the remaining examples by Professor John N. Stockwell, who has supervised the passage of Mr. Crehore's MS. through the press. The "method of moments" in this form is not much in favour among bridge designers in England, but possibly its use may become more extended when it is seen how applicable it is to the investigation of the economics of construction, and no one has more fully exemplified this than the author of the present work.

#### SPECIFICATIONS FOR PRACTICAL ARCHITECTURE.\*

It is so seldom that an architect addresses himself to serious literary work that we are most reluctant to discourage such attempts by a too rigorous criticism. Still, there are cases in which plain-speaking is a duty, and the work before us presents such a case. The original edition of Alfred Bartholomew's "Specifications for Practical Architecture" was published in 1839. It met with an immediate and deserved success, was re-issued in the following year, and republished with revisions in 1846. It was the first attempt to reduce the art of specification writing to a system, and was prefaced by an essay on the history of the art of building. Its author possessed all the necessary

\* Specifications for Practical Architecture: a Guide to the Architect, Engineer, Surveyor, and Builder, &c. Upon the basis of the work by Alfred Bartholomew. Thoroughly revised, corrected, and greatly added to. By Frederick Rogers, Architect. London: Crosby Lockwood & Co. 1889.

qualifications for the task, a wide experience of practical building, a true feeling for art, a vast store of archaeological and antiquarian learning, and a literary style of singular clearness and force. This once popular text-book has been for many years out of print, and it was a happy thought to revive and revise it for modern use.

The preface matter which forms the first part of the original work should have been reprinted intact for its historical interest, or omitted as no longer applicable to the present state of the art; or, if modified and modernised, should have been so printed as to leave the variations readily distinguishable. The editor has, however, taken a different view. He has mutilated the original text,—omitting about one half,—and he has not brought the remainder to date. The author's remarks on the Elizabethan and other impure styles have been cut out, either because the editor does not share the expressed objections to those styles, or because a change in the public taste has sanctioned their use. It may be fairly inferred that the editor endorses what remains of this preface essay. But will he seriously maintain that in this our day "our only endeavour is to copy at second-hand some ancient work in bad, improper materials"; that architects "are not sufficiently acquainted with the principle of the truss"; that we "expend our means in concealing chimney-shafts" (shades of Norman Shaw & followers!); that architecture has scarcely received from mechanical science "one machine for facilitating, improving, and rendering more exact the operation of building"; and, finally, does he really believe that even our public institutions become "in the first year of their existence masses of creaking ruins," filling every mind with "one humiliating feeling of disgust"? If he does not believe that this is a fair picture of the art as now practised, why does he publish it and hold up the profession, of which he is himself a member, to the scorn of the Philistines?

But, to come to the specifications themselves, which form the second part of the book. They have been reduced in number from fifty-four to twenty-seven, and with this we have no fault to find. They might have been still further reduced with advantage if only those retained had shown something of that "thorough and careful revision" which the editor claims to have exercised. Of the new systems of building, to which reference is made in the preface, we see little or nothing. As to the "greater attention given to hygienic matters," rendering certain additions to the text necessary, let us take this portion of the work for examination.

Chapter xvii. is a specification for a mansion, and here, at least, the subject of drainage may be expected to be fully gone into. We note in passing that all reference to a damp-course is omitted; but that is a trifle. Under the marginal note "Drainage," we are referred back to p. 77. This is a specification for a small dwelling-house" (of the fourth rate in the original edition), and does not look a very promising beginning of an important subject. At p. 77 this is what we find:—"Drainage, &c. To lay to a fall of 1 $\frac{1}{2}$  in. in 10 ft., 6-in. socket-jointed earthenware soil drain-pipes, and 4-in. branch drains from the rain-water-pipes, with proper Y and other junctions, bends, and diminishing pipes, trapped to all outlets, as shown on plan of drains."

It is not necessary for us to enlarge upon the scantiness and imperfection of this description. Let us try again. For the sinks we are referred to p. 81, and there the waste is properly described as being carried through the wall and discharging over a gully. Under "Butler's sink" we find, however, this instruction "Line the butler's sink . . . with bell-trap and connexion with the drains."

What sort of connexion? At p. 390, the last example in the book, it is stated casually in a note that rain-water pipes and wastes are not to be connected direct with the drains. It is the business of a specification to show how much work is to be done, and it is provided for in the earlier examples as follows:—

"To put to the sink in the scullery a 2-inch strong lead waste to lead into the drains."

"Put stacks of rain-water pipes from flats of projection (sic) bays and carried into drains."

"To put from the sink to the drains a 2-inch strong lead waste-pipe, &c."

We can find no reference whatever to the customary intercepting traps, the fresh-air inlets, the split pipes, the inspection pits at changes of direction, the flushing-tank at head of drains, nor to any of the points to which every architect now attends in the performance of this portion of his work.

We are almost afraid to call attention to these omissions lest the "Sanitary Engineer," for whom amongst others the book is written "as a guide," and who is now usurping the architect's position, should bring it before his clients as an indication of the manner in which the architect of to-day deals with this important part of his duty.

It would be an endless task to criticise in detail these model specifications. They teem with inaccuracies of all sorts. Precept and example are in perpetual conflict. The use of ganged brickwork is condemned and enjoined throughout, and all sorts of separate subjects are jumbled together. Pieces of carelessness, such as the provision of wash-out closet-pans with three-quarter inch service-pipes; and such antique injunctions as "put to internal doors wood mouldings to resemble architraves" are met with. Such paragraphs as this appear: "Put to all the windows Portland stone sills . . . and to all the other windows" &c. &c.; whilst the typographical errors—"damp corner" for damp course, "period" for per rod, "cubit" for cubic,—are incredibly numerous. Two words which should be banished from all scientific specifications are sprinkled thickly over the pages, viz., "proper" and "patent"; everything is to be "proper" or "properly done,"—which is not by any means specific; and "patent" is used as though there were in every case two articles, one patented and the other not,—patent lines, patent fasteners, patent w.c. apparatus, patent everything. The contractor for the fourth-rate dwelling-house is given the alternative of copper or zinc nails for the slating! Vagueness is carried in some instances to an extent which runs very closely to the amateur quantity surveyor's celebrated "No. 1 bay window complete."

We have, however, no heart to pursue further the distasteful task. A book on specifications has still to be written, and possibly the editor has all the necessary practical knowledge and literary qualifications, if he would only give himself the requisite trouble. But he should substitute the pen for the scissors, and for the long wail over the ignorance and back-sliding of his professional brethren,—which is as inaccurate as it is irrelevant and unseemly,—a carefully-written description of the various building processes as now pursued. He may then produce an edition "based on" Bartholomew's book which shall be really useful to the student, and we promise it in advance a welcome in proportion to its deserts.

#### NOTES.

THE Works Committee of the Metropolitan Board of Works have selected from the candidates for the post of Superintending Architect the following six names for further consideration:—Mr. A. Peebles, Mr. Rowland Plunbe, Mr. H. Gundry, Mr. T. Blashill, Mr. P. Gordon Smith, and Mr. E. J. Tarver. The Committee intend to recommend that the election be proceeded with on Friday next, the 4th of February. It may be remarked that the first four candidates on the list are all District Surveyors under the Board, and Mr. Gordon Smith is Architect to the Local Government Board, so that Mr. Tarver is the only one of the six selected who is a non-official architect. From among these six candidates the Board will be able to make a good selection for the post; but we cannot help expressing surprise at their ignoring the claims of their present Acting Superintending Architect, who seems to have been passed over for some reasons not apparent on the surface.

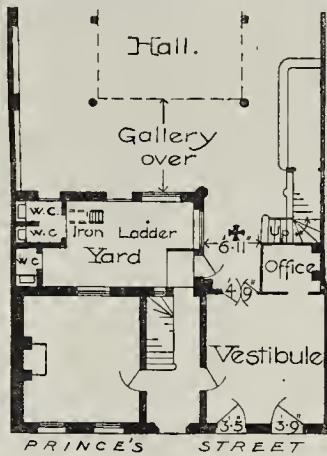
Since this was written we find that Mr. Williams has given notice that, when the recommendation of the Committee comes before the Board, he will move:—

"That the voting on the six selected candidates for the office of Superintending Architect be by ballot, and that the ballot be taken by each member of the Board writing one name of a candidate on a piece of paper, and so continuing until one of the candidates has a majority of the votes, and that at each count of the votes the name of the candidate who has the least number be struck out of the list."

FROM Mr. Westgarth we have received a pamphlet consisting mainly of a reprint of two papers contributed by him to the Journal of the London Chamber of Commerce. The object of the papers is to show briefly how the "appreciation" or rise in the standard value of gold has had an influence in temporarily reducing profits, for a concise explanation of which rather difficult subject we refer the reader to Mr. Westgarth's pamphlet,\* which puts the matter very clearly for the intelligence of the non-economic reader, though perhaps Mr. Westgarth does not bring forward quite prominently enough the necessarily temporary character of the influence and the almost certainty of a compensating re-action of the balance sooner or later in an opposite direction. The second portion of the pamphlet is devoted to a suggestion for the employment of labour in work for which the profit is to be obtained by "natural increment" (which phrase Mr. Westgarth prefers to "unearned increment"), in plainer language by holding on to the property till its rise in value in the natural course of things affords an adequate return for the outlay. Mr. Westgarth draws attention to the fact that outlay has already been incurred on this principle, in the Birmingham Municipal improvements and in some of the schemes of the Metropolitan Board of Works. As a matter of fact, it has often been tacitly acted upon; but the author wishes to suggest that this is a means of employing labour and putting out capital in an ultimately remunerative manner, which is destined to be much more largely and systematically employed than it has been. As a practical illustration to his paper, he cites the Houndsditch area as one where extensive improvements and rebuilding might be carried out to the employment of many hands, with the certainty of a large return eventually, from its contiguity to the increasingly overcrowded "city," and the same principle would apply to other sites which might be named. The difficulty is, perhaps, to find capitalists who can afford to wait long enough for their money.

WE append a ground plan of so much of the hall of the Hebrew Dramatic Club in Spitalfields as will serve once more to point the moral of such disasters as that which occurred a few nights ago to a panic-stricken crowd. The case is all the more noteworthy in that the defective planning which contributed to the disaster could easily have been obviated. The \* shown on the plan indicates the spot where the two streams of persons,—one coming from the body of the hall, and the other down the stairs from the gallery,—impinged and became jammed together. The stairs from the gallery could easily have been carried down in a straight line over the space marked "Office," instead of being turned at right angles, and with "winders" too. The vestibule is apparently wide enough to take both streams of people had they been both passing in the same direction, even without any barrier or partition wall to divide them, as would be preferable, and as is required by the Metropolitan Board of Works in buildings over which it has control. Too much attention cannot be paid to the planning of the exits of all buildings where large numbers of people assemble. Former disasters have shown that exits which might be sufficient when used by an audience of intelligent, self-controlled people (we doubt whether large audiences of such

are often brought together) are totally inadequate when there is a helter-skelter rush of panic-stricken people upon them. That the large hall in Spitalfields should not be under



the control of the Metropolitan Board of Works, while every little first-floor room of an ordinary public-house, if used as a concert-room, is under their jurisdiction, is one of those anomalies which are so abundant in the details of London "government."

THE circumstance that the funds raised by means of the Coal and Wine Dues have been almost exclusively devoted to the carrying out of public improvements within the metropolis itself seems to give good ground to the contributing outlying districts for desiring some alteration in the mode of administering these funds. The Acton Local Board has secured the support of most of the suburban authorities to a petition which, though not seeking the total and unconditional abolition of these dues, urges the application, in their administration, of the principle that representation and payment should go together. And there is no doubt that if the outlying districts were properly represented in this respect, the benefits derivable from these revenues would be extended, in a fair and equitable measure, to all parts of the contributing area. It is asked, for example, why should the inhabitants of districts as far west as Kingston-on-Thames and Staines be called upon to contribute by these dues funds for the construction of the proposed tunnel underneath the Thames in the east end of London? A carefully-prepared Bill, conceding to the outlying districts the principle of representation in regard to these dues, and the extension of their benefits to the whole of the contributing area would take away a great deal from the arguments of those who would totally abolish them.

MANY of our readers will have heard with great regret of the early and unexpected death of Mr. Alfred Newman, the worker in wrought iron, whose atelier, carried on under the firm of A. Newman & Co., has exhibited a remarkable progression since its comparatively recent establishment. Mr. Newman united in an unusual degree the qualities of business capacity and artistic taste; he thoroughly understood the principles of the treatment of wrought-iron work, and took the greatest interest in the adequate carrying out of designs entrusted to him; going into every detail, and often making valuable suggestions for the improvement in detail of designs entrusted to him for execution, especially in regard to facility of working, and appropriateness to the capacities of the material employed. His work was formerly carried on in some rooms in Marlborough-mews, whence he had not long since removed to the rooms in Archer-street, which had already become well-known to architects and others

interested in the production of wrought-iron design, and which presented to the visitor an interesting combination of artistic detail and practical workmanship. Several of Mr. Newman's works have been illustrated in our pages from time to time. Mr. Newman had been employed on among other things the great wrought-iron lamp standards for Eaton Hall, for the Marquis of Westminster; he had also carried out a good many wrought-iron signs for various premises in London, notably the large one which forms such a conspicuous object at the angle of Mr. Norman Shaw's picturesque building at the end of Pall-mall. Another characteristic work which we illustrated was the grille, with the spider in the centre, made for the entrance door of a house in Prince's-gate. Mr. Newman's loan exhibition of wrought iron work, ancient and modern, in some rooms in Bond-street a year or two ago, and his Saturday expositions on the subject to artisans, attracted much attention; and his forge in the grounds of the Health Exhibition was one of the centres of interest there. Only two or three weeks before his death we took part in a consultation with him and his chief artisan at the rooms in Archer-street, on the carrying out of a design of peculiar type; and he was then full of energy and interest in his work. Mr. Newman was quite a young man, and his death has terminated unexpectedly a career highly creditable to him, as that of one who put his whole heart and ability into everything he undertook.

DEVERTING to the mention made by us last week as to the opportunity which now presents itself for the re-erection of Temple Bar on a site which, as was pointed out in our column nearly two years ago, is a peculiarly appropriate one, viz., at the eastern entrance to the Temple precinct, we are glad to see that Mr. G. Gilbert Scott has written to the *Standard* in support of the suggestion. We have received a letter from Mr. J. R. Morgan, the Secretary of the Temple Bar Reconstruction Committee, stating that the remains, though no very great care has been taken of them, are in a better condition than might have been supposed, and approving of the idea of seeing the monument re-erected on the site proposed. Mr. Morgan states that the committee have been given to understand that, though the Corporation are indifferent as to the re-erection of Temple Bar, the stones will be presented to any one finding a site and the cost of erection.

THE last two numbers (35 and 36) of *Der Baumeister's Denkmäler des Klassischen Alterthums*, a publication the more noteworthy of whose issues we have drawn attention to from time to time, contains an article on Pergamos of special popular interest. It is not every one who can consult, still fewer who can possess, the magnificent work which the Prussian Government have published on the recent excavations. Now, at the cost of a few shillings, any one can obtain a reliable account of the whole proceedings, and what is even more desirable, a series of plates, which are in most cases very respectable reproductions of the now famous marbles. The great frieze of the altar is by now in part known to every one interested in art; photographs of it have, however, been dear and scarce. As to the smaller frieze, known as the "Telephos frieze," it is practically almost unknown. It is less well preserved, and of far less sensational interest, but in connexion with the history of art it is quite as important. The reason of its comparative obscurity is, no doubt, the fact that even at Berlin the original is not yet exposed to public view, though the courteous directors are always willing to show it to the professional visitor. We are glad to find that in the *Denkmäler* three of the slabs are figured, and in the text the interesting but little known myth of Telephos is fully discussed. The old and incorrect restoration of the great altar is unhappily given, but the editor states in a note that he is aware of the recent correction. This correction appears in a general view of the whole Acropolis.

\* To be had from F. C. Mathieson & Son, Bartholomew House, E.C.



WE recently called attention to the discovery of the statue of a running girl in the excavations at the Villa Spithover. The statue is just published, front and side views, in a fine prototype in the *Bulletino della Commissione Archeologica Comunale di Roma* (iii., 11), and turns out to be of even more interest than was expected. The statue has lost the head, arms, and lower part of both legs, but enough remains to show a curious and very close correspondence with a passage of Pausanias. Speaking of the races run by the maidens at Elis, in honour of Hera and in memory of the contest for Hippodameia, he says, "They all run with their hair loose down their back, and they wear a short tunic to below the knee, and the right shoulder is bare to the breast." All these characteristics appear with singular exactness in the Spithover torso, so that there can scarcely be a doubt that we have a votive statue set up by a victorious maiden. She was represented as *actually running*, not as just about to start, like the Vatican running girl. The style of the new statue is of the fine period, and the drapery is of singular freedom and grace, drapery that it was possible to run in, a singular delight in these days, when part, at least, of "the human dress is forged iron."

THE current issue of the *Board of Trade Journal* contains the following extract from a report on the water and sewer works at Warsaw, made by Mr. H. Grant, H.M. Consul in that city:—"The works undertaken in 1882 by Mr. W. H. Lindley for providing this city with a daily supply of 600,000 cubic feet of well-filtered water and with sewers measuring 58,000 ft. in length, at a cost of 350,000l. sterling, will be completed next spring, when it is expected they will be further extended, as the above supply of water will only suffice for about half the present population of Warsaw (420,000), and the same may be said of the sewers." The following articles required for the works have been supplied from England:—Stoneware invert lining, stoneware pipes, fire bricks, steam engines and boilers, cocks, and sluice-valves. The field is now open for water and sewer fittings, taps, water-closets, syphons, gullies (street and yard); also stoneware pipes and specials for house drainage (4 in. 6 in. and 8 in. diameter), stoneware gullies, &c. Lead piping will also be required, but it is doubtful whether British makers could compete in this.

WE have before referred to investigations as to the use of galvanised iron for water-pipes, and we have now another report on this subject from a German source, which is quoted in the current volume of the Proceedings of the Institution of Civil Engineers. At the 26th annual meeting of the German Gas and Waterworks Engineers, held at Eisenach, Dr. Bunte presented the report of a committee that had been appointed to inquire into the suitability of galvanised iron for water-pipes. As a result of numerous experiments made, it appeared that in the case of new pipes the water invariably took up zinc; but notwithstanding this, was in no way injurious to health. After some discussion the meeting unanimously decided the "employment of galvanised wrought-iron pipes for water supply occasions no injury to health."

MR. ACLAND'S letter in the *Times* of the 21st inst. demands the consideration of the powers that be. He pointed out the difficulties which exist in the obtaining of Government publications, such as reports of Select Committees and Royal Commissions. Not only is their price high, but their form is very inconvenient, indexes and tables of reference are often published long after the evidence or the report appears. Except by very special application and at the expenditure of some trouble, it is not possible to obtain these publications. It is clear that reports and similar documents should be published at a reasonable price in a convenient form so that they should be not only published in the sense of being printed but should be issued in such a manner that any one interested in the subject of which they

treast should be able to obtain them without difficulty and at a reasonable price.

THE next thing to abolishing distance by making new railways is to utilise more completely those that are made, and to get the very utmost of them by international connexion, which at once impresses upon the system a necessity for saving every moment. By so doing the Iberian Peninsular Company has succeeded in saving seventeen hours in the journey between Lisbon and London, and twelve hours between Madrid and London. Fifty-one hours' run between the Spanish and English capital is pretty good work, and no one can complain of thirty-six hours from Lisbon. There is no change of carriage between Lisbon and Calais, the difference of gauge being got over by the simple means of slinging the body on another set of wheels, and so easy is this arrangement, that it is a wonder that it has not been resorted to before. The South American trade will benefit by this new route more than all others, and when we remember the horrors of the Bay of Biscay, we may well imagine that a fair overland traffic to Gibraltar and the Mediterranean may spring up, bringing Lisbon in the regular highway of traffic. It is to be hoped, too, that the parcel post between England and Spain may be put on a proper basis; for hitherto we have been one of the few nations that have been bereft of that privilege.

WE have received from Messrs. W. Cooke & Co., of Leeds, a number of samples of their "Golden Lustre Silk Paperbangings," which are, in fact, wall-papers of the usual types of design, but made, by a special process, with a surface having a silk-like lustre, and with something also of the richer texture of silk, as compared with ordinary paper. We are not, we confess, liable to be moved to any great enthusiasm about improvements in wall-papers, having a deeply-seated conviction that wall-papers are at the best an evil which it is for the time necessary to be subject to, because no other more sanitary and equally economical method of giving a decorative surface to the interior of a room has been devised. Apart from this general principle, however, we admire the effect and lustre of these papers, which may afford a new item in decorative effect, at a moderate cost.

A PROJECT is on foot to provide a new parish church for Hornsey. The Rev. James Jeakes, rector, has offered a site in Church Yard for an edifice to receive 1,200 persons. An amount of 4,000l. is already promised, under certain conditions, to the building fund. The existing church, rebuilt in 1832, is conspicuous for its ivy-clad tower, that dates from the fifteenth century. In the graveyard are buried Rogers, the poet, who once lived at Stoke Newington; and a daughter of Tom Moore, who for awhile occupied a cottage at the foot of Muswell, or rather Mousewell, hill. The surrounding woods are remains of the ancient manor and park of Haringhee or Haringay, that were reserved for the chase by the bishops of London. In the bishops' palace Henry VII., on his accession, was offered homage by the citizens of London. Hornsey Wood together with the later Wood House or tavern, and its lake, near to the Stuce House, a favourite resort for cockney anglers of the last generation, is now represented by Finsbury Park. The park covers 115 acres of the Finsbury division of Ossulston Hundred.

SOME old houses by the entrance into Fleadis-court, Fetter-lane, are about to be demolished. That to the left hand is a traditional home of Dryden, who is said, when living here, to have opened a quarrel, in verse, with his neighbour, Otway, across the street. This house bears a tablet to the memory of "glorious John!" It is remarkable for the two lions' heads above its side piers. The house on the right hand of one entering the court is notorious for the murder there (1767) by Mrs. Brownrigg of her apprentice Mary Clifford. They who are curious in such matters may see the cellar-

grating through which the victim's screams were heard. Here was formerly one of the fishing-tackle shops for which Fetter-lane was at one time renowned.

AT their recent annual general court the Honourable Artillery Company of London resolved to commemorate the Queen's Jubilee concurrently with the 350th anniversary of their own-embodiment. The commemoration will consist of the addition of a new wing to the Armoury House, by Bunhill fields, together with a spacious drill-hall and riding-school, to cover an area of 65 ft. by 108 ft. The ground they now hold, being part of the prebendal manor of Finsbury (more correctly, Holywell), was originally leased to them in 1641, under name of the New Artillery Garden. This regiment is singular in its absolute emancipation from anything in the form of Parliamentary control. The members of the infantry battalion are commonly regarded as modern representatives of the City Trained Bands. But they quite repudiate an honour which more strictly appertains to the City of London Militia, whose headquarters adjoin to their own. There are records to show that in 1796 the Court of Assistants resisted,—and for some months with success,—the use of their ground by the London Militia, who had been enrolled, or rather, reorganised, in the previous year. The Company, distinguished as "Honourable" in 1685, claim status and governance in virtue of certain royal warrants granted and confirmed to them by our several sovereigns, from a date when "regular" forces were not. In the year 1537 King Henry VIII. gave them a charter of incorporation, with the style of the "Fraternity or Guild of St. George." Their muster-rolls comprise an unusually long list of highly eminent personages. In 1770 John Wilkes was elected as a "general." Alderman Beckford, Monk, Milton, Prince Rupert, the Duke of Monmouth, and Sir Christopher Wren, were also members of the corps. It is this Company who are represented as firm upon the "No Popery" rioters in Broad-street (on the 7th of June, 1780, Walpole's "fat day"), in F. Wheatley's fine drawing, after an etching by J. Mox. Some of our readers are perhaps familiar with Picket's large-size aquatint, after E. Dayes, of the inspection a Finsbury by the Earl of Harrington, on the 22nd of September, 1803, wherein the artillerymen are shown as drawing their cannon with ropes. The Jubilee festivities will be attended by delegates from the Artillery Company of Boston, U.S., founded there in 1731 by an emigrant member of the Company in London.

THE Baths Committee of Bath, not satisfied with Mr. Penrose's report, have now called on Mr. Waterhouse to report both as to the stability of the new building and the steps taken to keep the Roman bath remains unobstructed. On the latter part of the matter Mr. Waterhouse does not differ much from Mr. Penrose; he considers that City Architect has steered a fair course between archaeology and practical requirements. This may be fairly said, perhaps, though it strikes us that both reports were (unconsciously, no doubt) drawn up rather in the terms of an advocate of the City Architect than of a judicial critic. Mr. Waterhouse is against the idea of making a vaulted basement for the specific purpose of enclosing the Roman remains, on the ground that it will spoil the new room above by taking away from their height, and that the Roman remains will get very little light in that way. He is emphatic, however, in saying that every means should be taken to facilitate inspection of the Roman remains, and to isolate them completely would have been the most effectual way of doing this. Part of the mischief was done before the fight began about it; and the matter seems unfortunately to have been argued out by two parties, each holding rather exaggerated views in opposition to the other side. The archaeologists are no doubt somewhat neglectful, in their zeal, of the practical requirements of the modern bath-



while the City Architect and his allies seem actuated a good deal by a spirit of opposition and a determination not to take anybody's advice if it does not agree with their own opinion. Mr. Davis has not done all the damage to the remains that he is charged with; but he might have done still less if he had given his efforts to that object.

A CORRESPONDENT sends us a delightful specimen of "Instructions to Competing Architects" for a competition for a proposed cemetery at Fareham, Hants. No premiums are offered, and each competitor is to send a statement for what commission on the outlay he will do the work of planning and superintendence; so that apparently the "job" goes to the lowest bidder. Do the Fareham Local Board imagine they will get the services of any competent professional man in response to such an advertisement?

#### ON GREEK SCULPTURE AS EXPRESSIVE OF THE EMOTIONS.

ROYAL ACADEMY OF ARTS.

MR. A. S. MURRAY, Keeper of the Greek and Roman Antiquities in the British Museum, delivered the first of a series of three lectures on this subject, on Monday evening, to the students of the Royal Academy. He commenced by saying that it was a matter of common belief that Greek sculpture was singularly defective in expressing the emotions. Without stopping to contest the accuracy of the belief, which was partially shown to be ill-founded by such groups as the Laokoon, its origin and prevalence might, perhaps, be accounted for by the fact that our knowledge of the ancient Greeks had come down to us more through their literature than their art. It was usual with most people when they saw a piece of Greek sculpture to be content with the thought that it was Greek; that it had come down to them from a nation whose art they had been taught to admire; that it was strangely attractive to them by its costume, its attitudes, its lines, its modelling of form. They rarely set themselves to interpret it; it was enough that it was Greek. Their ideal was the Parthenon. They did not trouble to think much about the older sculptors who worked out the beginnings of the art and launched it on its prosperous voyage; nor did they mind overmuch the later sculptors, whom new impulses drove beyond the severe limits of the Parthenon. Worst of all, the remains of Greek sculpture were but a fragment of the whole, and that fragment we viewed only in such aspects as suited us. While it was true of the literature of the ancient Greeks that it was one of measured dignity and reserve, yet that was not the whole truth. The plays of Aristophanes were an obvious exception; and if the vast number of comedies which we knew now only from fragments had met with a better fate, we should have had more than enough of evidence as to the faculty of the Greeks for observing and characterising emotions of one kind or another. He did not know whether it was meant for blame or praise,—possibly sometimes the one and sometimes the other,—when it was asserted of Greek sculptors that they were defective in expressing the emotions as compared with the sculptors of modern or comparatively modern times. If it were meant for blame, the blame could not be just, even if it were true. A fair comparison would be between the Greeks and their predecessors, the sculptors of Egypt and Assyria, because the Greeks had many opportunities of learning from them or of profiting by their mistakes. It would be a fair comparison also from the fact that in both those nations sculpture had long flourished, if not with the same freedom as in Greece, yet with ample encouragement. In Egypt it was an art which ministered to the deepest thoughts and most sacred hopes of the people. In innumerable instances it was called upon to furnish forth a true presentment of famous deeds and famous men. But if inquiry were made as to what the Egyptians had done in that matter of expression, and if their works were contrasted with those of the Greeks, the advantage would be found to be on the side of the Greeks. Even in Assyria, where the sculptor was free to deal with forms and incidents of daily life, and to reproduce them in a manner likely to please and gratify the common tastes

of the day, we found extremely little in the way of representation in sculpture of the human emotions. As a rule, the Assyrian sculptor preferred action, and passed over the passions or emotions out of which it had arisen. The lecturer next proceeded to define what he meant by the phrase "expression of the emotions." No doubt, he said, there were certain emotions which were habitually expressed by certain actions. For instance, fear was expressed by opening wide the eyes and mouth, by the beating of the heart, the paleness of the skin, and, as fear increased to terror, by the hair standing on end and by the limbs losing their power. And this was true of savages as of educated persons. At the same time, the degree of intensity with which those actions were evoked might differ widely in differently-constituted men, or even in the same men under different circumstances. As an example of this, the lecturer quoted the beautiful scene in the *Odyssey* where Nausicaia and her maidens, while playing at ball on an open field, were startled by the sudden appearance of Ulysses, stripped by shipwreck of every rag of clothing he had possessed. The maids screamed and ran in horror, but the Princess Nausicaia awaited calmly to hear the story of the poor castaway. Homer, it would be allowed, was no bad observer of the different ways of expressing emotion in different classes of people. In reference to the scene referred to, there could, the lecturer supposed, be no question that the princess experienced the same emotion of surprise and fear as did her maids; she only revealed it in a different manner. He had not noticed that that different manner of expressing emotion in different classes of persons had been dealt with by Darwin and Herbert Spencer in their inquiries on that general subject. From their point of view it was held to gather as much evidence as possible from the average of mankind, if not from savages and others below the average, and thus establish the link between man and the lower animals. Besides, their object was to show that certain emotions, when they were produced at all, were manifested in the like manner in all persons; whereas the artist, in reproducing a particular incident, might treat it as the cause of strong emotion, or the reverse, according as he conceived the character of the persons whom it affected. He might make a child moved with terror while a grown-up person beside it remained perfectly calm. He might take his model from the market-place, where the slightest incident produced overdone emotion, or he might go to the other extreme, and find types of persons who had steeled themselves in presence of causes which produced emotion in others. The lecturer's argument was that in Greece there were sculptors who took both directions, but that naturally the latter sculptors chose the better types to work upon. That might appear to be a confession that the best sculptors of Greece avoided the expression of emotion; but he (the lecturer) had still to consider whether, by selecting a type of man steeled against the direct expression of emotion, and placing him in circumstances which would greatly move a different person, one might not equally convey the powerful, though not emotional, effect on him. It might be asked, did the Greek sculptors, like their contemporaries the dramatic poets, recognise the need of any contrast or foil to their tragic or serious compositions? and, in recognising that need, did they produce other statues or compositions intended to express emotions among beings of a lower nature? One would think that they must have occasionally experienced, after the strain of a more or less tragic composition, the same necessity of a spontaneous outburst of common nature in which they might give plastic form to their observation of scenes or incidents in daily life. We could easily understand how works of that kind were allowed to perish along with the multitude of satiric and comic plays which in later times no one cared to preserve. But a difficulty arose here, for whereas we had a record of the existence of the comedies, we had little or no record of works of the kind here contemplated being executed by the sculptors of the great age. We might fancy that Polykleitos, a sculptor renowned for the severity and dignity of his style, must have relaxed those qualities when he made a group of two boys playing at knuckle-bones. Or we might reinforce the argument by appealing to the story of the painter Zeuxis having died of a fit of

laughter at the figure of an old crone which he had himself painted. But, after all, the conclusion appeared to be inevitable that the vast proportion of sculptors in the best age dealt with subjects of a grave and serious turn, where emotion was naturally made evident by repression rather than by expression. In time there arose a new and separate class of artists who addressed themselves gradually, and at length specially, to a lighter kind of work, just as the strictly comic poets of Greece might be said to have arisen to produce the fun and drollery which their tragic brethren could not always command, the result being that the tragic poets were soon banished altogether from the stage, the comic poets reigning in their stead. Much of this lighter kind of work, displaying the keenest observation of the emotions, had survived to our day, and examples of it would be mentioned later on in dealing with the later stages of sculpture, for it was part of the lecturer's argument that the steady progress of Greek sculpture from its early times was accompanied by a progress in the expression of the emotions. The lecturer here quoted Lucian's description of a painting by Apelles, which represented "Calumny":—

"On the right sits a man with long ears, like those of Midas, holding out his hand towards the figure representing Calumny, who approaches him. Beside him stand two women, in whom Ignorance and Suspicion are personified. On the opposite side is Calumny herself, a woman of surpassing beauty; but here she is burning with anger and agitation, like one who cannot repress her rage and indignation. In her left hand is a flaming torch; with her right she drags along by the hair a boy, who stretches his hands to Heaven and calls the gods to witness. Then comes a man, pale and thin, with the cadaverous look of one wasted by long disease. That is Envy, and next appear two more women, pressing, decking, and adorning Calumny; they are called Cunning and Deceit. Behind them follows, poorly clad in black and tattered garments, the figure of a woman, Penitence by name, who weeps and looks back, ashamed, to Truth, who follows her."

Except for the figure of *Penitence* and that of the boy imploring Heaven, both of which were emotional enough, the picture of Apelles would remind us rather of the "Pilgrim's Progress," or, more appropriately to the present question, it would recall a little-known book, the "Characters of Theophrastus." Theophrastus would be more or less a contemporary of the painter Apelles, and would represent the general taste of the times for the observation of character—a taste which, though it perhaps never died out in any nation, yet had its times of ebb and flow. Strictly speaking, it might be said that the representation of character and of emotion were different things; and, what was at present more to the point, it might be said that the representation of both the one and the other in painting or in literature could not have more than a remote bearing on ancient sculpture. But he (the lecturer) was not so sure of that, for whatever was being done by contemporaries eminent in literature or in painting was done also, in their own way, by the sculptors. Why not, then, it might be asked, let Greek sculpture speak for itself? Unfortunately, Greek sculpture had been rendered dumb to a large extent by the loss and destruction of its greatest and noblest works. Passing on to notice the difference between the expression of character and that of emotion, the lecturer observed that the permanent character of a man was frequently revealed more strongly under emotion than otherwise. For that reason it was often difficult, in reading ancient descriptions of works of art, to make out how much or how little of the quality of emotion had been employed by the artist to help out his expression of character. Parrhasius, we were told by Pliny, painted a picture of the Athenian democracy in which he showed it to be variable of temper, angry, unjust, inconstant, and at the same time inexorable, clement, compassionate, self-glorious, proud, humble, fierce, slippery: in fact, "everything by turns and nothing long." We had to suppose that the Athenian *demos* was here represented by a single figure; but how so curious a complication of character could have been depicted in it was beyond comprehension, unless we assumed that his face was so conceived and so painted as to show a capacity for each and all of the various moods and emotions which had been mentioned. The remains of Greek sculpture which we now possessed afforded no large number of instances of emotional expression, except in minor or in later branches of the art. A well-known piece of sculpture mentioned by Homer ("Iliad," xxiv., 613) was the figure of Niobe out on the rock on Mount Siplyos. According to the poet, she had been turned into stone by the gods, and

there for ever sat brooding over her woes. Travellers found there still a figure cut into the rock, which, at a distance, had a resemblance to a woman. It was a figure of about 16 ft. in height, but the workmanship was too rude to give any evidence of a sculptor's talent; yet it might well be the Niobe of Homer. He need not have known how rudely it was cut; but it was certain that he believed the figure to be a woman expressing in her attitude the deep emotion of a mother who had lost at a moment her six brave sons and six fair daughters. Keeping still to Homer ("Iliad," xviii., 590) the lecturer instanced the chorus sculptured by Dædalus for Aridne in Crete, representing youths and maidens as they danced hand-in-hand round in a semicircle in joyous spirits. It was not supposed that these emotions were expressed by the sculptor with the precision of modern art, or with the accuracy of the poet in observing them. Greek sculpture was then in its infancy; but the mere fact of attempting such a subject was evidence at least of its desire to render emotions. One of the oldest existing works of Greek sculpture, the frieze of a temple which stood at Assos in the Troad, was now to be seen in the Louvre, with the exception of some pieces found on the spot recently by an American expedition. The relief was very low, and in many places very carefully executed. On one slab Herakles was shown wrestling with the sea-god Nereus, to the astonishment of the sea-nymphs, who dreaded the consequences to their friend Nereus. Their manner of expressing astonishment and fear was to extend their hands with the palms wide open, to run away and yet to be unable not to look back. In conclusion, the lecturer instanced one of three surviving metopes from a temple at Selinus in Sicily, in which the subject represented is Perseus cutting off the head of the Gorgon Medusa, the sculptures of the Harpy Tomb, some slabs of the Phigaleian frieze, the sculptures of the Temple of Zeus at Olympia, and a bust of one of the fourteen statues lately found on the Acropolis at Athens, to the north-west of the Erechtheion, as each and all affording clear evidence, more or less pronounced in character, of successful efforts made by early Greek sculptors to express the emotions.

Mr. Murray's second lecture was delivered on Thursday evening last, and dealt with Greek sculptures of about the time of Pheidias. He commenced by asking his hearers to bear in mind the significant fact that though Pheidias was the first to introduce true largeness and dignity into sculpture, yet in respect of those two qualities of style he had been preceded by others in the sister art of painting, and in particular by the painter Polygnotus. If then, we might gather from the records of that painter any conspicuous evidence of an inclination towards expressing human emotions, it would not be unreasonable to hear that evidence in mind as an indication of the atmosphere in which Pheidias was brought up. He did not mean to argue that Pheidias was obliged to follow out every line of observation indicated by the great painter. On the contrary, it was likely enough, from all that was known of him, that he rather set himself to confine within narrower bounds the freedom of expression which the painter had indulged in. Sculpture had a different function from painting in those days. It was more in the service of religion, and thus, even if it were known that Pheidias had in every instance severely repressed emotion in his figures, we should only be free to conclude that the occasion required so much,—not that he refused to recognise expression of the emotions as a legitimate channel of sculpture. As a matter of fact, we could not believe that his practice excluded a recognition of that view which we read ancient accounts of the impression made on spectators by his great statue of Zeus at Olympia. Of course, for a statue to make an impression was not exactly the same thing as to convey an expression. But it was worth observing that an artist, whether he were sculptor, painter, or poet, who produced a figure or a scene that moved us deeply, and yet was not itself moved, must possess the true creative faculty of anticipating our emotions,—must have himself gone through those very emotions in working out his conception. Returning to the painter Polygnotus, the lecturer said that the description had survived of two of his great paintings at Delphi, the one representing the taking of Troy, the other a visit of Ulysses to the Lower World, and

what he saw there. In the former picture there must have been extremely little of emotion, as, indeed, might be expected considering that the subject was one in which emotion had passed over into action more or less violent, according to the general law laid down by Mr. Herbert Spencer, and accepted by Mr. Darwin, that "feeling passing a certain pitch habitually vents itself in bodily action." But in the picture of the visit to Hades all that was changed. There, action had ceased to be of any avail,—so much so, that Achilles would rather have been a day-labourer on earth than a prince in the Shades. There was, however, a compensating scope for emotion. Having described this picture, in which, he said, there must have been abundance of emotion expressed, the lecturer glanced at the poetry of Greece during the century that immediately preceded Pheidias, which, fragmentary as it deploredly was, contained much to convince us of the strength and force with which the emotions were expressed. Homer was then, and for long afterwards, the great school-book of the Greeks. It was because of him in particular that Plato wished all poets to be banished from his republic; and one of the strongest arguments for that purpose which he put into the mouth of Socrates was founded on those very Homeric passages where emotion was most strongly expressed. Socrates, though he had been trained from his childhood to love and revere Homer, thought it wrong that the sorrow and tears of great men should be exhibited. The blame of Socrates extended to Pindar and Æschylus, the actual poets of the time of which the lecturer was speaking. But we ought to take notice of the fact that the strong objections which Socrates urged against the poets in the matter of expressing the emotions were not held out by him as applying equally to the sculptors. Socrates had himself been trained as a sculptor, and might be presumed to have been familiar with the various characteristics of the art which he had abandoned for the pursuit of philosophy. He was acquainted, also, with painters and painting. What, then, were we to say of his silence in regard to these arts on the subject of expressing the emotions, so objectionable to him in the poets? In the first place it was Plato who made the objections, and not necessarily Socrates, though the words were put into his mouth. In the second place, it had always been a cause of surprise that a thinker like Plato, who combined the perfection of literary art with the most intricate problems, should have passed over with so extremely little notice the great works of sculpture in the Athens of his day. There was no proof that he had any eye for them at all, and we could readily suppose that in avoiding criticism of them in reference to the emotions he was guided by the desire of not exposing himself to successful rejoinders. In any case his silence was not to be construed as proof that in his estimation the sculptors were altogether free from the charge which he had levelled at the poets. It was not, of course, possible for sculpture to go nearly the same length in that matter as a narrative poem like the Iliad. Sculpture was from its nature more organic, and had the forms and energy of actual life, and as such it appealed so vividly to the imagination that we could not allow any vagueness or inexactness of detail, any compensating here for what was left out there, such as there might be in some kinds of painting and of poetry. In sculpture, therefore, if there was to be emotion, it should be spread throughout the whole figure, or, in the case of a group, it should be diffused through the whole organism. It should be, so to speak, like the colouring matter of a plant, and should give the whole tone of the figure or group. The lecturer then called the attention of his audience to a slab from the west frieze of the Parthenon, which represented the youth of Athens starting and preparing to start on their ride to the Acropolis on such occasions there were always some too eager and some too slow. The young horseman on the slab in question was of the former class. He was placed at a point in the frieze where his impatience was easily intelligible, for just before him the great body of the cavalcade was heaving away at a gallop. He knew that there were some behind who had not yet mounted, and he had thrown himself round on his horse's back to urge them to make haste, which he had the more reason to do since

just before him there stood one of the marshals of the procession, looking round attentively if not anxiously. On his head had been attached a metal wreath, now lost, and the usual explanation was that his left hand was raised in the act of placing the wreath on his head. He (Mr. Murray) could not agree with that explanation. The figure seemed rather to have thrown up his left hand in the act of urging forward his companions. Eagerness was marked in the whole movement of his body. The throwing up of the arm was so completely part of that movement, and was so truly the very climax of the action, that the mere suggestion of its being due to the act of placing a wreath on the head was repugnant to the whole sentiment of the figure. The whole figure, including the face, was a noble expression of a fine emotion, and the more one realised the circumstances in which the youth was placed the more readily would that be seen. In Greek sculpture it was often difficult, if not impossible (and at the best it was always laborious) to realise the circumstances that were in an artist's mind and that were familiar enough to his contemporaries. Yet there were times when nothing was more necessary. We could do without it, or rather we had to do without it, in judging, for example, of one of the metopes of the Parthenon, which represented a Lapith suffering severe pain from the grasp which a Centaur has made a his throat. We knew the savage nature of the Centaurs, and we were told that the Lapiths were of a race, endowed with simple and noble natures, whose primitive function it was to subdue the more brutal elements of the world, represented by the Centaurs. It was essential, therefore, for the sculptor to give the Lapiths simple and noble forms, though in the particular metope referred to he had not succeeded to anything like the degree of his success in some of the others. But why, it might be asked, were the Lapiths always young in these metopes of the Parthenon, and in Greek sculpture generally of the good time, while the Centaurs were long-bearded and old? Apparently the intention of the artist was to bring out the contrast of a new race subduing and supplanting an older race. To the ordinary fancy of the Greeks it must have appeared at times that some of the Lapiths must have been old and some of the Centaurs young. Had the sculptors allowed their imagination the same licence the result would have been that they would have left us a record of what had been done by the Centaurs and Lapiths, or of what was believed to have been done by them; but they would not have told us how it was done. Therein lay the function of the artist, as Aristotle rightly observed, to tell how things were done, and not what things were done. As the lecturer had been led by these considerations away from the subject of emotion, he would go a step further, and call attention to what seemed to him to be a curious difference of style in the sculptures of the Parthenon metopes. In another metope which represents practically the same subject as the one before referred to, the Lapith and Centaur were massed together so as to present as large and as broad a surface to the light as possible, the shadow playing principally round the outer contours of the group. But such was not the case with the other metopes. There each limb had its true projection, its own light and shadow, and so far, it must be allowed that the sculptor was in the right, considering their position on the Parthenon, exposed as they were to the full light of day. We may further suppose him to be right because it was in following out that principle that those other metopes were sculptured which had won the greatest praise. Still, there was a strong source of attraction in the other method which admitted of a softening and toning down of the action. It exposed to the light large surfaces which a gentle hand might modulate with sunny pleasure in its ups and downs. It was high relief in a true sense, whereas the opposed principle was more nearly sculpture in the round. Having thus noticed some examples of the metopes and frieze of the Parthenon, the lecturer proceeded to discuss in detail the extent to which the groups of the pediments would serve the purpose of illustrating the expression of the emotions in sculpture. Was there any method or principle in allotting the sculptured decorations of the Parthenon which would enable one to forecast from an emotional point of view, the characters of the sculptures of the two pediments? H

believed there was. Having described the rizee, the metopes, and the pediment groups, he lecturer said that they presented a series of opportunities for the expression of emotion. Among the sculptors older a little than Pheidias, notice had been handed down of Pythagoras, and a statue which he made of Philoctetes offering so badly from the wound in his foot that the spectators could not but feel the pain of it. It seemed strange to find a group of boys playing at knuckle-bones among the works by Polykleitos, the contemporary and rival of Pheidias. Obviously enough, such a subject could be treated so as to express strong or even violent emotion, as in the remains of a marble group in the British Museum, executed in Roman times, where the one boy was so far carried away as to bite the arm of the other. We might make it for certain that that was not the view of the subject chosen by Polykleitos, who was never in search of strongly-expressed emotion. The lecturer concluded with a notice of the works of another fellow-pupil and contemporary of Pheidias,—Myron,—whose well-known work, the "Discobolus," or disk thrower, did not express so much emotion in the face as might be expected, though it was a question whether we were justified in looking for any strong expression in the face in those instances where emotion was venting itself in action, as Mr. Herbert Spencer put it. Mention was also made of Myron's statue of Ladas, the celebrated runner, who was represented in the attitude of leaning forward to the goal; of that statue, a Greek epigram said that the sculptor had stamped the whole figure with expectancy of winning the Olympian crown. According to the writer of that epigram, then, the statue of Ladas was an instance of emotion forcibly expressed throughout the whole figure.

[Mr. Murray's third and concluding lecture of this course, to be delivered on Monday evening next, will deal with the works of sculptors subsequent to Pheidias.]

GLoucestershire.

With the exception of Tewkesbury and the cathedral cities of Gloucester and Bristol, this county may be said to be comparatively unknown to architects. Perhaps the fact of its being surrounded by rich districts,—Oxfordshire, Wilts, and Somerset,—may account for this to some extent. Nevertheless, there is much interesting work, both ecclesiastical and domestic. So much has been written about Tewkesbury, that it would seem difficult to say anything new. The chapel on the north side of the transept is interesting, however, as being in a somewhat similar position as what is known as the Elder Lady Chapel at Bristol Cathedral. At Bristol, it adjoins the east wall of the transept, and is approached from it, and also from the north aisle of the choir. At Tewkesbury, the chapel was built along the north side, the length of the nave coinciding with the breadth of the transept, and the chancel extending beyond it eastward. The nave has been destroyed, though the traces against the transept wall show it to have been of four bays. The chancel arch is double with a central column,—an unusual feature. This still remains. Both examples retain their wall arcading, the carving at Tewkesbury being much coarser in character than the beautiful spandrels at Bristol, so well known for their grotesques. Some colour remains at Tewkesbury, the spandrels having had a groundwork of blue and red.

The fine apsidal choir, with its radiating chapels, is seen to advantage from the private gardens on the north-east side (see lithograph plate), and the marks of the Lady Chapel eastward are still visible.

Amongst the wealth of shrines and tombs possessed by this abbey is one of late character, ascribed to Abbot Coates, in the south ambulatory of the choir, having a rich segmental band of vine-leaves, with dragons in the spandrels. The abbot's tomb of the fourteenth century, on the south side of the south choir aisle, is chiefly remarkable for the immense heavy-looking finial that surmounts it. Here, again, a comparison may be made with Bristol, where, in the sacristy,—also of fourteenth-century date,—the finials to the arcading and the spandrels have the same heavy appearance, and approach to coarseness,—a defect which cannot be charged against the Tewkesbury work.

From Tewkesbury it is three miles to Deerhurst, where is to be seen an interesting series of caps, which show the gradual development of the Early English foliage from the Norman cushion form. South-west of the church is a fine old timbered house, known as Abbot's Court, and adjoining which is the Saxon Chapel recently discovered.

a fine old manor-house, built round two courtyards, with a fine bay-window and many interesting internal details.

Standing in a lonely valley at the back of the Cotswold, on the Roman road, is Northleach. The church here is probably the finest parish church in the county, excepting perhaps, Cirencester. It is of Perpendicular date throughout,



Deerhurst  
Abbot's Court & Saxon Chapel.

*Spencer  
1851.*

Across the country, at Stow-in-the-Wold, is a good church, finely situated on a hill, and visible for many miles. The early church of the thirteenth century has been destroyed, with the exception of the lower portion of the tower, and upon this has been raised a simple but very elegant Perpendicular superstructure of two stages, crowned by an embattled pannelled

and is remarkable for the curious treatment of its western tower, the fine parvise porch, elaborately decorated with canopied niches and figure-work. Inside is some stained glass, the remains of a fine reredos in the south aisle, good sedilia, and a font of the same date as the church. Both Northleach and Cirencester possess very good stone pulpits, the former



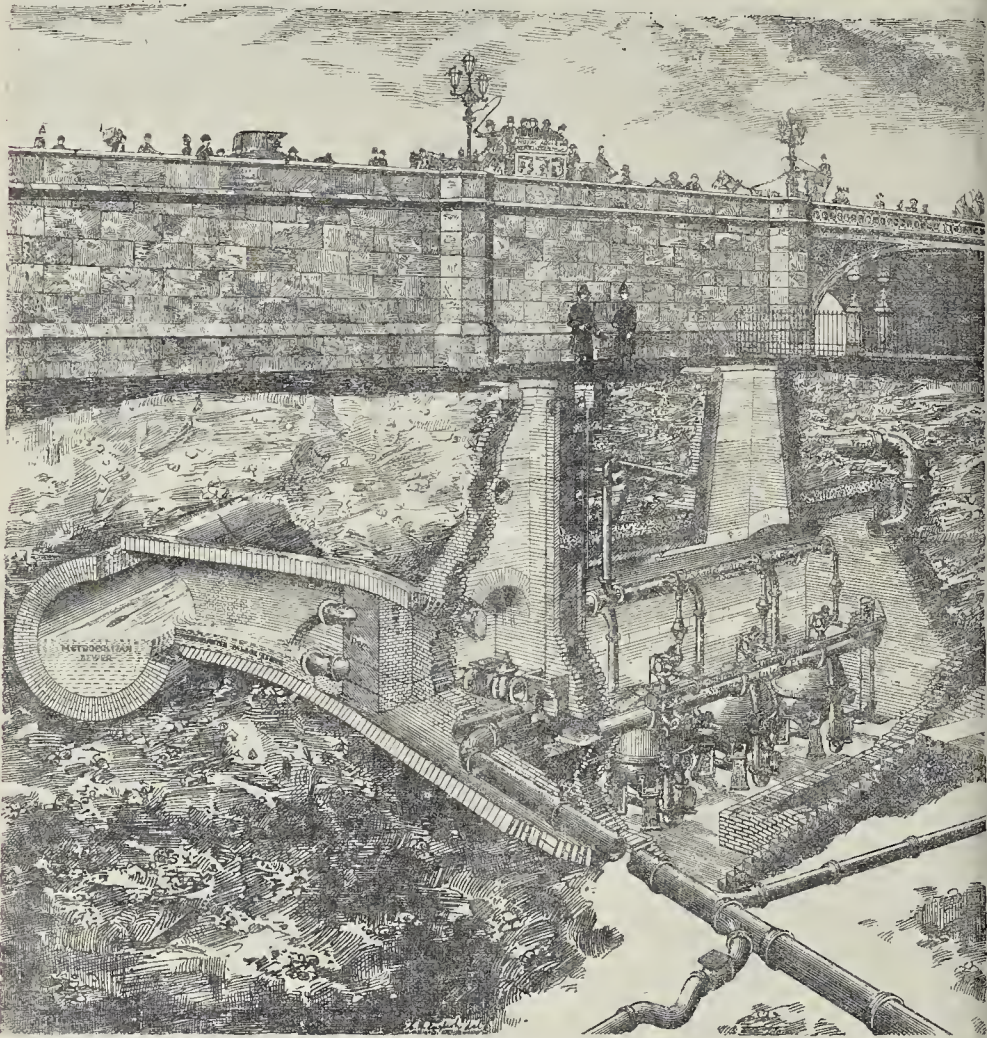
Stow-in-the-Wold.

*Spencer  
1851.*

parapet and angle pinnacles. Note the triangular stair lights. The tower is, as is often the case with early work, in an unusual position here, at the east end of the south aisle. The rest of the church is mainly Decorated, with later additions.

Near Stow is Icomb, or Iecomh, well worth a visit, for its perfect Early English church and

more nearly approaching the type found in Somersetshire. In the Cirencester example the sides are pierced above the floor-level. Cirencester is rich in screen-work, the chancel screen having an excellent cresting of birds, and the parclose screen, known as the "Jesus Chapel," in St. Mary's Chapel, should not be overlooked.



The New Drainage Works at the Houses of Parliament.—Sectional Perspective View of the Pneumatic Ejector Chamber.

No architectural visitor in Gloucestershire should pass over the fine old church at Berkeley, with its well-proportioned arcade, its stone rood-screen, and the mortuary chapel of the Berkeleys on the south side of the chancel, which, owing to the exigencies of the site, is not a rectangle, the south wall canting north-east,



Chichester  
crossing, rood screen.

making it narrower at the east end than at the west. The chapel has its own stone screen dividing it into nave and chancel, and a curious arrangement of squints allows the chapel altar to be seen from the nave of the church, whilst another gives a view of the high altar from the chapel. The tomb of James, eleventh Lord Berkeley, is rich in figure sculpture; amongst them a good St. George and the Dragon. Outside, on one of the pinnacles, is the same saint, elaborately worked amongst the crockets, and

in richness of effect reminding one of the appearance of the work at Rosslyn, near Edinburgh.

In various parts of the country are to be found fine examples of Domestic work: Southam House, near Cheltenham; Icomb Place, Berkeley Castle, Wanswell Court, Iron Acton, Little Sodbury (with a fine hall and oriel), and last but not least, Thornbury Castle, are all worthy of close inspection.

**Surveyors' District Map**—If we may judge by letters that have reached us, the Map of London, showing the boundaries of the Surveyors' districts, which we issued with the first four numbers of the present volume, is likely to prove as useful to architects and builders as we hoped would be the case. The Publisher has now made arrangements for mounting the sheets on strainers or rollers, for convenience of reference, as to which particulars will be found in our advertisement columns.

**Death of Sir Joseph Whitworth**—Mechanical science has sustained a great loss by the death of Sir Joseph Whitworth (which occurred at Monte Carlo), but, as we need hardly say, it has gained greatly by his life's work.

THE NEW DRAINAGE WORKS AT THE HOUSES OF PARLIAMENT.

ON Tuesday last we were enabled to inspect the new drainage works at the Houses of Parliament, which, however, are only completed in detail for a portion of the buildings, leaving the remainder of the work to be done in future recesses. But, as will be seen by the following particulars, for which we are mainly indebted to a pamphlet issued by the engineer of the works, Mr. Isaac Shone, the main part of the work has been done, and the source of the evil smells which have been so noticeable until lately within the building and its precincts has been removed.

It appears that in 1839 Sir Charles Barry laid down, under the middle of the Houses of Parliament, from north to south, a large, nearly flat-bottomed brick sewer, which discharged into a similarly constructed sewer in Abingdon-street, near the Victoria Tower. This sewer, owing to its bad form, excessive size, little fall, and absence of any means for flushing it, accumulated a large amount of sewage deposit, the gaseous emanations from which continually polluted the air of the Palace. In 1846 the smells from the Palace sewer were so bad that Sir Charles Barry consulted Mr. John Phillips,

E.E., who was then the Chief Surveyor to the Westminster Commissioners of Sewers, with a view to its improvement. Mr. Phillips, after examining the sewer, recommended that a narrow, deeply-curved invert, with a reversed fall, should be substituted for the old invert, and that it should be continued northward, across the Speaker's Green, into the outlet of a sewer in Bridge-street, which latter he found to be about 5 ft. lower than the sewer in Abingdon-street. Sir Charles Barry not only adopted and carried out these recommendations, but the increased depth enabled him to construct two main branch drains from near the lower end of the new portion of the sewer, for draining the east and west sides of the Palace at a much lower level than they were originally. By the better gradient thus obtained, and by the narrow and deeply-curved invert put in, the sewer, as altered, supplemented with ample flushing power, became self-cleansing, and it continued in this improved condition for a quarter of a century,—until twelve or thirteen years ago. At that time,—about 1873,—the Metropolitan Low Level Sewer, 7 ft. 9 in. in diameter, was put down through Westminster, and the Palace sewer was connected with it, its bottom at the junction being about 21 in. above the bottom of the Metropolitan Low Level Sewer. Ever since this work was done there has been daily, in dry weather, from 3 ft. 6 in. to 4 ft. in depth of sewage flowing on the bottom of the Metropolitan Low Level Sewer, and this created a constant head of sewage against the Palace sewer outlet, converting it into a creek for a length of about 200 ft., containing from 1 ft. 9 in. to 2 ft. 3 in. in depth of nearly stagnant sewage, which was always present upon the bottom of the Palace sewer. But, besides this, in wet weather the Metropolitan sewer was not only always filled with sewage water, but sometimes this water has risen to 10 ft. above the crown of the metropolitan sewer, or 13 ft. above Ordnance datum. During wet weather, therefore, the Palace sewer and its main branch drains have been filled with sewage and rain-water, which could not be discharged until the flood-water contained in the Metropolitan Low Level Sewer had subsided, by being cleared out by the pumps at Abbey Mills, Bow, and by running it off through the sluices at Blackfriars and elsewhere into the Thames. Hence, for twelve or thirteen years past the Palace sewer, as well as its main branch drains, have been periodically converted into a series of sewage reservoirs; and from these the sewage water, as it accumulated and filled them, pressed out the foul gases contained within them, up the various contributing drains into the Palace. This discharge of sewage-gas into the Palace has been going on more particularly at night-time, during the Sessions of Parliament, when the gas has been burning throughout the Palace, and when the waste hot-water and steam from the warming and ventilating appliances of the Palace were discharged into the drains and sewers, and fermented the sewage lying therein. In the early part of 1886 a Committee was appointed, Sir Henry E. Roscoe, F.R.S., being the chairman. One of the members of this Committee, Mr. L. H. Isaacs, fortunately had a thorough practical knowledge of the subject upon which they were asked to report. He deemed it desirable personally to examine the interior of the main sewer under the Palace, from the Victoria Tower to the point of discharge at the Speaker's Green; and, having regard to the state of the main sewer, this was a disagreeable, not to say courageous, work to undertake. At the termination of his subterranean survey he presented himself as a witness, and deposed to the state of things which he found to exist beneath the Palace. Subsequently, he repeated his examination of the main sewer, and deposed a second time to what he had seen. Mr. John Phillips, who had had a large practical experience as a sanitary engineer, and who had advised Sir Charles Barry as to the improvements which were effected in the drainage of the Palace about 1848, as already mentioned, was also asked to give evidence before the Committee. With that object Mr. Phillips made examinations of the sewer, and of some of the branch drains, under the Palace, and endorsed the views of Mr. Isaacs in regard to the faulty character of the same. He subsequently, from his special knowledge of the circumstances connected with the drainage arrangements both inside and outside the Palace, submitted to the Committee a plan for again improving the main sewerage arrange-

ments of the Palace, and rendering them perfectly independent of the metropolitan low-level sewer as a means of discharge by gravitation. This plan was supported by Major Hector Tulloch, R.E., Local Government Board Inspector, who had previously reported to the President of the Local Government Board upon the defects of the drainage of the Houses of Parliament. The Committee, after due consideration of the subject in all its bearings, recommended Parliament that the plan, as proposed by Mr. Phillips, on the Shone Hydro-Pneumatic System, should be adopted; and their recommendations have been substantially carried into effect.

On the preceding page is a sectional perspective view of the pneumatic ejector station, looking from the base of the Clock Tower in the direction of Westminster Bridge. Fig. 1 on the smaller diagram is a cross-section of the 1839 sewer, showing, by black colour, the invert

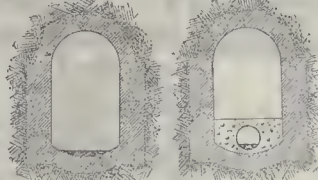


Fig. 1.

Fig. 2.

waterway necessary to pass through it the maximum quantity of sewage obtaining at the Palace when Parliament is in Session. The original sewer had a gradient of 1 in 923 only, but by the alteration suggested by Mr. Phillips in 1846 it was increased in 1848 to 1 in 315.

The new works, briefly described, consist (1) in improving the gradients of the main sewer and its principal tributaries; (2) in reducing the sizes of the sewers,—the main sewer, for example, from 10 ft. 6 in. high by 3 ft. wide, to one of 12 in. in diameter, as illustrated, by fig. 2; this latter figure also shows the waterway on the invert of the new main sewer, with its improved gradient, when that sewer is charged with the maximum quantity of sewage which obtains during the Parliamentary session. The chief tributary is reduced from 24 in. high by 15 in. wide, and laid at an average gradient of 1 in 372, to a pipe sewer of 9 in. in diameter, laid at a gradient of 1 in 309; (3) in providing superior flushing appliances (Shone's automatic hydraulic flushing ejectors) for the sewers, at a considerably reduced expenditure of water; (4) in providing an improved method of ventilating the main sewers; (5) in forming proper connexions between the drains and the main sewers, and giving facilities for inspection at the junctions; (6) in severing absolutely the large tunnel-like connexion between the Palace sewer and the metropolitan low-level sewer by means of a dam of brickwork shown in the sectional perspective view; in dispensing with the big cumbersome penstocks and flap-valve arrangements connected therewith, and substituting therefor a small 12-inch iron sewer, with sluice and reflux valve; (7) in providing, in case of need, improved automatic arrangements for permitting the palace sewage and rainfall to flow into the metropolitan low-level sewer by gravitation, on the principle heretofore adopted, independently altogether of the ejector system, but without the possibility of the foul gases from the metropolitan low-level sewer getting into the palace sewer; (8) in preventing the hot water and steam from the boilers, &c., from passing into the drains and sewers, and providing a separate and independent outlet for same into the Thames; (9) in providing means whereby the sewage and rainfall proceeding from the Houses of Parliament shall flow uninterruptedly therefrom both in dry and wet weather, irrespective of the height at which the metropolitan low-level sewer is discharging sewage, or sewage and rainfall in combination. This latter desideratum is effected by means of Shone's pneumatic sewage ejectors, which are fixed in a chamber (the interior of which is shown in the view) under the Speaker's Green, near the Clock Tower. These ejectors are placed below the level of the Houses of Parliament main sewer, so that the sewage and rainfall flows to and into them by gravitation.

There are three ejectors, one of 500 and two of 350 gallons capacity. They can be worked separately or unitedly, just as the flow of sewage or rainfall is small or large.

The compressed air required by the ejectors to expel the sewage and rainfall is supplied by air-compressors, driven by Atkinson's patent differential gas engines. There are four of these (of 4-horse power each) situated in the basement of the palace, about 650 ft. from the ejector station. The minimum and maximum quantities of sewage, and sewage and rainfall together, it is now difficult to estimate; but as one of Kaiser's patent counters is attached to each ejector, a practically accurate record can be kept of the quantities that will be received and ejected from time to time. When one engine and one ejector are insufficient, during periods of extraordinarily excessive rainfall, there is a float within the sewage manhole, adjacent to the ejector-chamber, which will rise and fall with the sewage and rainfall, and which will actuate one of Mr. Julius Sax's automatic electrical tidal water gauges. This apparatus is fixed within the ejector-chamber, and a duplicate of it is also fixed in the gas-engine room, both being very effectively operated simultaneously by the float. These instruments have faces resembling ordinary clocks, and the hands on them denote the exact level, in inches, of the water in the sewage manholes, from which the ejectors are supplied. The moment one engine is overcome the electrical apparatus rings a bell within the ejector-chamber, and in the gas-engine room, at one and the same instant, and then the attendant will set a second gas engine to work; but if the sewage continues to rise in the sewage manhole, notwithstanding the setting to work of a second engine, the electrical apparatus will continue to indicate such increased height, and the attendant will then put a third, and, if necessary, the fourth gas engine to work.

The works were divided into three contracts, the general contract (No. 1) being let to Messrs. John Mowlem & Co., of Westminster; and the special contracts (No. 2), embracing the supplying and fixing of the pneumatic and hydraulic ejectors, to Messrs. Hughes & Lancaster, Chester; and (No. 3) for the supply and erection of the gas-engine air-compressors, to the British Gas-Engine and Engineering Company, Queen Victoria-street, London. The cost of these special works has been about 11,000*l.*, but other works in connexion with them have been done by Messrs. Perry & Co., contractors, under the direction of Mr. John Taylor, of the Office of Works. The plumbing work has been done by Messrs. Dent & Hellyer. The whole of the work has been carried out under the general supervision of Mr. T. J. Jones, the Clerk of Works at the House of Commons.

Illustrations.

"SPRING TIME": DECORATIVE DESIGN.

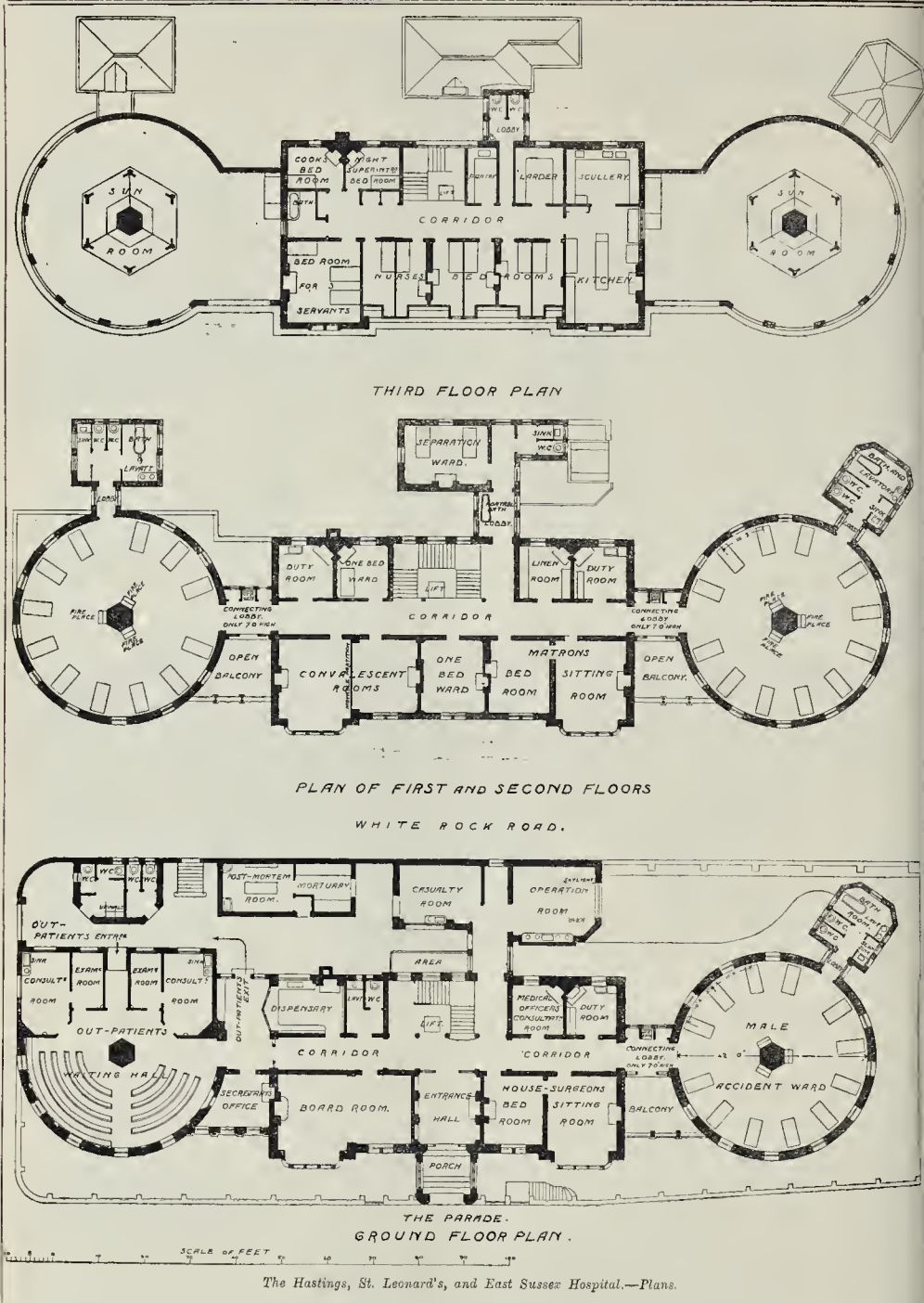
THIS design is the one which obtained the prize for decorative design in the Royal Academy Students' Competition for 1886, as mentioned by us at the time the designs were publicly exhibited. It was one of the few which fulfilled the proper requirements of mural decoration, being composed in one plane, and in a light key, and without any attempt at effects proper only to oil painting and easel pictures. The designer is Mr. Herbert J. Draper.

We may add that this is the design which was referred to by the President of the Royal Academy in his address to the students, when he congratulated them that, for the first time, the Academy had been able to commission one of the students' designs for execution. It will probably be executed in a London Hospital.

HASTINGS, ST. LEONARD'S, AND EAST SUSSEX HOSPITAL.

In December, 1884, we illustrated the designs for this hospital which had been prepared by Messrs. Young & Hall, and which had obtained the approval and sanction of the committee. The committee, however, failed to obtain the necessary funds, and the whole matter remained in abeyance.

In the early part of last year it was decided to considerably modify the original scheme for the new hospital, and plans on a much-reduced



The Hastings, St. Leonard's, and East Sussex Hospital.—Plans.

scale were accordingly prepared by the architects, Messrs. Young & Hall. Two schemes were submitted for the approval of the committee,—one having wards of the usual form, the other having wards of a circular form, a system which owes its origin to the eminent surgeon, Professor John Marshall, F.R.S.

Several members of the committee and of the medical staff having visited the Miller Memorial Hospital at Greenwich, which (the

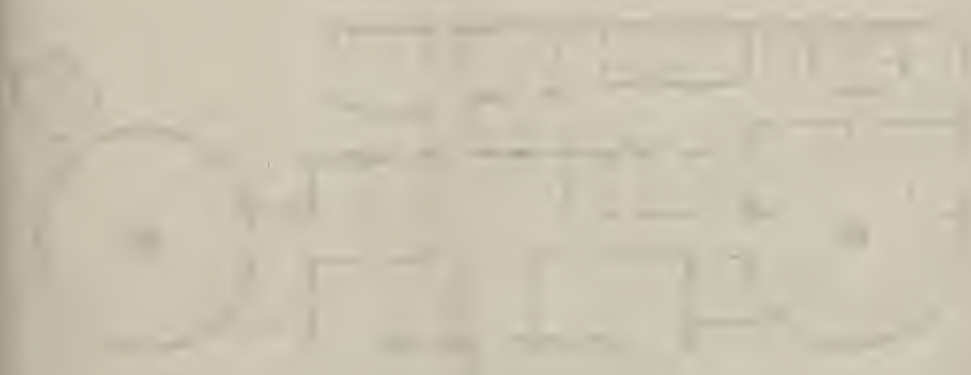
first hospital with circular wards erected in this country) had recently been completed from the design of Messrs. Young & Hall, the circular system was, after much discussion, finally adopted, and the designs from which the present hospital is being erected were definitively approved.

The building is planned to accommodate sixty-eight patients in five circular wards of twelve patients each, four wards of one bed

each, and two separation wards of two beds each.

The central portion contains the general administration offices, with rooms for the resident medical officer, matron, nurses, and servants. The kitchen is placed on the top floor, and will be fitted with a complete gas-cooking apparatus by Messrs. James Slater & Co.

The wards are connected to the administrative department by means of corridors which are



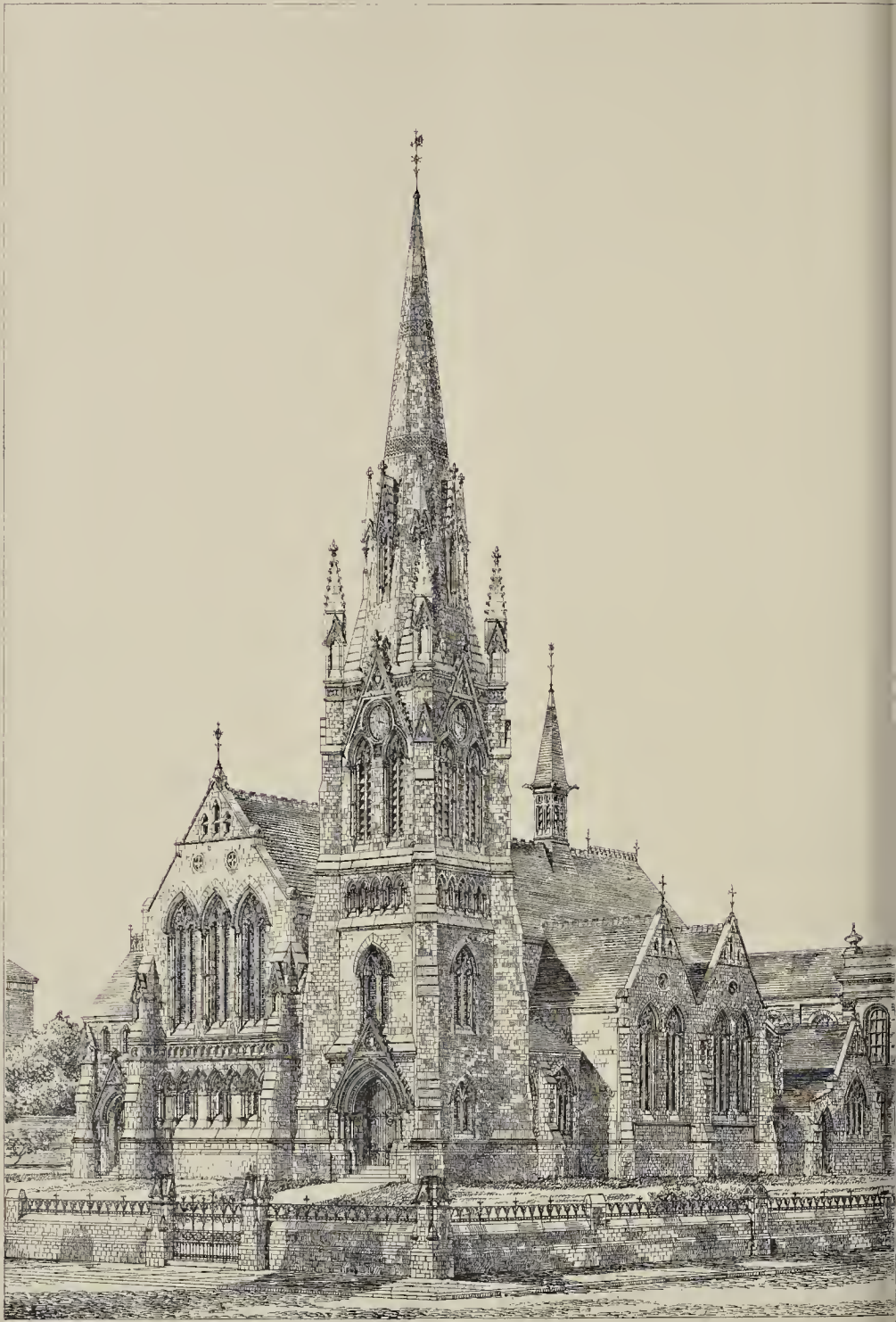
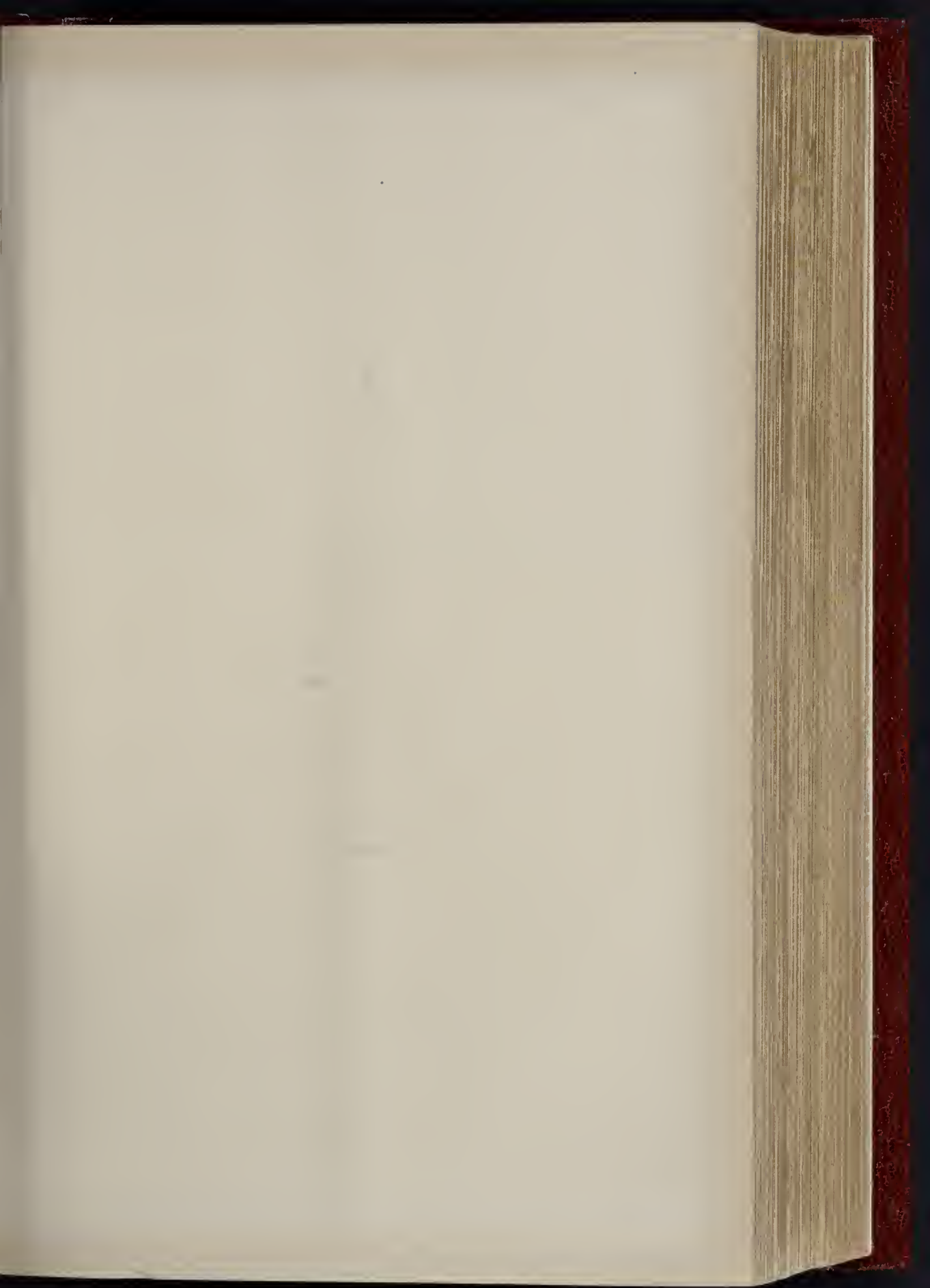


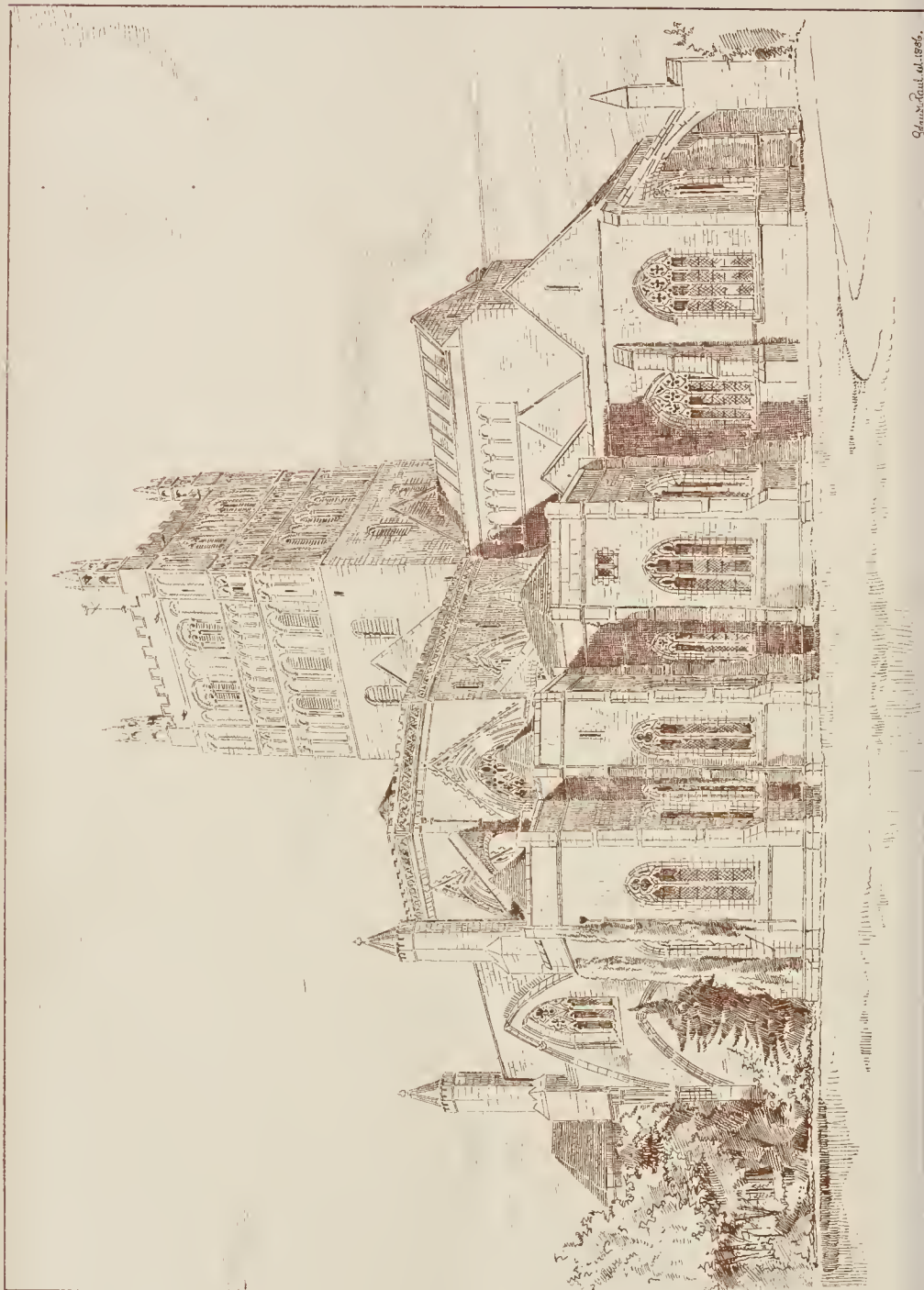
PHOTO-LITHO, SPRAGUE & CO. 22, MARTIN LANE, CANNON ST. LONDON. E.

NEW CONGREGATIONAL CHURCH, WEST CROYDON.—MR. W. D. CHURCH, ARCHITECT.

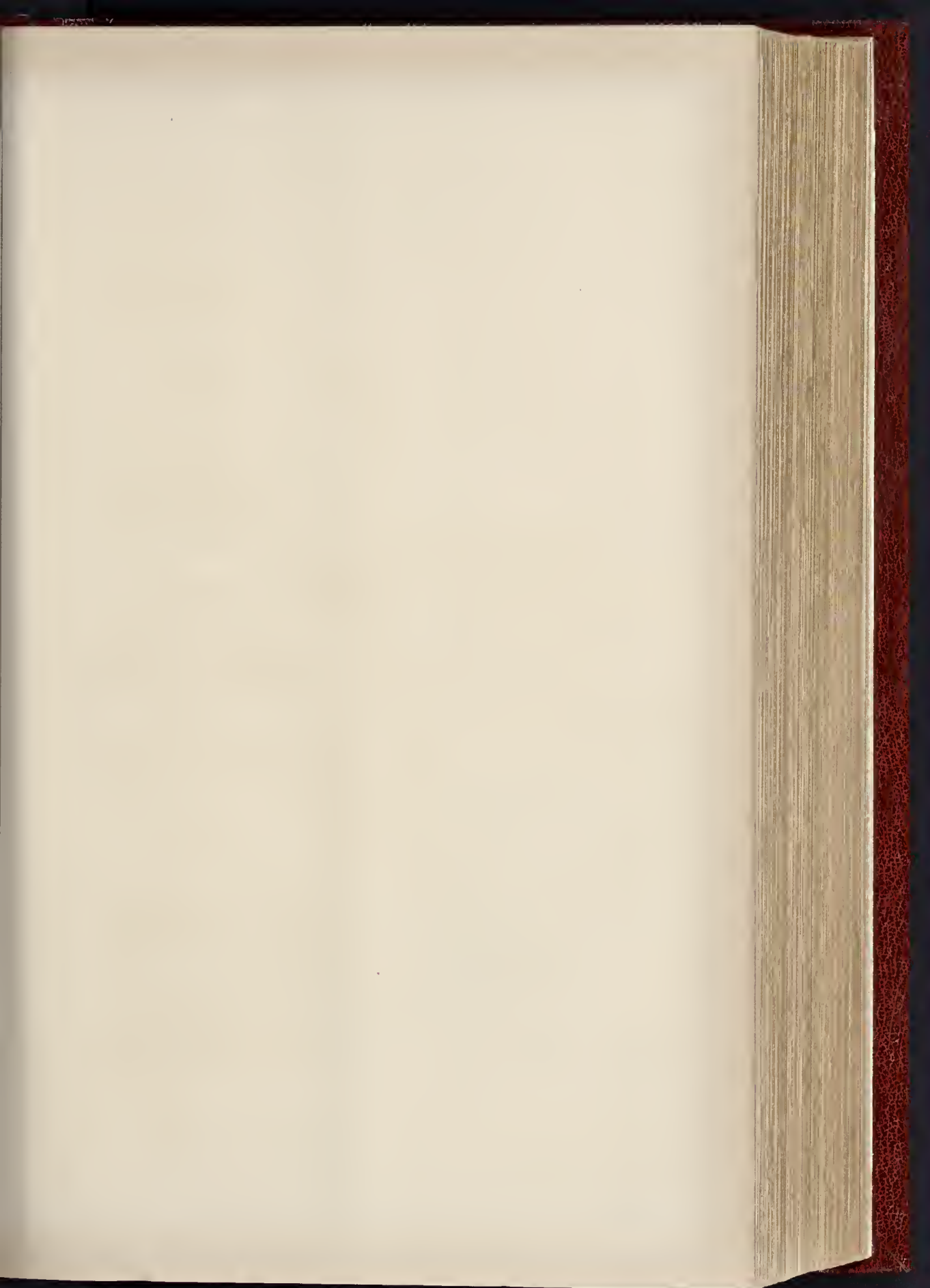




THE BUILDER, JANUARY 29, 1887.



Quadrant at 1886.





THE HASTINGS, ST. LEONARDS AND EAST SUSSEX HOSPITAL

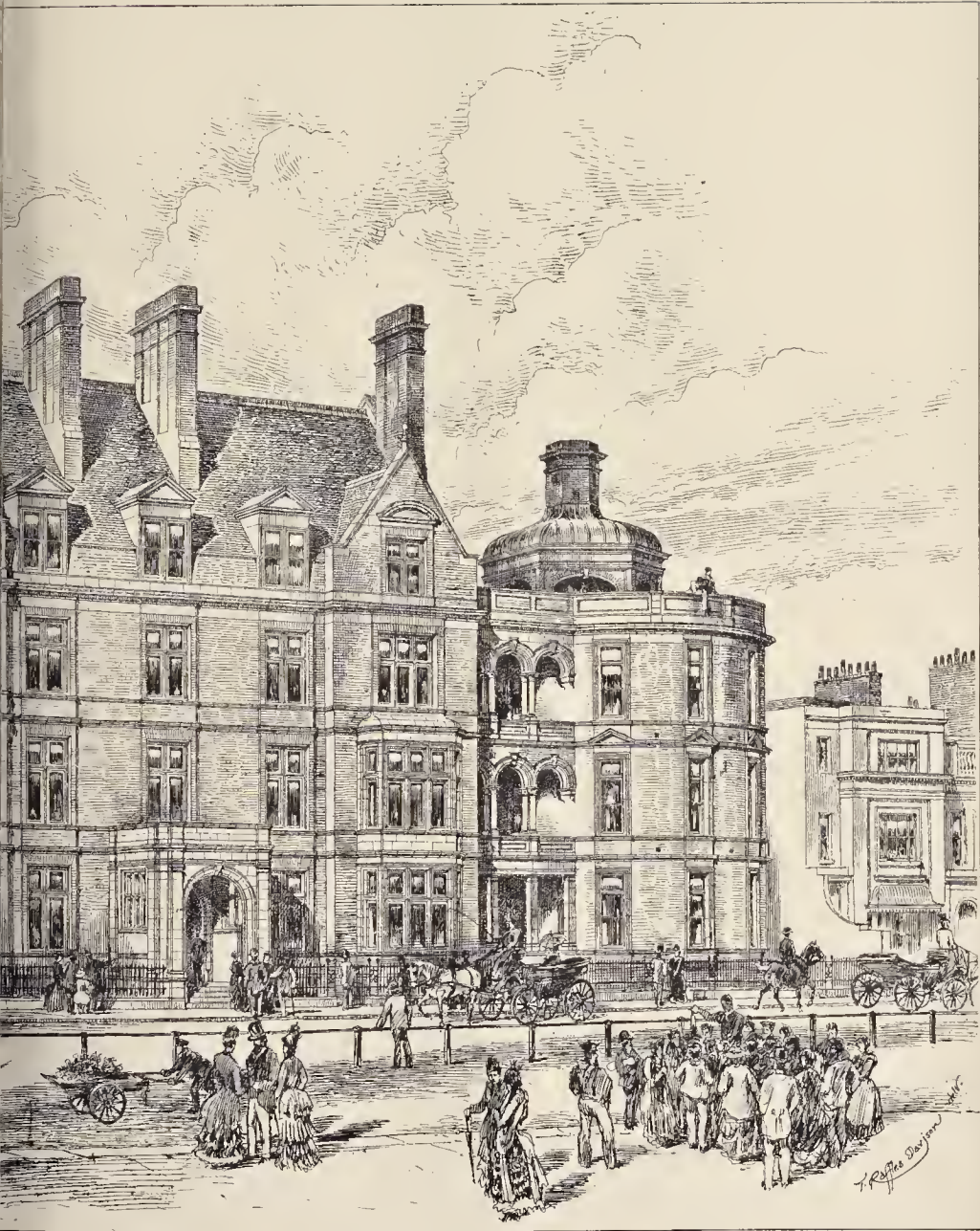
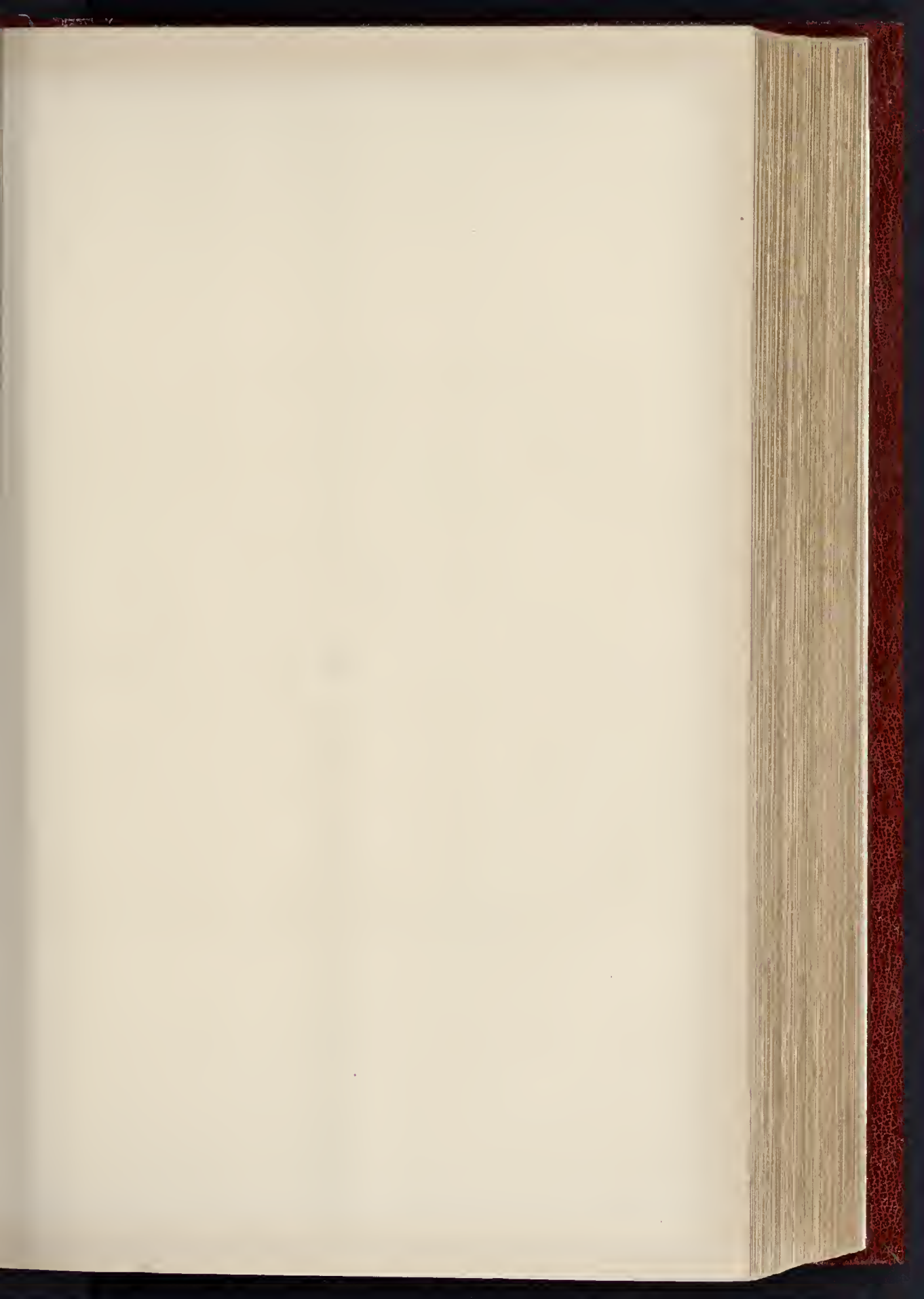


PHOTO-LITHO' SPRAGUE & CO., 22, MARTIN LANE, CANNON ST. LONDON E.C.

D. YOUNG, F.R.I.B.A., AND MR. HENRY HALL, A.R.I.B.A., ARCHITECTS.







"SPRING TIME": DECO

*Awarded Prize for Decorative Design, Royal Academy, 1886.*





INK PHOTO. SPHARJE & CO. 22, MARTINE LANE, CANNOCK ST., LONDON E.C.

BY MR. HERBERT J. DRAPER.





WE PHOTOGRAPHED BY MARTIN LANE FARRON ST. ANDREW ST.

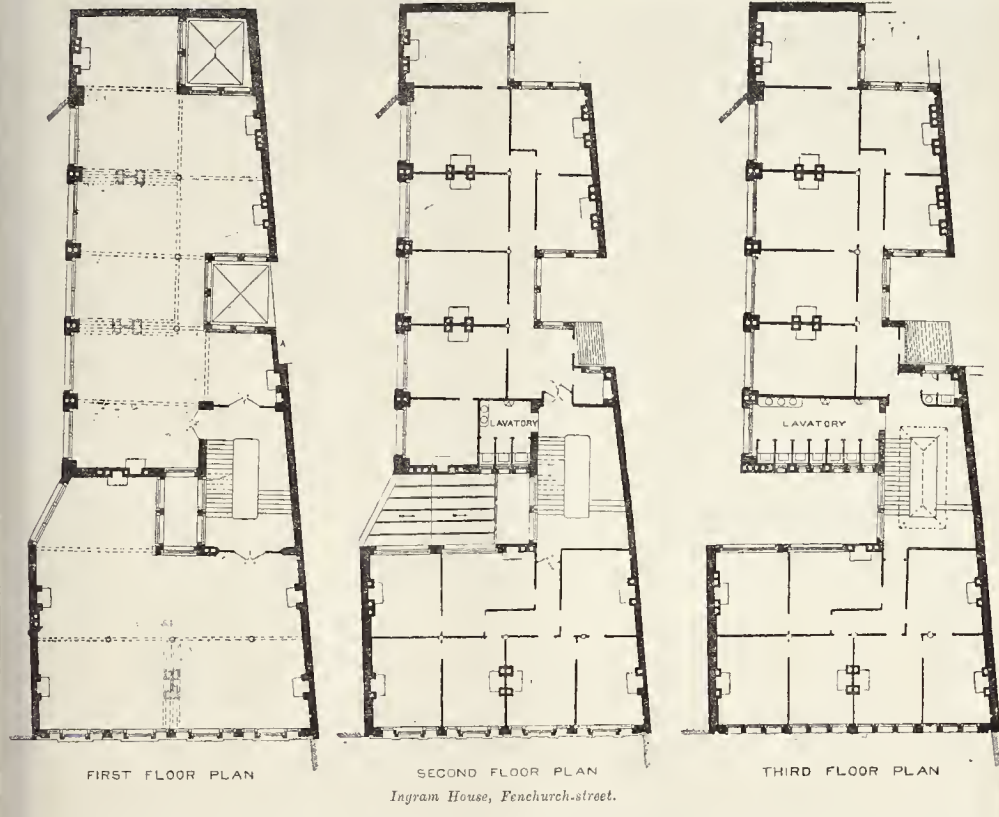
STATUE OF ADMIRAL COLIGNY, TO BE ERRECTED AT PARIS.—M. CRANK, SCULPTOR.





INGRAM HOUSE, FENCHURCH STREET—MR THOMAS BLASHILL, F.R.I.B.A., ARCHITECT.





Ingram House, Fenchurch-street.

only 8 ft. high, so constructed as to allow a free current of air to pass over them, and these lead to a broad balcony, so arranged that the patients can be wheeled out into it in their beds.

The mortuary and post-mortem room are placed on the ground floor, isolated from the hospital.

The building is constructed of red brickwork, and all dressings are of Portland stone.

Mr. H. L. Holloway obtained the contract in competition with eleven other builders, and is carrying out the work.

**THE COLIGNY MONUMENT, PARIS.**

The marble statue of the Admiral Gaspard de Coligny, of which we give an illustration this week, is intended to adorn the monument which is soon to be erected at Paris by public subscription. It is the work of M. Crank, one of the most eminent disciples of Pradier, and the author, among other works, of the winged Victory, which stands in the Square des Arts et M&etiers.

The monument is to be placed in front of the apse of the "Temple d'Oratoire" of the Louvre, and will therefore face the Rue de Rivoli, from which it will be separated by a small garden surrounded by an ornamental grille. It has a large pedestal in the form of a cenotaph, surmounted by two allegorical figures in marble seated on the extrados of a pediment. That on the right, symbolising "La Patrie," is grouped with a crown, bearing an inscription commemorative of the siege of St. Quentin, where the gallant warrior distinguished himself. The figure on the left represents Religion. Near it is engraved the ill-omened date of St. Bartholomew. Between these two figures an open Bible, sculptured in bas-relief on the base of the statue, recalls the source whence Coligny drew his patriotic valour and Christian faith.

The whole sculptural group is relieved against an architectural composition consisting of an order of Corinthian columns supporting an entablature, above which will be engraved the arms of the Coligny family.

The three figures carved by M. Crank, and which are still detained in the D&ep&ot des Marbres de l'Etat,\* are each 3 metres in height. The whole monument will be about 10 metres high by 7 wide.

We may add that the Committee, which includes all the leading persons of the "monde reform&e" of Paris, and is presided over by the Marquis de Jaucourt, has already raised in France and in the Protestant countries of Europe, and principally in England, a sum sufficient to warrant their commencing the work, as soon as the Municipality of Paris shall have officially approved it.

**WEST CROYDON CONGREGATIONAL CHURCH.**

This church is situated at the junction of the London and Campbell roads, Croydon. It is designed in the Early Decorated style of Gothic, arranged on plan with narrow aisles, nave with central passage and double transepts, and a small gallery at the west end. The tower, with the spire, rises to the height of about 150 ft. Vestries are provided at the rear for minister and deacons, as also a church-parlour. The organ-chamber is at the south side of the apse, and opens towards it, as well as to the church; it contains an instrument by Messrs. Hill & Sons, which cost about 1,200*l.* At the north side of the apse is the pulpit, which was the gift of the Misses Peacock, of Thornton Heath, and was executed by Mr. Sansom from designs by the architect. Externally the church is faced with Kentish rag, in drop-coursed work, finished with a fine joint. The dressings, mouldings, windows, &c., are in Monks' Park stone, from the quarries of Mr. Sanson at Bath. The interior walls are lined with Parleigh Down stone, relieved with bands of blue Bath, from the same quarries; the columns supporting the roof trusses are in similar stone, while the clustered columns to

\* Strangers passing through Paris who wish to see the statue of the Coligny monument should ask permission from M. le Pasteur Bersier, Boulevard Pasteur, 216.

the nave arches supporting the clearstory are in brown Portland. The fittings throughout are in pitch pine.

The following gifts have been made to the church:—A stained-glass triplet window at the west end, by Mrs. Peacock, executed by Mr. Frampton; and the clock and chimes, by Mr. J. Spencer Balfour, J.P., the work of Messrs. Gill & Co.

All the carving was executed by Mr. Sansom; Messrs. Vaughan & Brown did the gasfitting, and Mr. Boulting the warming. The ventilation of the building is by inlets built into walls, and the vitiated air is extracted by one of Boyle's ventilators. The work was carried out by Mr. James Holloway, from the designs and under the superintendence of the architect, Mr. W. D. Church. The foreman was Mr. Jones, and the clerk of works, Mr. Laurence. The cost of the building, exclusive of the pulpit, stained-glass windows, organ, and bells, was about 10,500*l.*

**INGRAM HOUSE, FENCHURCH-STREET.**

This building occupies the sites of four different premises that were acquired for its erection, except so much of the frontage as was taken for the widening of Fenchurch-street. It consists of three shops of moderate size, each having its basement, and of very extensive suites of offices and store-rooms occupying seven stories, and extending along the whole of the east side of Ingram-court. There is a sub-basement for storage, and a half-basement above it, lighted from Ingram-court. The principal entrance has a lobby panelled in teak, leading to the entrance passage and the staircase, which gives access to the offices. The floors of these parts are laid with mosaic pavement in ornamental patterns, by Messrs. Diespecker. The walls throughout the passage and staircase are covered with scagliola, by Messrs. Bellman & Ivey, the dado being of a very rich red, the capping of dark green, and the wall surface is of yellow. The staircase is of Cliff-wood stone. The windows of the staircase are of stained glass, by Messrs. Powell, of Whitefriars.

The building being designed with very large rooms on the ground and upper floors, which could be afterwards divided to suit tenants, considerable use was made of iron in columns and girders and fireproof floors, supplied by Mr. Archibald D. Dawney, of London Bridge House. The skylights are by Messrs. Marshall & Hatch.

The construction was so arranged that certain fireplaces were provided on the second and third floors in places where they could not be supported upon walls or piers on the lower stories. Strong rolled iron girders in sets of three were provided, as shown on the ground and first floor plans, the flanges being 4½ in. wide, to take the fronts and backs of the flues, while the flues themselves ran up between the girders. Provision was made on the first floor for building similar fireplaces afterwards if necessary, and this has been done as regards the back part of the building.

The plans throughout show the building as it was erected, leaving as much as possible to be determined by the requirements of the tenants. Certain modifications were actually made, but none that affect the principles of the arrangement.

The parts of the plan marked A show how it was necessary to slope off a small portion of the building in order to prevent a dispute about light with an adjoining owner.

The front elevation is of red Danfrices stone, with pilasters on first and second floors in dark Shap polished granite. The carving is by Messrs. Farmer & Brindley. The fronts to the shops were added when the shops were let, so as to accord with the views of the tenants. The front in Ingram-court is faced with Candy's terra-cotta bricks, which are of a warm white colour, and of very close texture.

The premises were built for Mr. C. J. Knowles, from the designs of Mr. Thos. Blashill, architect, the contractor being Mr. Edward Conder. Mr. Chas. Watkins was the clerk of works. The cost was about 16,000l.

*Houses at Chicago.*—In referring to the sketches published last week (p. 148) we have unwittingly done the injustice to their architect, Mr. S. G. Beaumont, of consigning him to a premature grave. The information which we understood to refer to the architect of the houses, viz., that he was educated in a London office and died shortly after going out to Chicago, referred, Mr. Townsend tells us, to the draughtsman, Mr. G. W. Tait, who made the sketches, and whose signature is appended to them.

#### BRITISH ARCHAEOLOGICAL ASSOCIATION.

At the meeting on Wednesday, the 19th, Mr. W. De Gray Birch, F.S.A., in the chair, reference was made to the death of Lord Idlesleigh, one of the vice-presidents of the Association. The Rev. Scott Surtees exhibited a large collection of fragments of Roman pottery and brick found at Pountneys Bridge, Dinsdale, on the River Tees. Mr. Loftus Brock, F.S.A., exhibited Roman pottery of various kinds found at Vinovia (Bincchester) during the recent excavations there. Mr. Roope exhibited a fine ancient Mexican howl, similar in style to some others shown on a previous occasion. Mr. Irvine forwarded sketches of Roman graves, formed of tiles of large size, made for this use, of peculiar pattern, one tile being sufficient to form the end of each compartment. Each tile bears a legionary stamp. A paper was then read on the "Early Sculptured Crosses and Stones of the Isle of Man," by Mr. Romilly Allen, F.S.A. (Scot.). These crosses are worked in the local slate of the island, and are found in considerable numbers, the earliest being a pillar stone at Santon, having an inscription in Roman capitals, AVI MONUMENTI; but the inscriptions are almost entirely Scandinavian, with runes. The forms are not unlike those of the early crosses of Scotland, Ireland, and Wales, but the ornamental patterns more frequently cover the whole of the shaft, without being divided into panels. The symbolism of the figures was dwelt upon, and it was stated that only a single representation of the Crucifixion has yet been found. The story of Sigurd and Tafna is shown on one of the crosses. The paper was illustrated by a fine collection of photographs and rubbings of the monuments described. A paper was then read on Roman Chieftain, by Mr. C. Roach Smith, F.S.A. The whole of the inscriptions found in the city were described.

#### THE ARCHITECTURAL ASSOCIATION. PROFESSOR CORFIELD ON "HOUSE SANITATION."

The seventh meeting of this Association for the present session was held at 9, Conduit-street on the 21st inst., Mr. J. A. Gotch (President) in the chair.

The following new members were elected, viz., Messrs. J. K. Wilson, G. W. Burrell, T. W. C. Woolf, S. Tugwell, S. Walker, and G. C. Taylor.

A letter from Mr. Thos. Blashill was read, referring to the forthcoming Italian excursion, and recommending those who intended to take part in it to study beforehand the information in regard to the different places they were likely to visit.

Professor Corfield then gave a lecture on "House Sanitation." He began by asking his hearers to suppose they were inspecting a house in regard to its sanitary arrangements. In his opinion, the proper place to commence with would be the roof. Going on the roof, they should look to see if there were any ventilating-pipes, their size, and the materials they were made of. Such pipes should be of the same size as the pipes they were intended to ventilate, and in the next place they should be above all the parts of the building, with the single exception of the chimneys. But they should not be in any way sheltered or protected by any building or wall, nor be against a wall or side of a chimney, for when the wind blew against the wall or chimney, the air in front of the wall or chimney, and over the top of the ventilating-pipe, would be under pressure, and would descend the ventilating-pipes, reversing their currents, for they were intended as outlets for the air of the soil and waste pipes and house drains, and if what should be the outlets were so constructed that air could blow in at them instead of being drawn out, then the insects in the front areas or back yards of houses would become outlets, and prove a great nuisance. A great variety of cowls had been made and used for crowning these pipes, with the idea of helping the extraction of the air. As to the utility or otherwise of cowls, he would not speak too positively, because a committee of the Sanitary Institute had been at work for some time on the question, had made an exhaustive report, and would shortly give the world the results of a series of experiments. He did not know what those experiments would prove, but he believed he might safely say that it was unnecessary, in almost any position, that there should be a cowl at the top of any soil-pipe. The only thing requisite was to have a few wires across the top of the pipe, and some holes or slits a little way down the side. The wires would prevent anything getting into the pipes, such as birds, which were fond of building their nests where there was a bend a little way down. The holes or slits would be of great use in allowing the air to blow through on the occurrence of heavy snowstorms, especially when the snow froze together as it fell, blocking the tops of the pipes. On the roof, too, they must look for the way in which the rain-water was got rid of. That was best done by pipes, front and back, carried down outside the house, and made to discharge in the area or yard below, either above a gully grating, or below the grating into a ventilated space above a trap. Rain-water pipes were, however, frequently carried down inside the house. It was not an uncommon thing to find builders, and even architects, who would not allow the pipes to go down the front of the house, so that the rain-water pipes were either embedded or encased in the walls, or carried down inside, often passing through the bed and sitting rooms into a drain in the basement. The pipes so improperly placed were frequently faulty in their jointing, and were, besides, liable to rapid decay, and especially when they were imperfectly trapped at the foot, they were mere channels for the admission of foul air into the dwelling. If trapped at the foot, and then connected with the drain, it made little difference, because, even with water in the trap, they were apt to become very foul. In the intervals of storm or rainfall, the foul air from the drains passed, in accordance with the law of diffusion of gases, through the water in the trap, filling the rain-water pipe with foul air, and nearly as foul as if no trap existed at all. He had frequently known cases of illness to persons sleeping in bedrooms the windows of which looked out behind parapets immediately over the rain-water gutters, often at the very point

where the rain-water pipe went down to the drain, and that even where the down-pipe was provided with a trap at its foot. Great mischief, too, was often caused in cases where, to avoid taking the pipe down the front of the house, the rain-water was carried in an open gutter or trough through the top part of the dwelling, either to a down-pipe in the centre of the house or to a pipe at the back of the house. These troughs or gutters were at one time very commonly carried through the house in this way, either just below the ceiling of the top story, under the attic floors, or in the space between the top ceiling and the roof covering. Sometimes the heads of the internal down-pipes for rain-water were placed under the bedroom windows. He had known many instances of illness arising through foul air engendered in such rain-water gutters, into which leaves, soot, and dirt were washed. Rain-water pipes were not unfrequently, but very mistakenly, made to serve also as soil-pipes. The heads of such pipes were necessarily (being used for carrying off the rain-water) often close to windows, so that much of the foul air emanating from them entered the open windows, and was inhaled by the occupants of the rooms. The first thing to look at inside the dwelling, either in the roof or in the attics, would be the cistern. The material of which it was made should be noticed, for a good deal both of truth and nonsense had been said on this subject. The common material for a cistern was lead, not in the way in which our ancestors used it, but as a lining to a wooden cistern. Now lead was not nearly so mischievous a thing for cisterns and pipes as it was commonly made out to be. Very few waters would attack lead, though soft water, and rain water especially, would do so. The effect of an ordinary town water on lead was practically inappreciable, and even in the case of Glasgow, where a most necessary change was made some years ago from the polluted water of the Clyde to the pure and soft water of Loch Katrine, there was no outbreak of lead-poisoning. Galvanised iron was now fast replacing lead as a material for cisterns, and a very admirable material it was, though there were certain waters which would dissolve zinc (and galvanised iron was simply iron dipped in zinc), the salts of which were poisonous. It was important to observe whether the cistern was clear, and capable of being easily kept in that condition, being of no importance to the health of a house as the waste or overflow pipe of the drinking-water cistern. That pipe need invariably be connected directly with the drains, and in that case the foul air, containing possibly the poison of one or more specific diseases, would get into the cistern. Even should the foul air not contain such poison, it would contain foul, putrescent, organic matter, suspended or else in a gaseous state, which the drinking-water would readily absorb. He had seen, in many old houses, the "standing wastes," as they were termed, of drinking-water cisterns connected directly with their drains, soil-pipes, and traps of water-closets. He was afraid that in many old houses that highly pernicious arrangement still existed unsuspected. Such waste or overflow pipes ought, of course, to be entirely dis severed from all connexion with drains, soil, or waste pipes. There were several ways of disconnecting them, but they should never be carried directly over a foul gully. A very common but very inefficient device was to put a siphon trap on the waste-pipe, or make a bend on it before it entered the drain, but such a trap did not always remain full of water, and even if it did it would not prevent the admission of foul air to the cistern by absorption and diffusion, in the way previously mentioned. The lecturer proceeded to give several examples of the extraordinary attempts on the part of plumbers which did not understand the true principles of sanitary science to remedy these defects. Denning next with a housemaid's sink, the lecturer stated that its position should be against an external wall, with a window capable of affording ample ventilation. The commonest form was the wood sink, lined with lead, but the best material was white glazed stoneware, which could be kept perfectly clean and sweet, whereas oily matter adhered to lead, and rendered it difficult to keep clean. The waste-pipe of the sink was frequently wrongly connected with some part of the soil-pipe. In order to prevent the ingress of foul air a P-trap, or what was incorrectly termed



siphon-trap (for if it would siphon out it would be a trap) should be used. The waste-pipes from such sinks should always end in the open air over the trap of a gully, or into the side of the inlet of one, or over an open pipe head. The waste-pipe of an up-stairs sink should either be carried through the external wall and discharged into an open pipe head or taken down and disconnected at the foot, being at the same time carried up through the roof full bore or ventilation. The bell-trap was often used for such sinks, the waste-pipe being connected with the soil-pipe. A more improper or highly dangerous arrangement could not be conceived, or when the bell was taken off there was no trap, and the pipe would, of course, ventilate itself into the house. Where a series of waste-pipes or closets discharged into the same down-pipe there was great danger of some of the traps becoming siphoned out and unsealed unless the main pipes and the branch pipes as well were efficiently ventilated. This was shown by a series of demonstrations made in face of the audience by the lecturer. Every pipe down which foul water went should be as small as possible, so that it might be self-cleansing. The waste-pipe of a bath should be trapped and disconnected in very much the same manner as the waste-pipe of a sink. The waste-pipes of sinks, although disconnected from drains or discharging over open gullies, should also be trapped immediately under the sink. If not they would become, and especially at night, inlets for outside air, which would be more or less tainted by the impurities which would necessarily adhere to the inside of the pipe. The up-stairs water-closet should be against an external wall, with a window opening into the air. Water-closets are often placed in improper positions, such as in the very centre of the house or under the stairs, and very often no attempt was made to ventilate them or they were very imperfectly ventilated into a shaft going up through the dwelling, into which rooms were also ventilated. Such things as this should be done away with, and the closets put against the outside walls. The soil-pipe into which the water-closet discharged should be outside the house, for, however perfect such pipes were at first, they did not remain so for ever. The best material was strong lead pipe with properly soldered joints, which could be made stronger than the pipe itself, thus giving much less chance of leakage than iron pipes having what might be called mixed joints. The soil-pipe carried down outside the house should be taken into a 6-in. drain, passing into a trap with an air inlet above the water-line. The soil-pipe might be connected with the drain at its foot, with the view of being the outlet ventilator, and be disconnected from it by a disconnecting trap, in which case the drain would have to be separately ventilated by an outlet-pipe carried up above the roof. If soil-pipes were not ventilated they would ventilate themselves sooner or later, for the sulphuretted hydrogen and other gases arising from sewers would act upon the lead in such a way as to eat holes into it and thus make their escape. The lecturer here exhibited a piece of piping showing hundreds of little holes eaten into the lead in this way. The soil-pipes inside houses were often placed in almost inconceivable positions, sometimes horizontally under floors, or placed in walls, covered over and plastered, so that nobody knew where they were until some one was taken ill, and on examination a soil-pipe, riddled with holes, was found, perhaps, in the wall immediately behind the bed-head. In all upstairs water-closets the traps should be part of the soil-pipe, and not part of the closet apparatus itself, as it was in so many earthenware closets. The reason why he condemned such closets was that if, for instance, there was an earthenware basin with an earthenware trap all in one piece, the weak point would be the joint between the trap and the soil-pipe, which would be a joint between two different materials, and necessarily more or less weak. Therefore, for up-stairs closets, discharging into lead soil-pipes, there should be lead traps soldered. In that case, if the apparatus got shifted in the least, the joint that would go would be the one between the apparatus and the trap, or, in other words, the one above the trap, and not the one between the trap and the soil-pipe, as would be the case in the event of a settlement of one of the combined earthenware closets and traps to which he had referred. To protect the ceilings below the floor in case of overflow of the basin or leakage of a valve,

it was usual to put a lead tray, called a "safe,"—a word the most inapplicable of any in the language to the contrivance as commonly constructed. The waste-pipe of the safe-tray should be carried direct through the external walls, and made to discharge into the open air; it should be provided with a little brass flapper to prevent draughts. The apparatus most commonly used in old houses was the pan-closet, which could not be too strongly condemned. It was a curious thing, and one not generally known, that long prior to its introduction the valve-closet had been invented and brought to a considerable degree of perfection by Alexander Cummings in 1776, the main difference between his closet and that now in use being that in his the valve was really a slide to let the water out. That closet was patented in 1776, an improvement being made upon it by the well-known Bramah, who made it more workable, though he did not improve it in principle. Practically in the form in which Bramah had left it it had been used ever since. The valve-closet had great advantages, one of which was that it held a large quantity of water in the basin, but as originally devised it had certain disadvantages that had not yet been quite got over. The first of these was that it was supplied with water only at one part of the basin. Valve-closets were now made with flushing rims, which, however, necessitated a large supply of water, and larger pipes. The next thing was the overflow-pipe from the basin, which might get siphoned out in the following manner. Below the valve was the valve-box, and below that the trap. When a large volume of water was discharged from the basin, it went into the valve-box, and through the trap. That partly exhausted the air in the valve-box, so that when the valve was shut, the water drained out, leaving the valve-box in a state of partial vacuum, and thus the overflow-pipe became untrapped. The difficulty was got over in several ways, one of which was to ventilate the valve-box by a pipe carried through the external wall. Again, if the overflow were opposite the handle and passed into the valve-box opposite the valve, when the handle was pulled up some of the contents of the basin were shot into the outlet of the overflow-pipe. The result was that the overflow-pipe and the little trap at the bottom got very foul, so that the proper side for the overflow-pipe valve was the left-hand side, because when the valve was opened it closed against the overflow-pipe and prevented anything getting into it. The valve-closet was for long displaced by the pan-closet on account of the cheapness of the latter, and possibly because of its being well advertised at the commencement. The first disadvantage of the pan-closet was the conical shape of the basin, and it had a large iron receptacle beneath it called the "container," which got very foul, for it was a veritable "container" of filth; so that every time the handle was pulled the foul air was forced up into the house. That evil was only very partially cured by having a ventilating pipe, carried up outside from the "container." The evils of the pan-closet were intensified when such an apparatus was fixed over an old-fashioned D-trap, which was in reality a miniature cesspool, and could never be thoroughly flushed out. The water-closet on the ground-floor was often necessarily placed in such a position that it required a separate soil-pipe, which was more often than not left unventilated. All water-closets should invariably be supplied from cisterns which did not supply taps. It was of no use to say that drinking water or water for culinary purposes was only to be drawn from one particular tap. Practically every tap must necessarily be looked upon as a tap for supplying drinking-water, for servants and others would replenish water bottles and jugs at the nearest tap, any injunctions to the contrary notwithstanding. Therefore, draw-off taps should under no circumstances be supplied from the cistern that directly served the water-closet. The best thing was to have a separate cistern to supply the water-closet, and the only other way of meeting the difficulty was to have water-waste preventing or intercepting cisterns between the main cisterns and the closets. Closets in basements were commonly hopper or "wash-out" closets. The ordinary long conical hopper was a very bad form of basin, but what was known as the "short hopper" was a great improvement. This was not a regular cone, being more vertical at the back

than in the front, and having also a flushing-rim. The traps should be simple bends, either P or S traps, and in the case of basement-closets should be stoneware traps cemented to stoneware drains. A disadvantage of hopper closets was that they held no water in the basin, only in the trap. That had been partly got over without employing complicated apparatus by the invention of the "wash-out closet," which retained a small quantity of water in the basin, and in which the outlet was at the side or in front of the basin, there being a weir over which the water and the other contents of the basin had to go to make their way into and through the trap. Various forms of this type of closet had become favourites, and especially the pedestal closets. The disadvantage of the wash-out closets which he had seen was that the weir, before referred to, was apt to become fouled, and no amount of flushing would keep it clean. Unless the handle of such a closet was well pulled the basin got extremely foul, so that on the whole the small short hopper was a superior apparatus to the various forms of "wash-out" closets.\* The "plug" closet had an outlet at the side, closed by a solid plunger, but this form had the disadvantage that one could not see the outlet, which was apt to get clogged with paper and other adherent matter. In connexion with scullery sinks, fat-traps were, as a rule, quite unnecessary, and all that need be said about them was that the waste-pipe should be disconnected from them. In inspecting the basement of a house, bell-traps would frequently be found in the floor. These were exceedingly mischievous and dangerous. There should be no traps in the basement of a dwelling connecting with the drains; and if there must be gullies there, they should be made to discharge outside the house, and entirely disconnected from the drain. As to the drains themselves, it should be seen whether the soil-pipes were ventilated, and so on; and if there were inspection chambers, it was an easy matter to examine them. Brick drains under houses were highly improper drains; they would not hold water, and rats made their way through them into the dwellings. Wherever rats went, the foul air followed, and thus the existence of rats in a house was always a very suspicious circumstance. The best way to test the water tightness of a drain was to block it at the lower end, filling it with water to the upper end, marking the level, and allowing the water to stand for half an hour or longer. If the water did not remain at the same height the drain was not, of course, water-tight. A good test of the efficiency of traps, &c., was by blowing in smoke, which, if it escaped in various parts of the house, showed that the traps were not efficient. A third plan was to discharge a specially-made rocket into the drain, thus causing an immense amount of smoke from any leaks that might exist. Drains should be water-tight and smoke-tight, but the better test was to be water-tight. In the case of new drains, they should be tested after being filled in as well as before. Cast-iron pipes coated with Angus Smith's solution were now largely used for drains. These iron drains had the advantage over those of stoneware of only having a joint every 6 ft. Stoneware drains, however, were made of a material which was absolutely unalterable, which water and acids would not touch, and they were smooth inside. No doubt an iron pipe could be made gas and water tight now, but what authority was there to show that it would be so in ten years' time? He answered, "none"; iron was a perishable material, rusted by moist air, and affected by acids. Even when said to be coated with a preservative solution, could they be sure of its being protected everywhere? Only the other day he saw a Barfield iron pipe eaten through and through merely by drinking-water. It was, therefore, a wrong principle to use a material known to be perishable, instead of a material like stoneware, which was practically unalterable. The method most in favour for jointing iron pipes was to caulk the

\* We cannot agree with Professor Corfield here. No doubt some forms of wash-out closet require a large flush of water to ensure clearing everything over the weir, and some of the waste-preventing cisterns now made are too small for safety in regard to any closet of this type. But the type of pedestal closet in which the water is driven forward across the basin to the weir through a series of pierced openings, so as to come with considerable force, appears to us as perfect a sanitary closet as can be made. Other types of "wash-out" basins we have found work very well with a large flush, and all forms of closet ought to be liberally supplied with water, if only to ensure proper carriage to the drain.—Ed.

PROVISIONAL SPECIFICATIONS ACCEPTED.

15,092, W. Bagshawe, the Application of Tubes or Pipes to the Construction of Roofs.—15,473, J. Winkler, Moulding Building Blocks.—15,562, H. Lowden, Roofing Tiles, &c.—16,429, F. Hayward, Varnish.—16,479, W. Scharath, Lintel.—16,480, H. Johnson, Water-wheel Air Propeller for Ventilating.—16,730, A. Dawson, Door Locks.—10,652, P. Everitt, Water-closets, Lavatories, &c.—12,588, W. Day, Chimney Pot and Ventilator.—15,570, W. White, Flushing Cisterns.—15,620, S. Timmins, Closing Springs for Doors and Gates.—15,905, C. Dobbs, Moulded Slag Paving Blocks.—16,812, C. Harris, Chandeliers, Gasellers, and Gas Brackets.—16,708, M. Syer, Syphon Cisterns for Flushing Closets, &c.—17,125, Paxton & Turnbull, Kitchen Ranges.—43, W. Martin, Domestic Firegrates.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

2,286, A. Schanschieff, Locks and Latches.—3,420, G. Jarvis, Basic Bricks.—3,452, J. & F. Loughran, Window Sashes and Frames.—3,712, Sutherland & McIntosh, Bakers' Ovens.—3,948, Ahrebecker & Grew, Water Meters.—4,580, J. Parker, Dry Earth and Ash Closets.—8,713, M. Blanchard, Ornamental Tiles, &c.—9,444, T. Taylor, Door Knobs, &c.—1,691, T. Helliwell, Zinc or other Metal Roofing.—2,502, B. Phillipson, Water-closets and Pipes, and Connections for Same.—2,571, Swindell & Clifford, Chimney and Ventilating Caps.—3,569, J. Dyson, Wall Bonds or Bricks for preventing Damp Walls.—6,426, W. Parry, Construction of Floors, Roofs, Arches, &c.—11,511, Nicol & Hercus, Kitchen Ranges.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

| JANUARY 17.                                                                      |        |
|----------------------------------------------------------------------------------|--------|
| By BEE & FRY.                                                                    |        |
| Holloway—28, Campbell-road, 79 years, ground-rent 5l.....                        | 4150   |
| 40, Rupert-street, 79 years, ground-rent 5l.....                                 | 156    |
| JANUARY 18.                                                                      |        |
| By G. STOCKINGS.                                                                 |        |
| Kensington—111, Earls Court-road, 84 years, ground-rent 15l.....                 | 2,000  |
| By R. BOYCE.                                                                     |        |
| Hoxton—27 to 33 and 49 to 59 odd, Gifford-street, 12 years, ground-rent 60l..... | 800    |
| 3 to 8 and 12 to 17, Tyssen-street for Same, ground-rent 33l.....                | 1,050  |
| 45 and 47, Gifford-street, 14 years, ground-rent 6l.....                         | 310    |
| Holloway—120, Tabbey-road, 79 years, ground-rent 7l.....                         | 380    |
| Hoxton—80 and 82, St. John's-road, 37 years, ground-rent 8l.....                 | 700    |
| By H. RETLEY.                                                                    |        |
| Camden Town—75, Arlington-road, 50 years, ground-rent 7l.....                    | 600    |
| Kilburn—91, Pembroke-road, 75 years, ground-rent 8l 10s.....                     | 180    |
| Tottenham Court-road—1 and 3, Grafton-street, 22 years, ground-rent 18l 8s.....  | 1,930  |
| 7, Grafton-street, and 110, Huntley-street, 22 years, ground-rent 16l.....       | 1,350  |
| 102 to 110 even, Huntley-street, 22 years, ground-rent 42l.....                  | 3,185  |
| 11 and 13, University-street, 21 years, ground-rent 15l.....                     | 1,210  |
| JANUARY 19.                                                                      |        |
| By FAREBROTHERS, ELLIS, CLARK, & Co.                                             |        |
| Mincing-lane, E.C.—Ground-rent of 143l, reversion in 71 years.....               | 3,820  |
| Putney Hill—1, Cambet-road, 94 years, ground-rent 25l.....                       | 1,770  |
| Acton, High-street—'Lichfield House' freehold, a plot of freehold land.....      | 1,785  |
|                                                                                  | 1,140  |
| JANUARY 20.                                                                      |        |
| By J. HIBBARD.                                                                   |        |
| Clerkenwell—8, Great East-street, freehold.....                                  | 1,430  |
| By BLAKE, HADDOCK & Co.                                                          |        |
| New Cross, Surrey—Freehold land, 9s. 1r. 2pp.....                                | 13,300 |
| JANUARY 21.                                                                      |        |
| By BAKER & SON.                                                                  |        |
| Regent's Park—5, Taunton-place, 22 years, ground-rent 7l. 4s.....                | 340    |

**A House of Straw.**—It is stated that at the forthcoming American Exhibition, which is to be opened on May 2nd at Earls Court, Kensington, will be a house of straw, now being made in Philadelphia. This house is an American suburban villa, "two-and-a-half stories high," and covering a space of 42 ft. by 50 ft. It is built entirely of materials manufactured from straw, foundations, timber, flooring, sheathing, roofing—everything, in fact, including the chimneys, the material being fireproof as well as waterproof. The inside finish will be in imitation rosewood, mahogany, walnut, maple, ash, ebony, and other fine woods, the straw lumber taking perfectly the surface and colour of any desired wood.

**Timber-Drying.**—We have already described Mr. Philip Parsons's "Common-sense" Patent Drying-kiln. We hear that Mr. John T. Chappell, the well-known builder and contractor, is erecting at his works, Thames Bank Wharf, Pimlico, two large drying-rooms, each 43 ft. long, on the "Common-sense" system.

The Student's Column.

FIELD WORK AND INSTRUMENTS.—V.

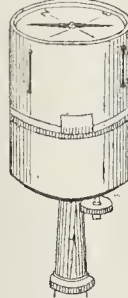
Surveying Instruments.

V.—THE CROSS STAFF.

THE cross staff consists in its simplest form of a rod, having a spike at its lower end for fixing into the ground, and two pairs of sights attached at right angles to one another at its upper end. Sometimes these sights are made with hinged joints to fold down, and at other times two fine grooves are sawn at right angles to one another, through a block of wood, which forms the head of the instrument.

Fig. 1 shows a cross staff head with brass fittings. The rod which connects it to the ground is set up, and fixed plumb over the point at which the right angles are required to be set out. The head consists of an octagonal brass box having slots in four of its sides, two of each being in line with one another through the centre of the instrument, and so cut that a broad opening comes horizontally exactly opposite a small circular opening, the latter serving as an eye-piece. In the centre of each of the broad openings shown below A and above D in fig. 1, are fixed wires or horse-hairs, which are intended to range the eye in adjusting the instrument over the rod upon the main line, and to act as a guide in setting out the cross line. Narrow openings with a small circular hole at top and bottom are provided opposite one another in each of the four remaining sides of the octagon, as shown between A and D in fig. 1. On the top of the cross staff head is shown a compass box, which can be revolved round by the hand, while the lower octagonal portion remains fixed. By means of this compass the magnetic meridian can be obtained with reference to any required direction. This is accomplished by setting the points on the compass box, marked north and south, as near as possible in the direction of the line under observation, and allowing the needle to float freely on its centre; then when the needle is at rest the angle which the magnetic meridian makes with the given line can be read off the graduated ring, which is marked round the edge of the compass box. By means of a small catch or trigger in the side of the box, situated in the rim where the word "compass" is marked in our illustration, the needle can be thrown off its bearing when not in use.

The cross staff is sometimes constructed in a circular form instead of the octagonal shape shown in fig. 1, and may be fitted with a rack and vernier, in addition to the compass box,



as shown in the accompanying cut. When this is done, the upper portion is made to revolve upon the centre of the box over a graduated circle fixed upon the circumference of the instrument, so that when great accuracy is not of importance, any angle may be thus set out approximately.

The accuracy of an ordinary cross staff may be tested as shown in figs. 2 and 3, where A, B, C, D, represents an enlarged sectional plan of the instrument shown in fig. 1. Having set up the cross staff vertically over the point E by means of the rod, which is fixed plumb in the ground, the eye is applied to the small opening at A, and ranged by the vertical hair or wire in the broad slot at C, the pole H is fixed at any convenient distance in the direction of the line of sight A C. Then, without moving the cross staff, the eye is applied at the small opening at B, and ranged by the vertical hair or wire in the broad slot at D, the pole F is fixed in the ground in the direction of the line of

sight, B D, which should be at right angles to the direction A C. Having done this, we next turn the cross staff round a quarter of a circle, so that when half-reversed, the position indicated by the letters on fig. 2 take the position shown in fig. 3. If when the line of sight A C points towards F, and the line of sight D B points towards H, the poles F and H, as set out in fig. 2, still remain, when viewed in fig. 3 in the lines of sight A C and D B respectively, the instrument is correct. If not, it must be returned to the makers for adjustment.

The cross staff is used for setting off perpendiculars from a base line that are too long to be approximately estimated by the usual tape or offset rod measurements, also for laying-out streets and building lots, and for setting out lines of cross-sections at right angles to a longitudinal direction, preparatory to taking levels. In the latter case the instrument compares itself as being sufficiently simple for a sharp intelligent chainman to be trusted to assist the surveyor in setting out his transverse sections, whereas an optical square or box sextant could only be used for this purpose either by the surveyor himself or a competent assistant.

VI.—THE PRISMATIC COMPASS.

The prismatic compass is shown in fig. 4 open ready for use, consisting of a glass-covered box containing a magnetic needle, which turns upon an agate centre. The needle is either attached to a card, as shown, or to a light graduated silver ring, which revolves with it. The ring or card has its outer edge graduated into degrees and half degrees, sometimes subdivided into 20 min. or thirds of a degree. That known as Major Hutchinson's pattern constitutes the Woolwich and Sandhurst instrument, and consists usually of a box about 2½ in. diameter. When packed in a leather sling case it is very portable, and largely used in military surveying.

A magnifying prism, situated between A and B in fig. 4, is attached to one side of the box, and made to slide up and down in a groove, so as to obtain a proper focus for reading the divisions distinctly upon the circle underneath. Upon the opposite side is attached a vane having a fine thread marked C down its centre. This vane is equal in height to the diameter of the box, and has a hinged joint so as to turn down flat upon the glass, or upon the fixed cover plate over the glass. This cover is indicated in fig. 4 by only a portion of the card being seen. When turned down, this vane lifts the card off its bearing, and the needle ceases to act. When turned up, as shown in fig. 4, the needle is free to turn, and the instrument must be held horizontally so that the card may play freely on its centre; otherwise the results obtained will not be accurate. The sliding framework by which the prism at B can be raised or lowered for arranging the focus, is also connected by a hinged joint so as to fold back, and be easily packed in the case when not in use. In order to show bearings in degrees to the east of north the card is graduated from the south, reading west, as shown in fig. 5. The numbers also are inverted upon the card, so that they may be refracted in an upright position through the prism of glass while viewing the direction required. The vibrations of the compass card when playing freely, can be checked by gently pressing a small spring, not shown in the illustration, but generally placed in the side of the box under the sight vane C, and below the level of the floating card. When the compass is held over a station point or any selected point in a line, and an object is viewed through the hole and slit in the prism at B, the instrument is turned horizontally by the hand until the fine thread in the vane at C bisects the point under observation. When the card is at rest, the number of degrees indicated in the line of sight is read through the prism. If, under certain circumstances, an increased amount of light should be found necessary in order to read the figures correctly, the card can be clamped while at rest, and the instrument tilted up a little above or below the horizontal, until there is sufficient light upon the card to see the divisions distinctly.

**Tanagra Terra-Cotta Reproductions.**—Messrs. Bellman & Ivey wish us to say that they are not the makers of these, which are made by Mr. R. Lechner, of Vienna, whose sole London agents they are.

PRISMATIC COMPASS

— HUTCHINSON'S PATTERN —

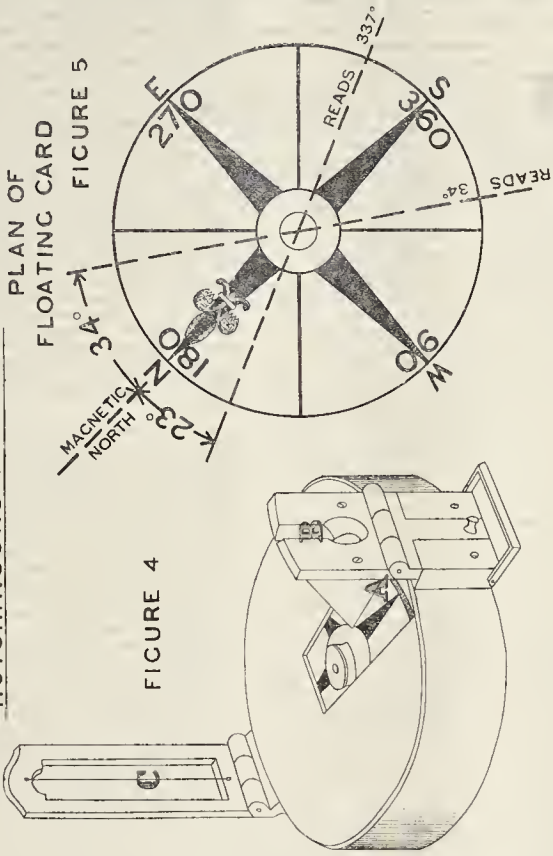


FIGURE 4

$$360^{\circ} - 337^{\circ} = 23^{\circ}$$

MAGNETIC MERIDIAN—THE PRISMATIC COMPASS IS HELD IN THE DIRECTION OF A GIVEN LINE, THE BEARING OF WHICH IS REQUIRED—THE INSTRUMENT IS THEN TURNED HORIZONTALLY IN THE HAND UNTIL THE VERTICAL SIGHT VANE AT C, WHEN VIEWED AT B, COMES IN THE DIRECTION OF THE GIVEN LINE. THE FLOATING CARD IS ALLOWED TO SETTLE, AND IS THEN MAINTAINED AT REST BY PRESSING THE SPRING STOP THROUGH THE PRISM OF GLASS AT B—AS SHOWN UPON THE PLAN OF THE FLOATING CARD, THE ZERO OR 360° CORRESPONDS WITH THE SOUTH POLE IN THE MAGNETIC MERIDIAN, 90° IS MARKED ON THE WEST SIDE, 270° ON THE EAST SIDE, AND 180° DENOTES THE NORTH; HENCE IN READING THE CARD AT A, THE DIRECTION OF THE MAGNETIC NORTH, WILL LIE TO THE LEFT HAND SIDE OF THE SURVEYOR, WHEN THE ANGLE READ, IS LESS THAN 180°, AND TO THE RIGHT HAND SIDE OF THE SURVEYOR, WHEN THE ANGLE READ, EXCEEDS 180°—THE EXACT DIRECTION OF THE MAGNETIC MERIDIAN, WILL BE IN A LINE, MAKING AN ANGLE WITH THE GIVEN LINE; AT THE POINT OF VISION, EQUAL TO THE NUMBER OF DEGREES READ UPON THE CARD, WHEN THIS ANGLE IS LESS THAN 180°, BUT IF THIS RESULT EXCEEDS 180°, THE ANGLE OF DEVIATION, AT THE POINT OF VISION IS EQUAL TO THE DIFFERENCE BETWEEN 360° AND THE NUMBER OF DEGREES READ UPON THE CARD.

CROSS STAFF

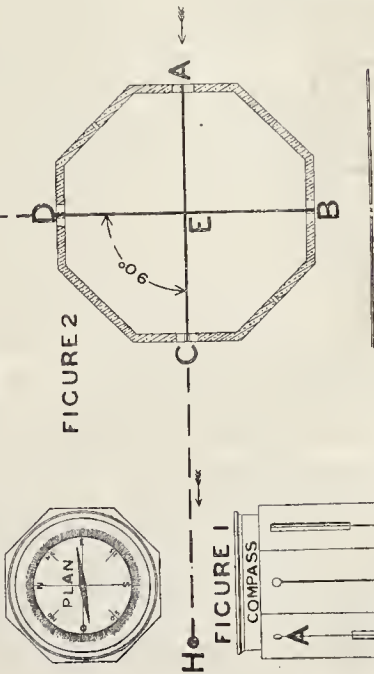
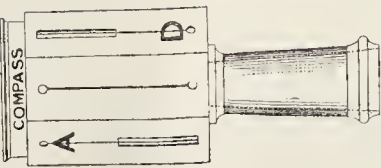


FIGURE 2

FIGURE 1



$$BEC + CED = 180^{\circ}$$

ELEVATION

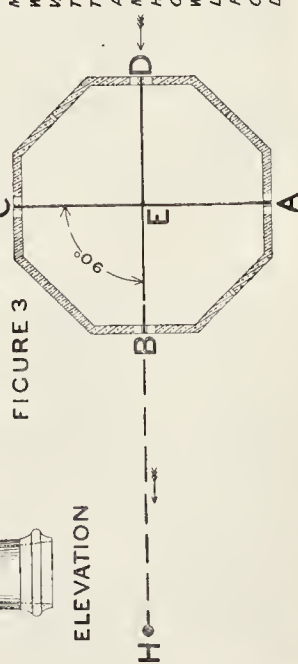


FIGURE 3

## MEETINGS.

SATURDAY, JANUARY 29.

*St. Paul's Ecclesiastical Society.*—Annual Meeting. 2.30 p.m.

MONDAY, JANUARY 31.

*Royal Institute of British Architects.*—Mr. William Simpson, F.R.C.S., on "Med. Architecture: Notes made in Persia and other Countries." 8 p.m.

*Royal Academy of Arts (Lectures in Sculpture).*—Mr. A. S. Murray on "Greek Sculptures—Expressive of the Emotions: after *Phidias*." 8 p.m.  
*Society of Arts (Junior Lectures).*—Dr. Thudichum on "The Diseases of Plants, with special regard to Agriculture and Forestry." 11. 8 p.m.

TUESDAY, FEBRUARY 1.

*Society of Arts (Applied Art Section).*—Opening address on "The Present Condition of Applied Art in England, and the Education of the Art Workman. By Mr. T. Armstrong, Director of the Art Division, Science and Art Department." 8 p.m.

*Institute of Builders.*—Third Ordinary General Meeting, to receive report of Council, &c. 3.30 p.m.

*Institution of Civil Engineers.*—Discussion on Mr. W. J. Dibdin's and Mr. W. Sando Crisp's papers on "Sewage Sludge and its Disposal." 8 p.m.

*Society of Biblical Archaeology.*—Rev. C. J. Ball on "The Metrical Structure of Zephaniah." 8 p.m.  
*Birmingham Architectural Association.*—Discussion, to be opened by Mr. Heuman, on "Stonework at Terra-Cotta." 7.30 p.m.

WEDNESDAY, FEBRUARY 2.

*Civil and Mechanical Engineers' Society.*—Mr. W. Lee Beardon on "House Drainage." 7 p.m.

*Society of Arts.*—Dr. Alfred Carpenter on "Sewage Irrigation." 8 p.m.

*British Archaeological Association.*—(1) Mr. W. de Gray Birch, F.S.A., on "The Domes in England and the Rebuilding of London by King Alfred." (2) Mr. J. T. Irvine on "Companion Plate, Peterborough Cathedral." 8 p.m.

*Builders' Foremen and Clerks of Works' Institution.*—Ordinary Meeting. 8.30 p.m.

THURSDAY, JANUARY 3.

*Institution of Mechanical Engineers.*—Fortieth Annual General Meeting. 7.30 p.m.

*Royal Archaeological Institute.*—Mr. Albert Hartshorne, F.S.A., on "Blythborough Church." 4 p.m.

*Edinburgh Architectural Association.*—Mr. John Kinross, on "The Jesuit Churches of Italy." 8 p.m.

FRIDAY, FEBRUARY 4.

*Architectural Association.*—Discussion on Professor Corfield's lecture on "House Sanitation." 7.30 p.m.

*Royal Institution.*—Mr. Edwin Froehfeld, F.R.S.A., on "Some Unpublished Records of the City of London." 8 p.m.

*Institution of Mechanical Engineers.*—Fortieth Annual General Meeting (continued). 7.30 p.m.

*Institution of Civil Engineers (Students' Meeting).*—Mr. John Goodman, on "Recent Researches in Friction." 7.30 p.m.

SATURDAY, FEBRUARY 5.

*Architectural Association.*—Visit to a new Church at Wimbleson. 3 p.m. (See advertisement.)

*Association of Public Sanitary Inspectors.*—Fourth Annual Dinner. 6 p.m.

## Miscellaneous.

**The Sixth International Congress of Hygiene and Demography.**—A considerable progress appears to have been made by the organising committee of the sixth international congress of Hygiene and Population Statistics, to be held this year at Vienna. The financial prospects of the congress are satisfactory, close upon 15,000 florins (1,500*l.*) having either been promised or received from public bodies, whilst it is expected that private persons will subscribe with equal liberality. Amongst the subjects coming on for discussion the following may be mentioned as proceeding from English members of the congress. Professor Frankland proposes to read a paper on the utilisation of sewage and the purification of rivers; Mr. Whymper one on the hygiene of factories and legislation for the protection of workmen; and Dr. S. Murphy one on international regulations for epidemics. An important paper, dealing with the most material changes of the European population during the last thousand years, will be read by Dr. Von Inama-Sternegg, of Vienna. During the congress an exhibition of objects relating to the purposes of the congress will be held; but only exhibits possessing novelty and acknowledged merit are to be admitted.

**The Association of Municipal and Sanitary Engineers and Surveyors** notices (as will be seen by an advertisement in another column) that the third examination of candidates for the offices of municipal and local board engineers and surveyors will be held at the Institution of Civil Engineers, Great George-street, S.W., on Friday and Saturday, the 22nd and 23rd of April next.

**William Edgcombe Rendle & Co. (Limited).**—Attention may be drawn to the prospectus of this new company, which has been formed for the purpose of purchasing as a going concern, and further extending, the well-known business of Messrs. Wm. Edgcombe Rendle & Co., Government and general contractors for glazing and other works.

**Hellhoffite versus Nitro-glycerine and Powder.**

—Some blasting experiments have recently been carried out in St. Petersburg with the new explosive, called "hellhoffite," invented by Messrs. Hellhoff & Gruson, as against nitro-glycerine and powder, which are somewhat interesting. Hellhoffite consists of a solution of an organic nitro-combination (naphthalene, phenol, benzine, and some similar substances) in nitric acid; but, for the experiments in question, bi-nitro-benzene, a solid, non-explosive, and slightly-combustible substance, had been used in the manufacture of the hellhoffite. At the first experiments glass bottles, with a capacity of 20 cubic cm. each, were filled with 20 grammes of each explosive and corked, a tube, filled with fulminate of mercury, being inserted through the cork, in the end of which was attached a slow-burning fuse. The bottles were then placed on conical blocks of lead, having a height of 60 mm. and a diameter of 35 mm. at the top, and 45 mm. at the base. On exploding the bottle filled with nitro-glycerine, the block of lead was compressed to about one-fourth of its height, whilst its diameter increased to 55 mm. The surface had the appearance of having been hammered with a very worn hammer. The hellhoffite had, however, far greater effect. The top of the cone was completely rent to pieces, bits of lead, 50 mm. long, and 20 mm. thick, being torn off and thrown a distance of several yards, whilst only the lower half of the block held together, but being quite unrecognisable. At the second experiment, the bottles were filled with 25 grammes of each explosive gunpowder, nitro-glycerine, and hellhoffite, and placed in holes bored in logs of fir of equal dimensions. On exploding the powder the log was splintered into four almost equal portions, as if it had been severed with an axe, the pieces being thrown to a distance of from 10 ft. to 18 ft., whilst on exploding the nitro-glycerine the log was splintered into a far greater number of pieces. The hellhoffite was, however, considerably more destructive, the log in which this explosive was deposited being rent into very small fragments. The advantages of hellhoffite, as compared with nitro-glycerine are,—1, that when exploded with fulminate of mercury its force is greater than that of the latter; 2, that it may be stored and transported without the slightest risk through being handled, as it cannot be made to explode by being shaken or struck, and does not ignite even under a naked flame. On the other hand, it has the following disadvantages:—1, it is a fluid; 2, the rapid evaporation of the nitric acid necessitates its being kept in hermetically sealed vessels; 3, on being mixed with water hellhoffite loses its explosive properties, and cannot, therefore, be used for submarine blasting as easily as nitro-glycerine or dynamite.

**The Architectural Court at the Manchester Exhibition.**—We would direct attention to the advertisement on our first page respecting the architectural court at the forthcoming Manchester Exhibition. The object, as has already been mentioned in our columns, is to get together a representative collection, illustrative of the progress of architecture during her Majesty's reign. The authorities of the Exhibition have confided this task to the Manchester Society of Architects, who are associating with themselves representatives of various architectural societies in the Kingdom. We are informed that the space allotted to the architectural court is already more than applied for.

**Lectures at the Royal Academy.**—Referring to the paragraph in our last (p. 168), giving dates and subjects of forthcoming lectures at the Royal Academy, we regret very much to hear from Professor Newton that the state of his health has obliged him to withdraw from his engagement to lecture to the students this session.

**Septicæral Monuments of Essex.**—A work on the "Ancient Septicæral Monuments of Essex," by Mr. F. Chancellor, is announced to be published by subscription. The book will contain illustrations, drawn to scale, of about 150 plates of monuments to members of various families in Essex, in parish churches and other places in the county.

**Concrete-work for Harbours,** which formed the subject of discussion at the Institution of Civil Engineers in November last, has just been issued by the Institution as a thick pamphlet, illustrated by seven plates and numerous wood-cuts.

**The Berlin Museum of Hygiene.**

—The Health Exhibition which was held at Berlin in 1883 has led to the establishment of a permanent Museum of Hygiene. The impulse to its foundation was given by Herr von Gossler, Prussian Minister of Education, who was ably seconded in his efforts by Professor Koch, the "Father of the Bacilli," as Berlin wit has dubbed him. The principal objects shown at the Berlin Exhibition formed the basis of the museum; numerous exhibits, the best of their several special branches, having been gradually added to it, so that the establishment now forms a unique exhibition. The objects are displayed in thirty-four well-lighted rooms, each of which contains complete departments. There are, in the first place, numerous examples of life-saving apparatus for use both on land and sea, as well as models, those objects forming a conspicuous feature of the late Exhibition. One room is specially devoted to models of workmen's dwellings; another to models of machinery used in spinning, weaving, agriculture, and other industries, provided with guards against accident, as well as of other protective apparatus in workshops. Four rooms are full of models of the various systems adopted for heating and ventilating of private dwellings and public establishments, as well as those relating to water-supply and sewerage. Another room contains hospital and ambulance appliances. An important room is that in which the various articles of food are displayed by the side of adulterations. The Exhibition is a most instructive one, although some departments,—for instance, public baths and washing establishments, in which Germany is behind other countries,—are not well represented. The electric light also makes but a poor show, the lighting department being chiefly confined to gas and petroleum.

**Historical Treasures in the Upsala Cathedral.**

—The Cathedral of Upsala, in Sweden, one of the oldest in Northern Europe, possesses some historical treasures of great artistic interest and value. Among them is a chalice of pure gold, with paten of the same metal, weighing 125 oz., covered with pearls, emeralds, sapphires, topazes, rubies, turquoises, and amethysts. On the foot is the following inscription:—"Hans Hviitt de Hallis hunc calicem fabricavit est, 1541. Taken at Prague, 1648; presented to Upsala Cathedral by Queen Christina." It is valued at 2,000*l.* There is also another chalice of gilt silver, richly covered with precious stones, brought by Charles XII. from Poland. On the foot is a Polish inscription, and the date 1655. Besides these treasures, the cathedral possesses the crown, sceptre, and orb of King John III., all of gold, and set with precious stones, recovered from this monarch's grave in 1833. The crown alone weighs 36 ounces. It also possesses the crown and sceptre of Queen Catharina Jagellonica, recovered from her coffin; a cross of gilt silver, weighing 17 lb., presented in 1160 by Pope Alexander III., to the first Archbishop of Upsala, Stephanns, in the foot of which is a splinter of the Holy Cross. Further Archbishop Arimbald's shrine of absolution, of enamelled copper, a beautiful piece of Byzantine workmanship; a heavy neck-chain of gold, recovered from the grave of Duke Gustavus of Saxony in 1767; two crosses and one ring of gold, found in 1815 in the grave of Sten Sture (Lord Protector of Sweden in the fifteenth century). The archbishop's staff still in use in the cathedral is believed to have been presented by Pope Urban VII. to Archbishop Jöris Bengtsson Oxenstjerna.

**Drainage of Codnor, near Derby.**

—A Local Government inquiry was held at Codnor on the 20th inst. by Major-General C. Phipps Carey, R.E., into an application made by the Basford Union Rural Sanitary Authority for power to borrow the sum of 4,000*l.* for proposed sewerage works at Codnor. The system known as intermittent downward filtration will be adopted. Mr. John Parker, C.E., of Nottingham, is the engineer appointed by the Sanitary Authority to design and execute the works.

**The International Statistical Institute.**

The first general meeting of this body, founded in London at the Jubilee-meeting of the Statistical Society in 1855, was to have taken place at Rome in September last, but owing to the prevalence of cholera was postponed until the present year. It is now definitely decided that it shall be held at Rome from the 12th to the 16th of April next.

The Surveyors and Auctioneers' Clerks' Provident Association on.—The annual report and balance-sheet of this Association, which has its registered office at the Auction Mart, Tokenhouse-yard, E.C., and of which Mr. Daniel Watney is the President, has been issued. The financial statement shows that the Association is in a sound financial position; the capital amount standing to the credit of each object being, in every case, larger than in the previous year. Five members have joined during the year, and none have become disqualified. Only one member has made a claim on the Sick Fund during the past year. The distribution of the members is as follows:—sick fund, 25; life assurance fund, 23 (including one member's wife); superannuation fund, 9; benevolent fund, 7. The committee have had several applications for grants from the benevolent fund from members of the profession not being members of the Association; but on investigation it did not appear that the circumstances of the applicants were such as came under the regulations framed by the committee, and no grants have been made. The annual meeting will be held at the Auction Mart, on Saturday, February 12th, at 3 p.m.

Liverpool Engineering Society.—The usual fortnightly meeting of this society was held at the Royal Institution, Colquitt-street, Liverpool, on Wednesday evening last, Mr. John J. Webster, M.Inst. C.E., President, in the chair. A paper was read by Mr. Charles H. Darbishire, M.Inst. C.E., on "The Ventilation of Sewers." After calling attention to the great disregard that had been generally paid to sanitary matters until recent years, the drainage system of the Houses of Parliament was referred to as an example of the awful state of affairs that could be devised and allowed to remain under the very chambers wherein were enacted the various Public Health Acts and other sanitary laws. The various gases which were usually found in sewer air were then detailed, and a careful description of Doulton's automatic flushing arrangement was given, illustrated by a working model. The systems of ventilation in vogue in various towns were compared, the conclusion arrived at being that the only safe, reliable, and universal system of ventilation was the simple one of as many openings as possible to the sewer. When, owing to faultiness of construction, or to improper matter being allowed to enter, any particular section of the sewer emitted foul gas and effluvia, if the sewer could not be rectified, or the improper matter excluded, special means, depending upon the circumstances of the case and the situation must be adopted to draw off the excess gas to where it could escape without injury to the public health or offence to the senses.

St. Paul's Ecclesiastical Society.—In the eighth annual report of this Society, to be presented at the meeting this Saturday, the 29th inst., the Council congratulate the members upon the proceedings of the past year, and say that the general interest manifested, and the very large attendances at the out-door meetings, testify to the continued usefulness and popularity of the Society. During the year, nine meetings have been held at the Chapter House, and papers have been read by Mr. J. T. Micklethwaite, Mr. J. P. Seddon, Mr. Charles Browne, Mr. G. H. Birch, Mr. Hugh Stannus, Mr. Joseph Grimshire, Mr. Somers Clarke, and Mr. Veargitt W. Maughan. Afternoon visits were made to St. Paul's Cathedral, the Charterhouse, the Church of St. Bartholomew the Great, to West Ham, to Hatfield, to Ongar, to Greensted, to St. Mary Cray, and to St. Paul's Cray. A day was spent in Ely. Part I. of the second volume of the Transactions has been issued during the year, and Part II. is in preparation. The balance-sheet shows that the finances of the Society are in a satisfactory condition. There are now 331 members on the register. Seventeen members have been elected during the year, and fifteen have resigned.

Exeter Cathedral.—A local paper says that the Dean and Chapter have decided to commence the erection of the cloister and library on the south side of the nave of the cathedral at once. The architect for the work is Mr. J. L. Pearson, R.A., of London, and the execution of the work is entrusted to Messrs. Luscombe and Son, of Exeter, who executed the work of restoration of the cathedral. The demolition of the old verger's house to make way for the first section of the cloister and library has commenced.

PRICES CURRENT OF MATERIALS.

Table with columns: Material Name, Unit, Price (s. d.), Price (s. d.). Includes items like Greenheart, B.G., Teak, E.I., Sequoia, U.S., Birch, Elm, Fir, Dantsic, Oak, Canada, Pine, Canada red, Lath, Dantsic, St. Petersburg, Wainscot, Bigs, Deals, Finland, Riga, St. Petersburg, 1st yellow, Swedick, White Sea, Canada, Pine, 1st, Mahogany, Honduras, Maple, Bird's-eye, Bose, Rio, Bahia.

TIMBER (continued). Table with columns: Material Name, Unit, Price (s. d.), Price (s. d.). Includes items like Box, Turkey, Satin, St. Domingo, Porto Rico, Walnut, Italian.

METALS. Table with columns: Material Name, Unit, Price (s. d.), Price (s. d.). Includes items like Lead, Pig, Spanish, English, common brands, Sheet, English, Silesian, special, Ordinary brands.

OILS. Table with columns: Material Name, Unit, Price (s. d.), Price (s. d.). Includes items like Linseed, Coconut, Ceylon, Palm, Lagos, Bappeded, English pale, Cottonseed, refined, Lubricating, U.S., refined, Turbentine, American, in casks, Stockholm, Archangel.

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Table with columns: Nature of Work, By whom required, Premium, Designated to be delivered, Page. Includes Re-Seating Chapel and New Schools.

CONTRACTS.

Table with columns: Nature of Work, or Materials, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes Making-up and Paving Roads, Town-Hall and Offices, Hall for Working Men's Club, Works and Materials, Granite Curb, Timber, Lamp Columns, Works and Materials, Rectification of Shaft, Repairing Footpaths, Miscellaneous Repairs, Sewerage Works and Carbolic Disinfectants, Watering and Cleansing Roads, Hospital for Infectious Diseases, Brick and Pipe Sewers, Construction of Sewer, Steel Dock Gates and Quays, School Desks, New School, Smethwick.

PUBLIC APPOINTMENTS.

Table with columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes Clerk of Works.

TENDERS.

Table with columns: Tender Name, Amount. Includes COSHAM (near Portsmouth), GEORGE and DRAGON INN, J. Biden, H. Jones, J. Crockerell, Burbridge, Leaver, Cosham, D. W. Lewis, W. R. & C. Light, J. Cross, T. Quick, J. Collings, W. Learmouth, J. H. Corrie, T. P. Hall, C. Dye, London-road, Kingston, Portsmouth, DEPTFORD, J. Heast.

Table with columns: Tender Name, Amount. Includes COLCHESTER, Messrs. Goby & Sons, Bull-road, Mr. J. W. Start, architect, Colchester; LONDON, For the laying-down of new granite carriage-ways and York-stone footways, the construction of a pipe sewer, and the execution of other works for the purposes of the Tower-hill and Postern-row Improvement, for the Metropolitan Board of Works.

LONDON.—For re-building printing office for Mr. George Stevens, 87, Commercial-road, E. Mr. Joseph Harris, architect, Bow:—  
 Huckle ..... £1,163 0 0  
 Croft ..... 1,068 0 0  
 Calman ..... 1,043 0 0  
 Russell (accepted) ..... 1,027 0 0

LONDON.—For alterations to the Queen's Head Public House, Piccadilly, for Mr. Stewart, Mr. H. I. Newton, architect, Queen Anne's Gate, Westminster:—  
 Dixon & Jones ..... £585 0 0  
 Burman & Sons ..... 359 0 0  
 Jackson & Todd ..... 230 0 0  
 John Anley (accepted) ..... 237 0 0

Feather's Work.  
 Davidson ..... £55 10 0  
 Helling ..... 50 0 0  
 Heath ..... 47 0 0  
 Sanders & Sons (accepted) ..... 46 10 0

LONDON.—For alterations and additions to premises in Whitfield-place, W., for the Borough of Marylebone Medical Club, Mr. Arthur W. Saville, architect, Strand. Quantities supplied:—

W. Downs ..... £84 0 0  
 J. Heath ..... 659 0 0  
 J. Adams ..... 443 0 0  
 J. Anley ..... 638 0 0  
 Ward & Lambie ..... 637 0 0  
 W. Royal ..... 623 0 0  
 Spencer & Co. (accepted) ..... 600 0 0  
 Treweeke ..... 685 0 0  
 \* As amended, £430 previously tendered in error.

LONDON.—For shop fittings at 133, Tottenham-court-road, for Messrs. J. H. Deakin & Co. Mr. Arthur W. Saville, architect, Strand:—  
 W. Royal ..... £165 0 0

PORTSMOUTH.—For extension of drainage, &c., at the Kingston Cemetery, Portsea, for the Portsea Island Burial Board, Mr. James W. Strand, surveyor, Portsea. Quantities supplied:—

|                     | General Estimate. |          | Alternative Estimates. |         |
|---------------------|-------------------|----------|------------------------|---------|
|                     | £ s. d.           | £ s. d.  | £ s. d.                | £ s. d. |
| Roberts & Crosby .. | 648 19 1          | 654 17 7 | 663 18 4               |         |
| W. Leamouth ..      | 405 0 0           | 484 11 0 | 556 0 0                |         |
| H. Farnimer ..      | 429 0 0           | 448 0 0  | 458 0 0                |         |
| D. W. Lewis ..      | 416 15 0          | 416 8 0  | 465 6 0                |         |
| E. Boulton ..       | 412 14 0          | 422 14 0 | 425 5 0                |         |
| J. H. Corke ..      | 383 0 0           | 372 0 0  | 388 0 0                |         |
| J. Croad ..         | 392 0 0           | 392 0 0  | 397 0 0                |         |
| W. Ford ..          | 359 17 0          | 371 12 0 | 373 0 0                |         |
| C. Dye ..           | 353 4 11          | 359 3 11 | 359 3 11               |         |
| T. W. Quick* ..     | 347 0 0           | 341 0 0  | 359 0 0                |         |

\* Victoria-road, Southsea. The others of Portsmouth and Southsea.  
 † Accepted for estimate A.

RAMSGATE.—For the erection of two houses at Ramsgate, for Mr. J. B. Hodgson, Mr. Alfred R. Pile, architect, Bloomsbury-square:—  
 Wehl ..... £769 0 0  
 Wood ..... 585 0 0  
 Bowman ..... 583 0 0  
 Martin ..... 544 0 0  
 May ..... 518 0 0

SOUTHSEA.—For additions to "Wealey House," Victoria-grove, for Mr. J. W. Gardner, Messrs. James W. and John W. Strand, architects. Quantities supplied:—

H. Jones ..... £397 0 0  
 W. Wood ..... 311 4 5  
 T. P. Hall ..... 330 0 0  
 J. Croad ..... 317 0 0  
 D. W. Lewis ..... 315 0 0  
 J. Crockerell ..... 312 0 0  
 W. & J. Briggs ..... 293 0 0  
 J. H. Corke ..... 290 0 0  
 J. Rogers ..... 243 0 0  
 Leamouth\* (accepted) ..... 225 0 0  
 \* Emworth-road, Kingston, Portsmouth. The others of Portsmouth and Southsea.

SWINDON.—For erecting house and shop in Regent-street, New Swindon, for Mr. J. E. Baker. Mr. William Drew, architect, Swindon:—  
 Wiltshire, Swindon (accepted) ..... £370 0 0

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than Four p.m. on THURSDAYS.

TO CORRESPONDENTS.  
 Registered Telegraphic Address, "THE BUILDER, LONDON."

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# The Builder.

Vol. LII. No. 2265.

SATURDAY, FEBRUARY 5, 1897.

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### Mountain-Building.



**EXCEEDINGLY** few works have been written exclusively on the theory of mountain-building, and no monograph, so far as we are aware, had appeared in the English language before the publication of the work

now before us.\* The author being both a civil engineer and an architect has incorporated a few observations which apparently came under his notice in professional practice, in illustration of some of the points of his work, and it is our intention to speak firstly of these and then pass on to the purely scientific part of the book.

In considering what effect a local change of temperature would have on the earth's crust, he points out the results of expansion on external objects, such as chimneys, kilns, metal-work, rails, bridges, roofs, girders, and masonry. He observes that a vessel formed of such a ductile material as lead, if repeatedly heated and cooled, permanently increases in size with every such operation. "In laying small sheets of lead or zinc the metal must be free to move or it will quickly rupture by changes of temperature. Hence in all good roof-work, if of lead or zinc, soldered joints are rigidly excluded. Notwithstanding all these precautions, one has only to examine an old lead roof to find it covered with ridges and puckers. These ridges arise from the accumulated small superficial expansions which imperceptibly affect the lead, but the low tensile strength and ductility of the metal will not allow it to regain its form by contraction."

The distortion, however, occurs in a more perfect manner in vessels lined with lead, for the metal in such cases has very little play. "Who has not noticed the ridges on an old bath lined with lead?" To further illustrate this portion of his subject, the author made several experiments by heating sheets of lead and observing the permanent results. Four good ink-photo plates are given to show the effects of superficial expansion on these. One of them is a fac-simile of a hutter's pantry sink, where a ridge is shown to have been formed by the contractions and expansions produced by the ordinary alternations of hot and cold water.

\* The Origin of Mountain Ranges considered Experimentally, Structurally, Dynamically, and in Relation to their Geological History. By T. Mellard Reade, C.E., F.G.S., F.R.I.B.A., &c. London: Taylor & Francis, 1898.

With regard to the effects of expansion by heat on brickwork, he observes (p. 12) that "Any practical man, who has had experience of setting of boilers, the building of chimneys, or the erection of kilns, knows that the effect of such heat as they are subjected to is very destructive of the structure. It arises from two causes,—first, the unequal expansion of the heated interior compared with the cooler exterior; and, second, the low tensile strength of brickwork. The heated interior brickwork expanding, ruptures the exterior, which expands less. This effect does not follow from one operation, but through repeated heatings and coolings. At every heating the brickwork is moved, but in a way imperceptible to the eye, and it does not recover its original dimensions on cooling. The accumulated results of these internal movements soon, however, become sensible by rifts in the brickwork. To counteract these destructive forces, it is usual to bind the brickwork together with iron rods or hoops, which, having a high tensile strength, hold the work more firmly together."

The author, in addition, quotes the opinion of Herr Eckhartz in the *Builder* of March 17, 1883, p. 362, wherein he dwells upon the use of iron-hooping, and remarks that its object and result are not, strictly speaking, the prevention of extension, but rather the attaining, in the outer brickwork, of a uniform distribution of the tension, and the prevention of its concentration at certain points.

The effects of expansion by heat are also exemplified by the well-known fact that a line of hot-water pipes for heating a building requires considerable play, even though never rising above a temperature of 212° Fahr., and has to be fitted in places with expansion-joints, otherwise the pipes would fracture, or the ordinary joints leak. The expansion of railway metals by the heat of the sun is also considered, as well as the huckling of plates on the sides of a series of girder bridges. With reference to the latter, the author states that some of them have domed up from  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in. in plates 1 ft. 8 in. wide. The effect is quite striking, and he is satisfied that it is mainly the result of changes of temperature, as in every case it is the south side exposed to the mid-day sun which is mostly acted upon.

A series of experiments on the effect of heat in expanding different kinds of building and other stones were conducted by the author, and the results given in detail, together with their co-efficients of expansion. These trials were in most cases made with dressed hars of stone about 15 in. long, but of various scantlings, best suited to the material. The ends were dressed square. Each stone was tested several times, and the mean of the observations taken as the correct result.

Summing up, we find the mean co-efficients of expansion of various rocks, as determined by the author's experiments, to be as follows:—

|                 |                     |
|-----------------|---------------------|
| Sandstones..... | $\frac{1}{178,825}$ |
| Marbles .....   | $\frac{1}{184,797}$ |
| Slates .....    | $\frac{1}{193,827}$ |
| Granites.....   | $\frac{1}{203,322}$ |

These results do not in most cases greatly differ from those of Mr. Adie in the *Trans. Royal Society, Edinburgh*, vol. xiii, p. 366. The author also refers to the well-known experiments on American building stones under Col. Totten, the object of which was to ascertain the cause of the fissuring of the joints of coping-stones in certain buildings, it having been found impossible to keep the joints perfect for more than a few weeks. The conclusion arrived at was that the fractures were due to ordinary changes of temperature.

Passing on to the purely geological portion of the work, we observe that the author firmly believes that the earth is solid throughout, and that although heat increases with the depth in the crust of the earth, and that a depth would eventually be reached at which any known rocks would be melted if they were at the surface, yet they are prevented from melting by reason of the pressure of the superincumbent rocks. He further believes that upon any sufficient release of the pressure, portions of such underlying rocks would assume a molten state, and that, therefore, the material below a certain depth, although being actually solid, may be described as being in a *potentially liquid* condition. When in that condition, they act as a plastic mass, and differ in their relative strengths in resisting the superincumbent pressure, so that, on contraction, the subsidence that must follow causes strains which, although occasionally are met by the strata merely bending, are oftener eased by sudden snaps producing faults. The nearest parallel to this state of things, he observes, is that of the walls of a building on a foundation of differing degrees of solidity, under which circumstances the building will very soon tear itself to pieces.

Up to this point, we have refrained from offering any criticism of the work. One has only to read it through to be convinced of the great amount of care and thought the author has bestowed upon it. But there are, nevertheless, many points that, in our opinion, materially affect the bases of some of his hypotheses. We entirely agree with the author as to the solidity of the earth, and the absence of a fluid stratum beneath the crust, as we think that, on the whole, this is the condition which most readily accords with the known facts of

geology, on this particular line of research. We are also prepared to believe in the plasticity of the potentially liquid mass and in the portion of the crust for some distance above it. It would also be idle for us to dispute that local changes in temperature, due to thick sedimentation in certain areas, cause a corresponding rise in the isotherms under those areas, the result of which would be expansion of the rocks so affected. The author's arguments on these heads are in many instances both novel and conclusive, and on this portion of his work we cannot too highly compliment him.

But we cannot agree that the effect of this sedimentation, and the consequent rising of the isotherms, and attendant results, are such as to be great factors in producing the phenomena of the elevation of mountain ranges. It may have a *little* to do with it, but we think that the principal effect of such thick sedimentation is to cause the slow movements of large continental areas. Besides, there are areas where the sedimentation has been of very great thickness, and where no mountain ranges have resulted from this loading. If the author's theory is the correct one, we cannot account for this. Looking at the matter from another point of view, we might say that unless a considerable thickness of rock were in existence before mountain chains were formed, there would have been nothing for them to have been made out of. We do not think, therefore, that any theory need be formulated to account for the connexion between mountain ranges and thick sedimentation.

We are pleased to see that the author does not attribute the corrugation of the earth's surface to the contraction of the nucleus (p. 125).

Speaking generally, it appears to us that he has not laid sufficient stress on the effects of the subsidence of large ocean bottoms, and the great weight of water thus accumulating on those portions of the crust immediately subjacent. Take, for example, the Pacific Ocean, the greater part of which has been formed in recent geological times by the subsidence of the land which now forms its bottom. Concurrently, volcanoes and mountain ranges appeared all round its shores from Cape Horn, through Chili, Peru, Central America, the Rockies, Aleutian Is, Japan, and so on, until New Zealand and even the land of the Antarctic continent are reached. Surely this is not without its significance, in dealing with the hypotheses connected with mountain-making. We cannot think that the deposition of the sediment,—however thick,—forming the mountain ranges referred to, has had such a stupendous effect, in the elevation of those mountain ranges and adjacent land, as to cause the subsidence of the land which is now the bottom of so great a part of the Pacific.

Again, we should like to have seen more notice taken of the action of extra-terrestrial bodies on the earth. We allude, of course, to the attraction of the sun, moon, &c. In our opinion, the silent forces which are capable of producing tides, the precession of the equinoxes, nutation, and changes in the obliquity of the ecliptic, have had a very considerable share in the formation of mountain ranges. We must not forget, either, the high probability of the instability of the earth's axis, changes of the earth's centre of gravity, or, indeed, the significance of the connexion between the periodicity of earthquakes (and attendant phenomena) and lunar attraction, as has recently been advanced and reported in our columns. All these things and more have had their share of work in twisting and corrugating the earth's surface.

We would not by such criticisms desire to convey to the minds of our readers that the work is not up to the mark. It must be remembered that the author has attacked a most difficult subject, and one about which it is quite impossible, in the present state of our knowledge, to dogmatise, as he himself, of course, admits. The work marks a distinct advance of, and is a valuable contribution to, physical geology, and must take its rank accordingly; for, whatever the value of the hypotheses he has brought forward, they are

interspersed with a large number of facts, which future writers will not fail to take advantage of in some way or another. Enough has been said to show that there is much in it of interest to our readers, especially in connexion with the effect of heat on various building materials. The work is well and very profusely illustrated by ink-photos.

#### ACADEMIC QUARRELS.

**T**HE incidents which would seem to have marked the recent elections to fill the gaps in the ranks of the Royal Academy are curiously calculated to prove how history repeats itself. Little as is actually known of a transaction which is usually conducted amidst the most dignified secrecy, enough has transpired to show that the causes of friction between the President and his brother Academicians closely resemble a very similar disagreement which occurred a century ago among the members of the then only recently-formed institution. At that time as now, the difference would seem to have turned on a purely personal source of irritation, and as is sometimes apt to occur on these occasions the friends of the "outs" would seem to have expressed themselves warmly respecting the backers of the "ins." Such quarrels are, of course, no novelty to those familiar with elections, of whatever description, but when they break the dignified ease and calm of academic life they smack almost of sacrilege. There is an air of staid respectability surrounding all academies, but especially our own Royal Academy, which is, strictly speaking, the sole existing Academy in our country. The divinity which hedges the governing body whose deliberations are held at Burlington House has, however, once again been rudely broken in upon, and in the causes of the difference the opponents of the Academy, who of late have been expressing themselves somewhat warmly, will, it is to be feared, have found fresh grounds for their attacks. In the quarrel in which Sir Joshua Reynolds was only with difficulty induced to withdraw his resignation the disagreement turned, it may be remembered, on the refusal of the Academicians to raise from the rank of Associate Reynolds's friend, the architect Bonomi, whom the President very rightly considered would admirably fill the then vacant chair of Lecturer on Perspective. But the clique which supported Fuseli manoeuvred with such apparent animus against their chief and his nominee that the President resigned. He returned to office, it is true, but a few months later he delivered the last of his long series of discourses, the collected edition of which is to this day presented to each medal student of the Academy. Fortunately, it is rarely that Academic quarrels reach such a pitch of acrimony as to result in open warfare, but it may be safely said that no election of members passes without a considerable display of personal friendship and animosity between the too-often conflicting "sets" into which every body of men belonging to one profession seem inevitably divided. Potter hates potter, a Greek proverb tells us, and united in their aims as Associates and Academicians may be, they are no less subject than other mortals to human influence, not to say weaknesses. Some of the most deeply-rooted failings of humanity would seem to be exhibited in the causes which dictate such quarrels as spring up among brother academicians, and to which academies at all times have owed the absence from among their number of some of the greatest names in literature, art, and science. Even the French Academy, the model of all such institutions, is not free from this defect.

The story of the forty-first *fauteuil* of the Académie Française has been brilliantly related by M. Houssaye, and the fact that that imaginary throne of honour has been occupied by some of the most eminent names in French literature,—Pascal, Molière, Diderot, Rousseau, Beaumarchais, Descartes, Béranger, Balzac, Théophile Gautier, Dumas, Georges Sand, among others less familiar to English readers,—is a point which certainly "scores" for the

opponents of academic exclusiveness. This spirit and the bickerings it never fails to rouse are the chief origin of the quarrels which seem to be inseparable from academic life. In the case of our own Royal Academy, it is to be regretted, for the sake of our national art, that such disputes tend to prove the assertions of those who urge that the Academicians are more interested in the promotion of their own personal interests than in carrying out the aims laid down in the famous "instrument" granted them by George III. "for the purpose of cultivating and improving the arts."

The arguments in favour of and against the influence of academies have often been brought forward. That influence has been accused of fossilising into nerveless tradition the living bones of free inspiration. Nothing, in fact, is easier than to criticise academic institutions, and the errors into which they fall. Whenever the controversy is revived,—and it would seem to enjoy a perennial vitality,—it seems too frequently forgotten that the real aim of an academy, whether it be connected with the arts, with literature, or with science, is not, and never can be, to satisfy the various personal sympathies and antipathies of the public, however intelligent that public may be. When, two centuries ago, Richelieu founded the famous French Academy, his intention was to form a high court of letters, to give, as Mr. Matthew Arnold has said, the tone to literature, and that tone a high tone. An academy, in fact, to carry out its true aim should be a sovereign organ of opinion, an authority which in addition should practically influence the current of public opinion. All readers of Mr. Matthew Arnold know with what brilliancy that master stylist has regretted the absence of such a standard in the literature of our own country, which individually has enriched the world with so many creations of pure genius. The arguments in favour of an academy of letters tell far more powerfully in behalf of the arts. It is on the point whether the Royal Academy represents this high standard, that should turn, and turn solely, the criticisms addressed to the Burlington House authorities. Does that body in its exhibitions show its encouragement of the highest work, not necessarily in the productions of its own members, who are privileged, but with the creations of the "outsiders" whose names (in smaller type) are admitted to a place beside their own in the pages of the familiar blue-paper covered catalogue. Unless these conditions be fulfilled the Academy must submit to the attacks to which it is yearly subjected, and its members must expect the recurrence of constant internal dissensions. It is singular how obstinately the Burlington House authorities seem to place themselves in the power of their enemies. Each year, as May comes round and "the Academy" is opened, the rejected ones are able to draw attention to exhibited works which no stretch of kindness can argue are up to the standard of merit which the Academy should uphold. The injurious effects of this are incalculable. In a past when the Academy was the one of the two or three exhibitions in which the English artists could show their year's work, the conditions of admission were different; but now, when certain streets in the West-End seem exclusively devoted to fine-art galleries, Burlington House could afford, without cruelty, to reject even a larger number of works than at present is the case, and the exhibition would then present a severe standard of English art, by which the public taste might be influenced, and the level of general "journeyman work" raised. It is because within the Academy itself there are members who hold these views that once again a quarrel has broken out between the representatives of the typical "Academic" traditions and the younger enthusiasts who would see the institution to which they belong boldly carrying out the aims for which their charter was originally granted.

**The Proposed Liverpool Cathedral.**—Sir A. B. Walker has signified his intention of giving 10,000*l.* to the building fund of the Liverpool Cathedral.



NOTES.



R. J. OLDRID SCOTT and Mr. Seddon have prepared a memorial for presentation to the Committee of the Liverpool Cathedral, to which they ask for the signatures of all architects who feel interested in the matter, desiring that the designs submitted in competition should be exhibited in London "for the purpose of eliciting the best skilled and widest public opinion on them." This is a compliment which Mr. Ewan Christian will no doubt appreciate equally with ourselves, the implication being that they have not received such "opinion" so far. Nevertheless, we are quite in the mind that it would be a matter of interest to have the designs exhibited in London, though it must not be forgotten that they have already received considerable general publicity through the illustrations in this and other journals, one of our contemporaries, indeed, having been so eager in the good cause as to produce them from our plates, failing other means. It cannot be said, therefore, that "this thing was done in a corner." Inasmuch, however, as the obvious intent is to re-open the discussion as to the selection of the designs, we hold that the proposition would have come better from persons outside the ranks of the architectural profession, who, we must plainly say, are a great deal too fond of endeavouring (of course in the interest of art) to upset competitions which have been fairly decided. *Aut rest*, we imagine the "most skilled public opinion" really means that of the "church party," who want to stereotype church architecture on the Medieval model; or, perhaps, Lord Grimthorpe is to write an article on the designs. In that case all concerned would be certain of amusement, if not of instruction.

ON the 28th ult. Baron de Worms received a deputation of Lancashire and Cheshire trade representatives on the subject of the proposed Government legislation on railway charges. The deputation wished to impress their views upon the Board of Trade as to the injustice involved in the principle apparently guiding the railway companies in fixing their rates, their own opinion being that the charge was often out of proportion to the service rendered. Judging from the Baron's reply, he was in entire sympathy with the traders, for he fully endorsed their views; and the Bill about to be introduced in the House of Lords will, doubtless, be quite as comprehensive as Mr. Mundella's. He expressed his belief that satisfactory remedies for their grievances would be found in the measure, and stated that the Government were prepared to give the fullest consideration to any suggestions. A notable defect in last year's Railway Bill was the absence of any practical clauses for the regulation and more efficient management of canals, Mr. Mundella admitting, after its introduction, that he had come to the conclusion that in this respect he had failed to make any satisfactory provision. It has been stated in the House of Commons that there are thirty-nine canals, with an aggregate length of 1,436 miles, under the direct control of the railway companies, several others being also in their hands to a great extent. Recent events connected with canals communicating with the Thames and the Severn, go to show that it is very probable that the fact of railway part ownership prevents the public from deriving that benefit from them which they are calculated to afford. The Great Western Company deny that the inefficiency of these waterways is due to any action of theirs (though it may be said, in passing, that the complaint is of inaction), and it is still an open question; but this, and other cases of a similar nature, will doubtless come under discussion when the matter is again before Parliament, and this particular question should receive more prominence in the forthcoming measure than it has done in former ones.

WE observe that one of our contemporaries has been commenting upon the line of frontage laid down by the Superintending Architect of the Metropolitan Board of Works

in what is known as the Brixton-rise and Trent-road case, and the question of the legality of his certificate has been brought before the House of Commons, — when the Chairman of the Board stated that the Board had no powers to interfere in the matter; and we are inclined to think that the Chairman's reply was in accordance with the law upon the subject, as also with recently-reported cases. The Superintending Architect is appointed by the 25 and 26 Vict., c. 102, as a statutory officer to define lines of frontage, and in this character the Metropolitan Board of Works have no power to interfere with his decision, which is final, and cannot be impeached in any way.

IT is a reassuring thing for English travellers and intending residents abroad, when they see the authorities of a city actively bestirring themselves to remedy their sanitary defects; and it is seldom that we meet with such determined efforts to improve the public health as are now being made in Florence. The city has recently been the scene of some serious aspersions on the score of health; and although a one-time resident defended her with more zeal than discretion, his figures were soon pulled to pieces, as proving too much. There can be no doubt that Florence, while fairly free from great epidemics, is not nearly as healthy as she ought to be. Few cities, either at home or abroad, are more carefully swept and garnished; and even in the slums around the Ghetto, such as Pelliceria or Calimari (where the cholera alarm took place last June), the smells are not unbearable, nor are the accumulations allowed to become too marked. The chief difficulties are the length and intricacy of the sewers, the cesspools, and the drinking-water. Everybody knows, and Florentines best of all, that if their fair city gets a bad name, they might as well efface themselves from off the earth. Neither Raffaele, Michelangelo, nor Donatello will attract visitors, if it is known that the drains are all wrong; and the Syndic and his followers are acting sensibly in acknowledging the evil, and resolutely bending to its cure. The Hygienic Society is doing its best, not only theoretically but practically, to inquire minutely into the conditions of typhoid; and the inquiry naturally brings to light many hitherto unsuspected errors of sanitation. Even now, the wells are being examined, the sewers flushed, and publicity given to all hotels, pensions, and lodgings, where proper drinking-water is supplied. This is especially necessary, in view of the enormous crowds which may shortly be expected to assemble at the opening of the new facade of the Duomo.

APART altogether from the question as to a cause of the death, at Chiswick, of the girls Wilkes, and the serious illness of the mother and other members of the family, which cannot possibly be known till the analysis of the food is completed, a deplorable case of over-crowding is presented. The mother and the six children slept huddled in a bedroom measuring 9 ft. by 8 ft. There were three unoccupied bedrooms besides, one of them containing an uncovered bed, in the house. It is a case, however, which only the closest watchfulness on the part of the sanitary officer would find out, as the general accommodation, so far as outward appearances are concerned, was ample for the family. It is reported that the sanitary condition of the house is distinctly bad; the atmosphere of the house was so stiflingly impure that an experienced ex-nurse only remained in it, under great trial, to wash the insensible children. It is rather surprising to find this sad sanitary condition of things in Chiswick, which only quite recently made a house-to-house inspection. But it seems the Local Board have not fully recognised the importance of the necessary corollary to this action, — effective steps to require the remedying of all sanitary defects. Inspection is of no use unless it be promptly followed by remedial action.

EVEN if Londoners had not daily before their eyes the smoothness and the almost perfection with which the Fire Brigade turns out for action, Captain Shaw's report and the

statistics embodied in it would make us feel assured thereof. The year 1886 showed a list of 2,149 cases of actual alarm in which more or less serious damages resulted, not to mention false alarms or chimney fires. And when we come to think of the extensive area over which the little army (only 539 altogether) is liable to be called at any moment, night or day, it is simply marvellous with what success the great demon is kept under. At the same time, we cannot disguise from ourselves that both the number and the size of the London fires have been increasing at an alarming rate the last few years, though it is true that 1885 exceeded even 1886. Another serious matter is the lamentable loss of life, which is undeniably on the increase. This seems to point to some defects in the life-saving apparatus.

THE delegates of the Edinburgh Free Library Committee, after having examined the several sites considered eligible for the central library, have recommended the site on the west side of George IV. Bridge, immediately to the south of the Highland Society's rooms, and opposite to the Sheriff Court Buildings. The estimated cost of the site is 11,000*l.* The recommendation was submitted to a full meeting of the Library Committee, and it was unanimously adopted, and the site in question fixed upon. The superficial area of the proposed site is stated to be ample for the requirements, affording an available floor space of 1,950 ft., which is capable of accommodating 150,000 volumes. The foundations of the new building will be upon the low level of the Cowgate, and will necessitate the removal of several old buildings in that street. The principal entrance will be from the high level of the bridge, having an elevation of three stories, beneath which will be other three stories. A report is to be given by an architect as to the best manner of constructing the proposed building, and it is probable that designs will be called for by an open competition.

AT a meeting of the Edinburgh Town Council on Tuesday last, it was agreed to ask the Executive Committee of the International Exhibition to remove all the buildings from the West Meadows at an early period. It was reported that fifty-five competitive plans had been received for the new Municipal Buildings, and arrangements were made for selecting those which are entitled to the awards. The successful plans are afterwards to be exhibited at the Council Chambers for the benefit of the public. This appears to us to be putting the cart before the horse. The real use of exhibiting competition drawings is to get general criticism and public opinion; to exhibit them after the award is made is to lose all the advantage of that.

WE mentioned a few weeks back that a series of plinths, bearing sculptors' signatures, of the school of Aphrodisias, had been discovered in the Sette Sale. We are glad to learn from the last issue of the *Buletino della Commissione Archeologica* that one of the statues belonging to a signed plinth has been successfully reconstructed. The statue represents Poseidon life size. The head is finely worked, and in excellent preservation. The body, with portions of both arms and legs, has been put together. The feet still adhere to the plinth, which is covered with a series of curved lines to indicate the sea. The right arm seems to have leaned on the trident. The inscription is clear, and can easily be restored: —

“ΦΛ(αοβίος) Χρυσάρι(ς) (Ἰάφρο)δεισ(αυς)  
(ἱπο)ίει.”

This gives us a clear instance of the type of the god Poseidon at a definite date, and hence a fixed standpoint for the dating of many other unsigned statues.

IN our number of the 27th of December, 1884, we described the new buildings for Hatchett's Hotel and "White Horse Cellars," at the corner of Dover-street, Piccadilly, which were opened on Monday, the 19th of January



following. On the 26th of January last (1887) the premises were put up for sale by auction, under order of the Court of Chancery. The sale at the Auction Mart realised 65,000*l.*, the purchaser being, it is reported, Mr. R. Pratti, of No. 45, formerly the Ship, Charing-cross. The ground plot contains about 4,550 superficial feet, excluding the vaults beneath the pavements. This freehold site was sold for 70,000*l.* about four years since. The land-tax having been since redeemed, the existing premises were erected at a cost exceeding 32,000*l.* What Limmer's, in Conduit-street, used to be to patrons of the ring and the turf, so was Abraham Hatchett's hostelry to the high-class gentlemen of the road. It served, in fact, for head-quarters of the mail coaches that travelled into the West of England. Hazlitt says that the finest sight in the metropolis is the setting off of the mails from Piccadilly,—a scene depicted in Rosenberg's print, after J. Pollard, of 1823. In Holcroft's yet popular play, "The Road to Ruin," will be found Goldfinch's rattling account of the wedding coach he had just ordered at Hatchett's. That "all-flash" equipage, could it be reproduced to-day, with its striped panels, fringed hammer-cloth, and green and white curtains festooned, and team of grays, would form a startling feature of the view whose pristine glories a recent revival has partially restored. Some relics of the former house are preserved here; amongst them an oaken drain-pipe, the smoke-jack, and game roasting-hook, the toasting contrivance, and the sign-board bearing the first proprietor's name.

A PARAGRAPH in the *Standard* of the 31st ultimo records the death of the Marquess de Foulon, architect, at the ripe age of ninety-two. He was the son (or nephew) of that Foulon who in the French Revolution told,—or was believed to have told,—the famishing populace to "eat hay." They set upon him in his carriage in the streets of Paris, murdered him in the presence of his wife, stuffed his mouth full of hay, and hanged him on the next lamp-post. We have heard the son recount the facts, while denying the assigned cause. He was, and used to be, a young man, the pupil of Nash, and used to meet at his house, among the society of that day, Brummel, the elder Pugin, Mathews, and the Prince Regent. He was full of anecdote, and recounted, with frank speech and much genuine humour, the sayings and doings of the jovial spirits of that practical joking age. He tried his fortune in America, and built more than one theatre in New York, but returned to this country partly through lack of employment and partly through dislike of the Yankee of the period. At seventy years of age he was employed in the Works Department of one of the Government offices. He had all the vivacity of a young man,—stood the whole day at his drawing-board, and walked to and from his work daily. He was a perfect gentleman, and had something of the grand manner about him, and although he never obtruded his affairs or his history on his companions, he would, upon a little encouragement, be communicative, and was on such occasions extremely interesting. As a water-colour artist he had considerable skill, although his work was of a kind now obsolete,—purely conventional, and having but little resemblance to nature. We hope that a full memoir of him will be forthcoming, for so long and varied a professional career cannot but be worth relating by those who have time and materials for the task.

IT appears that the Royal Academy, under the recent pressure of public opinion in favour of "reform," has voted, by a majority, for a scheme by which 100 privileged "outsiders" are to be selected, whose works will have priority of choice in hanging, after those of R.A.'s and Associates, of course. This appears to us a very clumsy expedient, merely creating another privileged class, and leaving painters of genius who have not been brought under notice in making the selection still the probability of having their works turned out for inferior but privileged ones. The question to be settled by the Academy is this: do they intend their exhibition to represent contem-

porary art at large, or do they intend it for an Academicians' Exhibition? In the former case, there is too large a proportion of their own work; in the latter, too large a proportion of outsiders. It is neither one thing nor another. What is really wanted is that a good many Academicians should paint better than they do, or else give up claiming space for exhibiting. The former condition they cannot comply with, and the latter would be too much perhaps for human nature. But we do not think the privileged-hundred idea will work.

A PORTABLE smoke-hox and fan for driving smoke for fumigation, testing of drains, &c., produced by Messrs. Baird, Thompson, & Co. under the uncouth sobriquet of the "Grahtrix," appears to be an acquisition in the practical application of smoke tests. The portion of the apparatus containing the motor windlass and fan fits inside the smoke-hox, and can be taken out and put in the reverse way, the whole then forming a closed hox with lid and handles, 17 in. by 8½ in. by 12 in., and such as one man can carry. The propelling of the smoke is done, by the working model we have examined, very efficiently.

THE collection of "Italian, French, and Spanish pictures" at the Goupil Gallery includes, among its best items, two or more works by an English painter, Mr. Fulleylove, which have been seen in London exhibitions before, but are well worth seeing again. Among the pictures which come properly under the description of the exhibition are some brilliant works by Benjamin Constant, and some of the light, hard, but very clever pictures of T. Benliure. Of these, "Selling Pardons" (41) is perhaps the best, and contains some brilliant painting of architectural detail. The "Spanish Flower Market" (18) is one of those paintings which represent the unreal effect of a brilliant sunlight which yet seems to cast no shadows,—a falsity which is unpleasant to the eye.

WE are glad to learn, from a letter in the *Times* of the 31st ult., that Mr. W. Colnett, the recent proprietor of the old Cook Tavern, immortalised by the Poet Laureate in his "Waterproof's Lyrical Monologue," has had all the old fittings, "including the celebrated chimney-piece, with the carved oak overmantel," and the panelling seats and tables, refitted in a room at 22, Fleet-street; so that the associations of the old room are not dispersed and lost entirely.

WHAT can be the meaning of this advertisement in the *Church Times*?

TO the CLERGY, and Others interested in Church Restoration and Rebuilding.—PLANS and advice free of charge, by an experienced and successful Architect. Highest testimonials. Distance no object.—Apply to Messrs. B.— & Co.

We suppress the address. What do Messrs. B.— & Co., or the architect they "keep," expect to get by this? Clergymen are usually pretty wide awake as to the capacities of the architects they employ. Surely in vain the net is spread in the sight of any bird, more particularly of a clerical bird. However, the *Church Times* is not a "trade journal," and that may account for odd things getting into it.

AMONG the various ways proposed of celebrating the Jubilee of our most gracious Sovereign, one of the oddest at first sight is that proposed by Mr. Mark H. Judge at a meeting of the Paddington Vestry on the 25th ult. We may give it in the form of the resolution proposed:—

"That in the opinion of this Committee, the Dust-collecting and other trades, which are carried on in connexion with the Canal basin between Warwick-crescent and Praed-street, besides being a continual menace to the health of the parish, are, during the summer months, a serious danger to the inmates of St. Mary's Hospital, and a source of annoyance to the Great Western Railway Terminus, which is so often visited by Her Majesty the Queen and the Ministers of the Crown; and that the Committee, therefore, considers that no better memorial of the Victorian Jubilee could be devised in Paddington than for the vestry to purchase the

canal basin and adjacent property in order that this long-standing nuisance may be abolished, and the site suitably utilised for residential and other purposes."

The other proposals, which were all referred to a Special Committee, were,—a Town-hall; a Recreation Ground; a Public Library and Museum; and an "Imperial Institute" (!). These are more showy projects, no doubt, than the dust (or anti-dust) scheme; but it may be doubted whether the latter is not the most useful and beneficial of all. Dust being "matter in the wrong place," if all the matter of every kind that is in the wrong place could be removed during the year, it would indeed be a year of jubilee.

#### LETTER FROM PARIS.

M. FOURQIAN, a young architect who in 1883 displayed much activity and taste in the organisation of the Amsterdam Exhibition, has been charged by the Committee for the French Railway Jubilee Exhibition to instal in the Bois de Vincennes, on the lawn Daumesnil, the International Railway Exhibition of which we spoke in our last. Though the City of Paris has given the committee every facility and has liberally granted them a large slice of one of our most frequented promenades as a site, the principle of the Exposition has been unfavourably discussed and has aroused a kind of tacit opposition. Thus, the six great French railway companies, in spite of protestations and of the favourable report of the new Minister of Public Works, persist in refusing to associate themselves with the scheme, which they declare to be contrary to historic truth and against the interests of the Great Exhibition of 1889.

This latter and larger project may be considered to have entered definitely into its active period. On the Champs de Mars the work for the foundation of the piers is being arduously carried on, and it is hoped that the foundations will be entirely finished by the 1st of May. Some figures may give an idea of the extent of the work. The general levelling of the ground and construction of drainage has been estimated at 780,000 francs. The cost of the Palace des Beaux Arts is taken at 6,205,725 francs. The gallery for various exhibitions and the annexes count for 5,900,179 francs, and the machinery pavilion is estimated at 6,496,228 francs.

Various modifications are being introduced in the architectural portion of the constructions. Thus, the principal gallery, by M. Bouvard, will have a monumental entry, surmounted by a dome, opposite to the Trocadero. The galleries designed by M. Formigé also present each of them a dome; and the machine gallery by M. Dutert, which will terminate externally in semicircles, will present at its two extremities enormous gables, the decorative effect of which will be ungraceful enough.

The Colonies Exhibition will occupy, on the esplanade of the Invalides, a surface of 11,000 mètres. Another space of the same extent will be reserved for the countries of the Protectorate. Lastly, the banks of the Seine will furnish a good position for the annex services of the colonies, where will be picturesquely grouped the multiform and many-coloured products of Eastern and tropical localities, illustrating boats, fishing, habitations, &c. Along the river also, on the Quai d'Orsay, will be installed the large bazars reserved for agricultural produce and food products.

As to the Eiffel tower, which one must still talk about because so much talk is made about it, its intended position has been again modified by being moved back to the extent of the width of one of the great piers which are to carry it. This unhappy tower was the occasion of a popular disturbance the other day, on the ground that three-fourths of the workmen engaged for it were foreigners. On inquiry, the number of actual foreigners was reduced to seven Belgians; and no one could complain of this, as the construction is really a private enterprise of M. Eiffel's. Nevertheless, there were loud protestations, and a numerous crowd repaired to the Hôtel de Ville to protest and demand work, as in the bad days of the *année terrible*. M. Alaphand dissipated the popular wrath by promising new and important works as soon as the weather became milder.

It may be mentioned, in connexion with this subject, that there is talk of organising on the Champ de Mars a section of "Economic sociale ouvrière," showing what has been done in

France since 1789 to improve the position of the artisan, and what is contemplated in the future.

The private exhibitions usual at this time of year have been inaugurated by that of the "Garde Artistique et Littéraire," in the Rue Volney. It contains important works by a good many artists of repute, and portraiture especially is very honourably represented by MM. Bonnat, Aimé Morot, Hennep, and Delannay. M. Cazin exhibits a landscape of great power and originality; M. Rollé's "Tauxem au Pâturage" is a magnificent study; and we may mention also the works of MM. Jules Lefebvre, Barillot, Carols Duran, and Contois. The exhibition of the rival club, the "Mirlitons," will take place shortly.

Special mention may be made of an exhibition of water-colours in the Galerie Georges Petit, the work of a young artist, M. Tsché, who gives evidence of remarkable originality and power. The collection contains impressions of Eastern scenes, painted with much truth, and some powerful original compositions, in which allegory and realism are successfully combined. The decorative feeling of the young painter has had the most free play in the work which he has executed at Chénonceaux, the mansion of M. Pelouse, a commission in which his talents were allowed full scope, and which shows him to be an artist with a future before him.

We referred before to a dispute between M. Marquette, the sculptor commissioned to complete the statue of Étienne Marcel, and the Messrs. Thibaut, the well-known founders. The upshot of the affair (in which the artist had the bad taste to invoke the aid of the Parisian press while the committee of experts was still sitting) was that, although the committee decided that the statue had been cast in one piece (which was what the sculptor denied), MM. Thibaut, by way of putting an end to discussion, requested to cast it again at their own cost. The actual merit of the work is left for the jury of the 1889 Exhibition to determine, as the founders are to keep it as the chief feature of their show-room until that period.

The Municipal Council have recently increased the budget of the Beaux Arts department by 100,000 francs for the undertaking of some new and important work. Independently of the decoration of the salons of the Hôtel de Ville, which is to be commenced soon, there is the question of the restoration of the magnificent Gobelin tapestries, the value of which is estimated at two million francs, and which are decaying in a cellar of the Pavillon de Flore. It is thought that the Municipality may purchase, as a museum for these and other objects, the Hôtel de Sens, the former habitation of the Archbishops of Paris, and which is now on sale. All the "Amis des Monuments Parisiens" join in hoping that the Government will thus save from almost certain destruction this ancient and interesting relic of the past.

In speaking last month of the future of the Musée Guimet, we forgot to mention another museum which is to be erected not far from that, on the Avenue de Trocadéro; a museum which the Duchesse de Galliera has generously given to the city. M. Guinain is the architect entrusted with the work, the cost of which is estimated at about three million francs.

The inauguration of the new Hôtel des Postes is at last announced for next month; so, at least, the Ministry promised the other day to the delegates from the Municipal Government. If this is adhered to, the ugly sheds will, it is to be hoped, be removed from the Place de Carrousel, and there will only remain there, for some time at least, a sufficiently enormous metallic construction which is erected really by way of an experiment. This, which is intended to serve the Public Library at Fort de France, is in the form of a square with angle partitions; the whole construction is of iron, partition walls, landings, tables, &c. The cost is about 100,000 francs.

Among current artistic news may be mentioned first two competitions opened, one for the erection of a monument to Sergeant Bobillot (killed at Tonkin), the other for the construction of a Hôtel de Ville at Vincennes. The first is open to sculptors and architects equally, the latter to architects who satisfy the jury that their designs can be carried out for 450,000 francs. We shall have occasion to refer to this competition again.

A fine statue of Denis Papin is to be erected in the Court of the Conservatoire des Arts et

Métiers; the sculptor is M. Aimé Millet. The work will soon have for a pendant the statue of the celebrated chemist Leblanc. During the month the statue of Louis Blanc, by M. Delhomme, will be unveiled on the Place Monge. Lastly, M. Margnet de Vasselot has nearly completed the model for the statue of Henri Martin, the bronze of which is to be erected at St. Quentin, the birth-place of the historian. The same artist is working at a bust in marble of General Boulanger, which the old comrades of the Minister of War wish to present to the Ecole Militaire of St. Cyr.

At the Ecole des Beaux Arts the work of the pupils is in full activity. The architectural section is proceeding to the classification of the sketches for the Achille Leclère competition, the subject of which was "An Establishment for the Exhibition of Horticultural Products." The decision will be made known on the 12th of March. The examination for the Diploma of Architecture has been completed, and it is to be conferred on MM. Devienne and Laffolye, pupils of M. Coquery; M. Leidentrost, pupil of M. Guinain and Questel; M. Kraff, pupil of M. Pascal; MM. L. Roy, Coetz, and Hardion, pupils of M. Vandremere; MM. Bomier and Handucœur, pupils of MM. Moyaux and André; M. Manahäfer, pupil of M. André; M. Brémont, pupil of M. Guinain; MM. Barbary and Majon, pupils of M. Guadet; and M. Étève, pupil of M. Douillard.

For the Godehœuf competition, for which the subject was "a design for an electric lamp standard," out of sixty-nine designs sent in, the jury presided over by M. Questel has given "premières médailles" to M. Paquier, pupil of M. Guadet; M. Tourmaine, pupil of M. André, and M. Raphael, pupil of M. Raulin; two "secondes médailles" to MM. Weissmerger and Defays, pupils of M. André; and twenty-three honourable mentions.

January has unhappily left us a longer list than usual of mortalities in the artist world. We have lost M. Bartet, the engineer, M. Alphonse's right-hand man, and most active assistant in the embellishment of Paris, of whom we have made mention on various occasions. He was an "aspiré d'élite," admirably gifted, and with a great faculty for work. He had the charge of the new crematory appliances at Père Lachaise, and had been commissioned to work with M. Alphonse on the 1889 Exhibition. He was still young, and it is to be feared he succumbed to the pressure of overwork.

Art has suffered a great loss in the death of Ferdinand Gaillard, one of the modern masters of the burin, who has died when in the maturity of his talent and reputation. He obtained the Prix de Rome in 1856, and received medals in 1867, 1869, 1872, and 1876, since which latter date he has been Chevalier of the Legion of Honour.

Two other artists of great talent are deceased after a long life of work. The celebrated glass-painter, Maréchal de Metz, is dead at the age of eighty-six, at Bar-le-Duc, where he had retired since the war. He received medals at the Salons of 1840, '41, '42, and '50, and was officer of the Legion of Honour since the date of the last Exhibition. The *doyen* of French sculptors, Daumas, has also died at the age of eighty-six. He was the oldest and one of the best known pupils of David d'Angers. His first exhibition work was in 1833. He was author of the "Cavalier Romain" statue on the Pont de Jena. He received a decoration in 1808, and medals in the Salons of 1843, '45, and '48.

Lastly has disappeared from the world of art Joseph Michel Anne Le Lonfaché, formerly pupil and then assistant of Duban, successively treasurer and then "censeur" of the Société Centrale des Architectes. M. Le Lonfaché was also member of the jury of the Ecole des Beaux Arts and Chevalier of the Legion of Honour. He built a number of private houses at Paris, and may be in some degree regarded as the creator of the Parisian house as adapted to the requirements and tastes of modern life. He was eighty-three years old at the time of his death, but had up to the last shown all his usual energy in the work of the Annual Congress of Architects, at which he assiduously attended the meetings, visits, and excursions. M. Questel and M. Hermant pronounced at his funeral some eloquent words in recognition of the merit of their old professional brother, whose death had left such a void in the Société Centrale.

#### THE TWO DE BRYs.

SOME of our readers who have followed us in our studies of the old masters of the art of decoration will, doubtless, feel some relief when they light upon the heading to this article, in the fact that at last we have come to two artists whose name and whose works are, to a certain extent, known to them. With the exception of two or three of the more famous of the German masters,—Israel von Meckenen, Aldegrevier, and Altdorfer, and possibly, though in a less degree, Béham and Virgil Solis,—in the numerous crowd of artists who lived by designing, there is hardly another, save the De Brys, father and son, over whom the cloud of oblivion does not rest; but that it does, as a fact, envelope them undeservedly we think that we have by this time established conclusively. Some of the work of the De Brys, however, must be familiar to many through the medium of the many illustrated magazines whose editors have dipped slightly, and all too superficially, into the treasure-house of the past for decorative friezes and tail-pieces. Both father and son were very prolific workers in a style, among others, admirably suited for these objects. But even in their case the difficulty of accurately apportioning to each his proper work meets us, and even so astute a student as Nagler has been compelled to give up his task in despair. This difficulty arises in the first place on account of the father and son having the same name, and using almost identical monograms; and in the second place, on account of their having worked a good deal together; so that "I.D.B. fec." now stands for the father, now for the son, and now for both together. Even when for the sake of the father, we are not free from trouble, for another son, John Israel, appears on the scene as the younger John Theodore's assistant. But John Israel De Bry does not appear to have done any original work, and he may be at once dismissed, leaving the two Theodores to be jointly studied.

The father, Theodore, otherwise Derick, which has been Englished into Dirk, De Bry was born at Liege in 1528; he afterwards resided in Frankfort, as a print and book seller, where he died in 1598. As an engraver he modelled himself on Hans Sebald Béham; whether he did more than this, whether he actually copied, worked with, or worked for Béham is a difficult matter to determine. One of his plates of processions seems to us to be a sort of "Homage à Béham," for on the awning of a cart forming part of it is engraved the Little Master's monogram H.S.B. with a coat of arms below it. The impression in the British Museum is printed on satin, as if it had been designed and published to commemorate some special incident in Béham's life. There are a great number of these processions, for the most part 7 in. or 8 in. in length by rather more than 1 in. in height. He seems to have taken the greatest delight in devising them; they are all crowded with admirably-drawn figures, and are all executed with the greatest skill and precision. One series is especially noteworthy; it bears the title "The Procession for the Funeral of Sir Philip Sydney, invented by Thomas Lant, gent., and graven in copper by Derick or Theodore de Brie, in the City of London, 1578, in thirty-four plates." These processions are outside the scope of our present study; they are interesting, however, to us as being the known work of the elder De Bry, and so furnish us with some clue towards the determination of the authorship of some of the less known decorative work. The engraving of the dolphin friezes is clearly from the same hand; there are four or five of them each containing, but not in consecutive design, five dolphins and children; a sketch of one of these groups is given in fig. 1; the endowment of the dolphin with acanthus fins and tail is especially curious. The child, however, is entirely realistic, and they may be regarded as whimsical fantasies rather than serious efforts at ornament.

But of ornament pure and simple the elder De Bry designed a considerable amount, and we think that there are certain fairly clear signs by which it can be distinguished from the ornament which is known to be by his son; that is to say, if we omit taking any note of the assistance which the son rendered to his father. The execution is as fine and careful as it is in the Processions, and the design is as closely packed on the surface of the object ornamented as are the figures in the crowds. We shall see when we come to the examination of the son's

work an absence of any attempt at compression, the subjects being chosen for the most part to allow of a greater freedom and play for the curves, and almost as a necessary consequence of this, a very much coarser execution. Figs. 2 to 5 are characteristic of the old De Bry's manner, and may be taken as typical of nearly all his work; the style is almost invariably Renaissance, which, if not very original, is at least graceful. The two designs, figs. 2 and 3, probably come from the series "Des pendants de cleffs pour les femmes, propre pour les argentiers"; fig. 4 is one of two isolated designs for bracelets. With regard to fig. 5 we confess to having some besitation in admitting it to be the work of either of the De Brys. It is, however, classed among his works in the British Museum collections,—a fact which must, of course, carry much weight. The elder De Bry is also known to have designed some "manches de couteaus avec les feremens de la gaine (the ironwork of the sheath), de plusieurs sortes, fort profitable pour les argentiers ou autres artisans." The work, both in detail and in general execution, almost exactly resembles the knife-handles of Michel Le Blond, more especially the series from which the fig. 8 of our issue of Jan. 15 last is taken, the quaint outlines of both being absolutely identical, though the ornament is different. Le Blond, it will be remembered, was born in Frankfort in 1580, and probably had begun to work there before the elder De Bry died. If therefore the two sets of plates are correctly assigned to their respective authors,—as to which we still have our doubts,—the resemblances are so strong as to indicate a close artistic relationship between the two men, such as the apprenticeship of the young Le Blond to Derick De Bry.

The large circular panel (fig. 6), though it is generally attributed to the father, seems to us clearly to have been the joint production of the two De Brys. The entire execution is as fine as the Processions, and the whole plate was probably engraved by the father. The compactness of the surrounding ornament in its main structure, and the neatness with which its main features split up the surface, suggest that the conception of the design was also the father's. But the subordinate details, the hunches of flowers and fruits, the dogs and the rabbits, the caterpillars and the butterflies, have no counterpart in any of the designs which may without doubt be attributed to the father, but are almost identical with the details which frequently figure in (or rather disfigure) the son's acknowledged work. It appears to us, therefore, that though the father engraved the whole plate, the son was employed to devise the minor details of the ornament which, though they are subordinated to its main structure, go far to mar the beauty of the whole conception. That conception, as we have said, is very charming, and to it may be attributed the popularity of the engraving, which is, perhaps, the best known of all the works of the Frankfort printseller.



Fig. 7.

Passing now to the work of John Theodore Do Bry, the son, who was born at Liege in 1561,



Fig. 1.

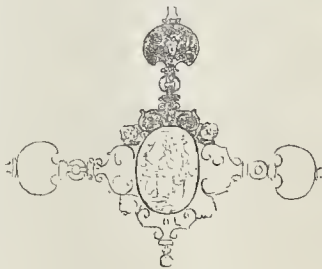


Fig. 3.



Fig. 2.



Fig. 5.



Fig. 4.



Fig. 8.



Fig. 9.



Fig. 10.

we must first notice his "New Artistic Alphabet, ornamented with beautiful figures, the meaning of which adapts itself to the letters, artistically engraved on copper by De Bry, also described by entertaining Latin and German verses." From this alphabet comes the initial letter S (fig. 7): S stands for Solomon, and the verse attached to the letter is as follows (translated into very blank verse):—

"Solomon, also, the wise man,  
Full of great gifts and good deeds,  
Trusting alone on God;  
He built to his honour a temple,  
Therein was God's name praised,  
And it covered the king with glory,  
For whatever is done for God's honour  
Shall endure everlastingly."

Each letter of the alphabet stands for some person famous in Scripture or history, beginning, as in duty bound, with A for Adam, the chief features in the ornament being supposed to

series of gymnastic evolutions, men fishing, bunches of flowers hanging about everywhere, varied by bunches of pears, and apples, and gourds (which will at once be recognised as coming from the same hand as the hanging fruits in the ornamental border of the circular panel which we have already criticised in fig. 6); tassels and tortoiseshells, helmets, spears, and armour of all kinds; in one Moses giving the law; in one a man in an impossibly awkward position cutting off poppyheads (presumably Trajan, though somehow or other he has found his way into the letter G); in another a centurion drinking to "love and war," and in yet another a fisherman holding grapes in one hand and catching a mullet with a hook and line in the other, while his naked spouse with less purpose in view even, dangles fruits into space; and everywhere Cupids put in just to fill up odd corners. Mongrel,

Israel De Brie, "fratres Germanos, cives Francofortien."

Figures 8 and 9 are two of a series of friezes probably executed by the younger De Bry at a much later period of his life. We have attributed them to the son on our own authority; no reference to them is made in Nagler's list, unless they are the "Grotis [grotesques] pour orfèvre et autre artisien" which he attributes to the father. But, as there is no possibility of doubt that they are not the work of a De Bry, so it seems to us there is no possibility of doubt that they are not the work of old Derick. The hand which crowded seven or eight square inches with fifty or sixty carefully-drawn figures, or which filled the little bracelet and "pendants de clefs" with minute Renaissance designs, could never have forgotten the minuteness of its cunning, nor would it even have voluntarily relinquished it. These friezes, which are about



Fig. 6

adapt themselves suitably to the character of the person, whose merits or demerits the poet sings in his simple verses; though it must be confessed that the connexion between Solomon in all his glory and the acanthus-tailed angel who forms part of the structure of the letter S is a little difficult to follow: though, of course, she may be a glorified Queen of Sheba. The letters themselves are about eight inches high by five broad, and can only be described as poor in the extreme; very few of them, indeed, have any sign of properly conventionalised ornament; the fragment of acanthus scroll at the bottom of the S, and forming the angel's tail, is almost the only attempt at it. The figures themselves are ill drawn, and the details are badly conceived and promiscuously put together: they are of all sorts and kinds; birds, beasts, and fishes, reptiles and insects, Cupids balancing themselves in all manner of impossible situations, ladies with wings going through a whole

impossible, contortionate, disproportionate, without a spark or germ of beauty from A to Z, and withal lacking the true humour of a genuine grotesque, this alphabet is still not without its interest, as telling of the simple things which pleased the minds of simple Frankfort folk towards the close of the sixteenth century; and it has a further interest too, for us, illustrating the remarkable progress in the art of decoration, which study can bring about in a man's work. The remarkable step from bad to good which the younger De Bry took, and which our remaining illustrations witness to.

It is not very clear whether the brother John Israel did not assist in the contriving of this remarkable production; he certainly did in another, which, from its title, is doubtless conceived in a similar style,—“Alphabeta et Characteres, jam inde a creato mundo ad nostra usq. tempora,” by John Theodore and John

9 in. by 3 in., came, on the face of them, from another workman; and though they differ from the alphabet as light from darkness, it is not impossible but that they should be examples of the mature powers which in their infancy had only produced work worthy of infants. In these friezes there is but little to criticise adversely; the birds do not obtrude themselves too prominently in fig. 8, and in fig. 9, they form a not illegitimate part of the design, and are treated almost heraldically. If there is a weakness at all, it is in a certain lack of homogeneity in the main structure of the design. Although it is with a certain sense of relief that we miss the great scroll of the acanthus rolling its length along, in at one end of the frieze and out at the other, yet we also notice with a certain sense of pain the absence of any well-defined lines of construction. They are there, it is true, but they are out of proportion with and lost behind the

foliage and flowers, which are of considerable size, and this gives at first sight a patchy appearance to the whole which is distinctly unpleasant. On closer study, however, we cannot fail to be struck by the beauty of the foliage and floral devices. They are as original and beautiful as those of Israeluh von Meckelen, though they only resemble them in the faintest degree. Wherever we look we are met by some form which is entirely new to us, and which has clearly been worked out and elaborated in accordance with the best traditions of decorative art. The conventional form of the seed-pod of a papilionaceous plant strikes us as especially beautiful and original. Nor do we remember coming across it in the work of any other designer before or since. Every one of the series (there are at least ten of them, and possibly more, though they are not all in the British Museum collection) will well repay careful examination. As we did in the case of Von Meckelen, in our issue of the 5th of December, 1885, we have extracted in fig. 10, from the remainder of the series, some specially noticeable forms with which we close our short sketch of these two men, who, if they are not in all things worthy of a place in the first rank of designers, are at least remarkable men, worthy of attention and study at the hands of those who follow the arts in these modern days.

#### ON GREEK SCULPTURE AS EXPRESSIVE OF THE EMOTIONS.

-ROYAL ACADEMY OF ARTS.

Mr. A. S. Murray, of the British Museum, delivered the third and concluding lecture of this series\* to the students of the Royal Academy on Monday evening. He said that the history of Greek sculpture in respect of style divided itself into three periods,—an archaic period, in which the tendency was towards technical skill in rendering the human figures with reference to its movements and costume; a second period, when the human figure was conceived and rendered in a large, broad, ideal manner; and a third period, when technical skill, with innumerable new resources, again obtained the ascendancy. If it were needful to define those three stages more strictly, one way of doing so would be to test each of them by its manner of dealing with the expression of the emotions. In the archaic stage the human figure, in its movements and costume, was paramount; its emotions, and the soul within it, were known and recognised, but they were not identified closely with the body; they were chiefly shown as impelling it to this or that action. In the ideal stage a grand effort was made to reconcile, as Hegel said, the inner with the outer life of man,—his emotions and his thoughts with his bodily form. The effect was altogether noble; but obviously the tendency could not rest at the simple reconciliation of soul and body which we found in the works of Pheidias, where emotion was expressed only so far as it was consistent with the highest conceivable type of form. The next stage was to particularise more the several elements of the body and the several elements of the soul resident in it, always, however, developing them both simultaneously, and never incurring the reproach which had been levelled at Christian art,—the reproach of treating the passions and emotions irrespectively of, and often with intentional indifference towards the form or beauty of the human figure in which they were displayed. The present lecture had to do with the last stage, when the Greek sculptors set themselves to particularise the emotions, and to find such types of the human figure as could best be made to express emotion and yet remain beautiful. It was a natural step from Pheidias, with his figures alike ideal in body and soul, yielding to passion or feeling only as such beings might yield. It was a step that led ultimately to the Laokoon group and the sculptures of Pergamon. But it was necessary to go back to the first masters of the school, Skopas and Praxiteles, and see the kind of beginning it made. For us, Skopas was represented by certain sculptures in relief from the Mausoleum, in particular those slabs found at Halicarnassus by Mr. Newton. A comparison of those slabs with the same subject as represented on the friezes of Phigaleia and of the Nike temple

\* For reports of the first and second lectures see last week's *Builder*, p. 175.

at Athens would show that the Mausoleum figures had a marked individuality. They were particularised in their forms; each had its own identity. They were more likeliving sympathetic beings than any other figures in older art. But the standard of beauty was still rigorously enforced as a necessary accompaniment to the expression of feeling. The lecturer did not claim for those figures a pronounced show of passion or feeling, but he contended that certainly some of them did clearly express emotion, and that their forms were so conceived as to be able to convey emotion and yet remain beautiful. For instance, there were bearded men as well as youths among the Greeks there fighting against Amazons, and it might as well have happened to a bearded man to have been struck down by an Amazon as it had happened on one of these slabs to a youth who still eagerly tried to defend himself. But the emotion which was appropriate to the fine form of the youth would have been disagreeable in an older man; it would have touched us with pain. It was almost an art in itself to find the right type of figure for the emotion which it was desired to express. Skopas himself might not have had any hand in those particular sculptures, but there was one figure from another frieze of the Mausoleum with which it was difficult to dissociate him. It was a figure of a charioteer bending forward in the race. The reason for assigning it to Skopas was that among the few fragments that had as yet been recovered from his sculptures at Tegea, was a head which closely resembled the head of the charioteer referred to, both in style and in type. It was a type of being to whom the eager straining forward in a race was perfectly natural, and not the source of confusion or perturbation. The eyes, which were naturally deep in the sockets, were pressed forward and rounded. The cheek was kept flat, showing the strong line of the jaw and the cheek-bone, as was usual in the expression of anxiety, where the muscles strained forward and produced that somewhat hard look. The throat had become strongly marked through the upward movement of the face, by which movement also the hair had slipped a little down on the ear, the charioteer being too absorbed in the race to notice it. This was made all the more noticeable by the fineness of the ear itself and the precision with which its relation to the cheek was indicated. The lips were parted in eagerness. Belonging to the school of Skopas or of Praxiteles was the statue of Demeter from Knidos. The type of the figure was that of a young mother, "a Greek Madonna," as she had been called, whose sorrows and whose joys were of a saintly character. Her feelings at the untimely loss of her daughter Persephone must not do violence to her physical beauty, and yet they must be expressed. It was thus a question with the sculptor of reconciling her physical beauty with her emotions, keeping both unimpaired. The head was turned sideways a little, as if in some uncertainty as to the direction in which she should look for the coming again of her daughter. The sockets of the eyes, though fairly deep, were relieved of some part of their shadow by the brows being rounded off and not allowed to impend over the eyes. Why the forehead was so unusually high seemed to pass explanation. The eyeballs were rounded and penetrating. The muscles of the face worked forwards towards the profile, as in all cases of sorrow, the effect being that the breadth of the face when seen in front was considerably narrowed, or, in other words, the expressive part of the face was circumscribed within the narrowest possible limits, and thereby intensified. But the cheeks did not lose their softness; they were not flattened at the sides, showing the jaw and cheekbones. That had been achieved by taking as a model one of those typical women who carried much of the aspect of ripe maidenhood on into a fairly advanced matronship, who, in fact, reminded us of Madonnas, and who combined both the spiritual and the sensual life. The mouth would be too small for a figure of the older ideal order of Pheidias, though it suited perfectly the type of figure under consideration. The lecturer next referred to the head of the statue of Hermes by Praxiteles, found at Olympia and still remaining there. The statue was of marble, and represented the god holding on his left arm a younger brother, the infant god Dionysos. Hermes was looking down and answering the infant's look of childish curiosity with a smile of kindness. The corners of the mouth were

drawn back as if he were restraining the smile from becoming a laugh, confirmation of this being afforded by the lips being parted, though the teeth were shown to be closed. The smile was not enough to broaden the face in front, as happened in the expression of mirth, yet it did sensibly broaden it. The right cheek was pushed back distinctly, and the effect was heightened by the otherwise strong and firm line of the jaw being interrupted through the lowering or bending forward of the head, an action induced by the feeling of kindness and tenderness, and one which contributed to the expression of an emotion. The eyes were turned inwards a little, as in looking with curiosity at a near object. The pupils, instead of standing vertically to the face, sloped forward in the upper part. That might not be possible in nature, but it was not uncommon in Greek sculpture where a face was looking downwards. In the present instance, the object of the sculptor was to express the full and kindly gaze of Hermes. It appeared to the lecturer that that position of the eye, filling up the socket more than was usual, and destroying the mass of shadow that would otherwise be there, helped materially to brighten the face, and to contribute to the expression of tender regard on the part of a strong man for a weak child. In the Farnese Hermes the same type of face was to be seen, but worked into an expression of actual pain or anguish, under the later influence of Rome, when for a time it seemed as if art, in its pursuit of sentiment and emotion, would abandon that old and true principle which insisted on a special type of physical beauty for special types of emotion. Having spoken of the statues of satyrs by Praxiteles, and of his statue of Eros, the lecturer said that an effective example of the expression of grief by sculpture was to be seen in a marble figure, of life size, found a few years ago not far from Athens. It had been a monument above a tomb, and represented a female figure seated in an attitude of grief, her head resting on her right hand, the elbow on the thigh, the left hand lying helplessly in her lap, and the feet crossed. That statue had been assigned to the age of Skopas and Praxiteles, but it must have been at the beginning of their age that it was sculptured, if not even a little further back towards Phidias. The forms were of a larger mould than had usually been associated with Skopas and Praxiteles, and there was a roughness and want of finish about the work which was unusual in their time. The figure was not penetrated with vitality, as were those on the Mausoleum frieze. She was not a personification of grief in general, but of grief as it affected a particular class of womanhood which she in her person placed before us. The sculptor appeared to have carefully avoided any very strong expression, such as would have driven us to think of some particular person and her sorrows. In Athens might be seen hundreds of funeral monuments sculptured with figures in relief, which were intended to soothe the survivors by appearing to share in their sadness and sorrow. As a rule there was no approach to violent emotion in those reliefs. Of the expression of such emotions as rage, the lecturer did not remember any noticeable instances in Greek sculpture, though there were several striking examples on the painted vases. While between the time of Praxiteles and the Laokoon group there had been growing up a desire on the part of sculptors of expressing strong emotion in the faces of their figures, that desire was accompanied by a considerable disregard of the principle which in the good times had insisted on powerful emotions being confined, as far as possible, to beings of a lower nature placed in subordinate positions in the design. The rule seemed to have been that a figure, ugly or repulsive in its form or expression, was not itself a fit subject for the higher arts. But in approaching the period of the Laokoon group, not only did strong emotions find expression in the faces of exalted persons, such as deities and heroes, but there was a large accession to the list of beings of a lower nature in whom the expression of violence of feeling or of passion was regarded as appropriate. The well-known figure in Rome of a dying gladiator, a Gaul in the very act of dying from a deep wound in his side, was a case in point. Anguish was expressed in every feature, and pain in all his limbs. Again, the *Amendola* sarcophagus, as it was called, was a very mine of sorrowful expression, with its series of reliefs representing com-

bats between Roman soldiers and Gauls. Among the figures of the Gauls, but only among them, the pain of mortal wounds, the fury of deadly combat, and despair at the sight of a descending blow from which there was no escape, were forcibly rendered; while among the women of the Gaulish camp it would seem that every attitude capable of expressing dismay, sorrow, and grief had been brought into use by the sculptor. The lecturer next proceeded to refer to the Laokoon group, an objectionable element in which, as it seemed to him, was that the punishment was being inflicted by hateful and loathsome creatures against whom there was no credit in struggling, if, indeed, there was any time given to struggle. Be that as it might, the three sculptors who combined their talents on the marble group conceived Laokoon as making a last effort of physical strength accompanied by an expression of the deepest pain and agony. The central figure was that of a priest of noble birth and of a fine form, yet with an expression on his face that could not be regarded as other than ugly and repulsive. Such a combination of beauty of bodily form with repulsiveness on the face seemed to the lecturer to be a mistake. No doubt the face was one which in time of repose would look equally noble with the bodily forms, but even that consideration did not remove the objection to it. The lecturer said he could only see one explanation of it, and that was that the group had been sculptured under the influence of what was called the Pergamon school, which revelled in representing battles of gods against giants having legs formed of serpents, or battles between Greeks and Gauls. A great many of these Pergamon sculptures were now in Berlin, where they constituted a long series of figures in pretty high relief and on a colossal scale of proportions. They were much admired in Germany, where force and rude vigour are more admired in art than need be. But admiration of the Pergamon sculptures was not at all confined to Germany. They appealed to every one who cared for a skilful handling of the human form with a sound knowledge of it in detail, and with a strong appreciation of its beauty. These sculptures showed invention, also, in abundance, but that was the point where they seemed to go wrong. The invention was not of a good kind. A recent writer in Germany had said it down that the business of an artist was to represent scenes and objects which the imagination of ordinary people was unable to recall or reproduce. That, said the lecturer, seemed to be a good description of an equally ordinary artist. One could understand the admiration of that writer for the sculptures of Pergamon, because, with their excellent qualities they combined a very ordinary faculty of invention. Nevertheless, it was a fertile faculty, and supplied us with much to look at. Side-by-side with the love of seeing strong emotions expressed in beings of a lower order there grew up also in later sculpture a love for the expression of the gentler feelings which distinguished persons of finer natures. Groups representing such sweet brotherly affection as existed between Orestes and Pylades, or Orestes and Elektra; or motherly tenderness, as between Merope and her son,—these were the subjects which Pasiteles and his followers delighted in for three successive generations. That was the last phase of Greek sculpture proper, and it was gratifying to observe that in it the old rule had re-asserted itself,—that whatever feelings were to be expressed, a special type of physical beauty must be found to convey them. No doubt the range of feelings expressed in the works of Pasiteles and his school was very limited. It included for the most part only such as could be reconciled with, and were most natural to, youthful forms advancing towards manhood and womanhood. In general that was the age of sentiment, and among persons of that age it was often difficult to say whether it was the sentiment they expressed or their physical beauty which ennobled them the most, so completely were those qualities reconciled in them. Pasiteles was a sculptor of many accomplishments, and he was a close student of the works of the old Greek masters in his art. Old records bore testimony to the carefulness and elaborateness of his preliminary studies, and to his having modelled directly from nature. That testimony was confirmed by such works as were known to have been executed by his school; unfortunately, we had nothing from his own hand. The sculptures of his school derived their pose and structure in the main

from an archaic Greek type. But the sentiment which pervaded them, the sensitiveness of skin and flesh, the delight evinced in observing the minutest formations of bone, as at the knees and feet, the softening down of outlines where they were apt to be harsh in nature, and the general placidity of forms which accompanied the severe and almost rigid structure of the limbs,—these characteristics were at variance with the sculpture of archaic Greece as we generally understood it, and we might credit their introduction into sculpture by Pasiteles and his school. In his concluding remarks, Mr. Murray said he had been anxious not to appear as a special pleader for the expression of emotion in Greek sculpture, because, though that had been the subject treated of in these lectures, it would have been equally allowable to have declared, in the manner of the famous chapter on snakes in Iceland, that there was no such thing as expression in the sculpture of the Greeks. The facts, however, did not justify such a view; what they did justify him in doing was to admit that there had always been a certain measure of constraint in the expression of the emotions by the Greek sculptors, but at the same time to claim that notwithstanding that, the desire of such expression was always present as a guiding factor in their conceptions.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The fifth ordinary meeting of this Institute for the present session was held on Monday last, Mr. Thomas Worthington (Vice-President) in the chair.

##### Obituary.

The Secretary (Mr. W. H. White) announced the decease of Mr. R. C. Hussey, formerly a Vice-President, and who had retired a short time ago from the membership of the Institute. He added that a memoir of Mr. Hussey, communicated by Mr. Rickman, would appear in the forthcoming Journal of Proceedings. Mr. Thomas M. Rickman was a pupil of Mr. Hussey, who had been a partner with Mr. Rickman's father, the Rickman of the Gothic revival.

Mr. Joseph Jennings said that he had known Mr. Hussey as a young man, and produced two architectural etchings of his executed in 1827 and 1828. Mr. Hussey was the youngest of a clever family, but he was for a long time inviolated, which was the reason for his retirement both from the profession and from membership of the Institute.

Mr. J. Macvicar Anderson (Hon. Sec.) announced the receipt of a large number of donations to the library.

##### The New Street at Charing Cross.

Mr. Macvicar Anderson further said that in connexion with the new street recently formed by the Metropolitan Board of Works from Charing-cross to Tottenham Court-road, a suggestion for its improvement had been made by the standing Art Committee of the Institute, and submitted to the Council and adopted by them. It was intended now to submit it to the Metropolitan Board. Any one who had taken the trouble to examine the street recently formed, especially at the part adjacent to the National Gallery, would see that the line adopted was a peculiarly ugly one, so much so that the marvel was how it had entered into the brain of any one to adopt such a line. It would further be observed that the plot of ground which existed north of Hemming's-row, and on which a public-house now stood, was proposed to be left for a small triangular plot of buildings. The Council intended to ask the Metropolitan Board to be kind enough to hold their hand for a short time in regard to dealing with this plot, until they had considered the suggestion about to be submitted by them. That consisted (1) of amending the line of street which had been adopted, along the eastern frontage of the National Gallery, making an architectural line parallel with what would be, he hoped, the architectural *façade* of the building to the east facing St. Martin's Church; (2) that the triangular plot, instead of being left as a group of unworthy houses standing on the north side of one of our most important national monuments, should be embraced in the site of the National Gallery, so that that building might have not only a southern frontage to

Trafalgar-square, but an eastern architectural *façade* opposite St. Martin's Church, and a northern *façade*, finished probably with a circular termination facing the new street. Those suggestions the Council thought well worthy of consideration, and they would be sent within the next few days to the Metropolitan Board of Works, accompanied with a strong letter of recommendation.

##### Jubilee Exhibition at Adelaide.

Mr. Anderson further referred to the Jubilee Exhibition to be held this year in Adelaide. The Fine Art Committee appointed for this Exhibition, and consisting of Sir Frederick Leighton, Sir J. D. Linton, and Sir John Gilbert, proposed to send out a limited number of drawings by leading English architects. They, however, regretted that the allotted space was small, but suggested that, in addition to the drawings, photographs should be sent of buildings executed by living architects. The Council of the Institute hoped that this invitation would be liberally responded to. They proposed to send 100 photographs of representative buildings, and the only condition was that the photographs should be of executed buildings, and not be taken from drawings. The expense of forwarding these photographs to Adelaide would be defrayed by the Institute.

##### The Liverpool Cathedral Designs.

Mr. J. P. Seddon remarked that next morning most of the Fellows would receive an invitation from Mr. John Scott and himself with regard to the proposed memorial to the Liverpool Competition Committee that they should, before coming to a decision on so important a subject, permit the drawings to be exhibited in London. This was a matter of national importance, and he believed that such a memorial could not but be acceded to. He would, therefore, be glad if the Council thought fit in any way to second the proposition.

##### Presentation of Medals and Prizes.

Mr. Anderson said that the next business was to present the Godwin Medal for the year 1886, but before that was done he might be permitted to explain that the successful competitor, Mr. W. T. Oldrieve, had carried out the necessary obligations, completing his tour and submitting his report to the Council, who had awarded him the money prize of 40l.

Mr. Oldrieve not being able to attend the meeting personally, Mr. Hugh MacLachlan received the Medal from the Chairman on his behalf.

Mr. Anderson then said that the Pugin Student for 1886 was Mr. H. D. Walton who undertook to make a tour in parts of Worcestershire and Shropshire, following the lines of railway that pass through Tewkesbury, Hereford, Ludlow, and other places of equal interest; and selecting such examples of domestic architecture as seemed most suitable. Those who had visited the exhibition of Mr. Walton's drawings in the Arbitration-room of the Institute had an opportunity of judging how he had fulfilled his obligations. The Chairman then presented the Pugin Medal to Mr. Walton.

Mr. Henry Thomas Hare then came forward to receive the Ashpitel Prize for 1886. Mr. Anderson explained that this was a prize of books to the value of about 10l., awarded by the Council to the candidate who, in the opinion of the Board of Examiners, distinguished himself most in any one of the examinations held during the year. The number of candidates who passed the obligatory examination, in the three held during last year at Leeds and London, was thirty-nine, and Mr. Hare was considered to have excelled beyond all the others.

Mr. Anderson added that before leaving the subject of prizes, it was not altogether inappropriate that Mr. Worthington should preside upon the occasion when a paper was to be read on "Mind Architecture," he having at the age of sixteen or seventeen submitted an essay upon the manufacture of bricks, which gained the Silver Medal of the Institute. In those days there were not so many prizes offered as at the present time, and the credit of gaining one was, therefore, all the greater.

##### The New Superintending Architect.

Professor Kerr.—I think we ought not to lose the opportunity of saying a complimentary word with regard to the selection of our Fellow and friend, Mr. Thomas Bashill, to a very dis-

tinguished appointment. There were many others amongst the candidates whom we might have cordially congratulated, but the fortune of war has gone in Mr. Blashill's favour. Those of us who know Mr. Blashill, and we almost all know him personally, will all be able to congratulate him on his appointment, and, not only so, but to congratulate the Metropolitan Board of Works upon having appointed him. Mr. Blashill is a sound practical man, and I think we ought to be gratified to give utterance to this feeling, as a testimony of our appreciation of him. We know him as a thoroughly practical man, who has been well trained in business, as a man of genial manners and good-natured conduct, and he has especially distinguished himself recently by promoting those happy excursions into Italy, which I hope will soon make their mark.

Mr. Charles Barry.—It gives me the greatest pleasure to second the proposition of Mr. Kerr. Had he not mentioned it, I intended myself to have suggested it to the meeting, knowing the great cordiality with which it would be received.

#### Portrait of Mr. Ewan Christian, Past-President.

With reference to the portrait of Mr. Ewan Christian, past-President, Mr. Charles Barry, Treasurer to the Subscription Fund, observed that from want of funds he was not yet able to accept the generous offer of Mr. Oules, R.A., to paint the portrait for the Institute at considerably under his ordinary charge. He needed about 150*l.* to complete the sum required, and could not doubt that it would be speedily provided by the members of the Institute.

#### Election of New Members.

The following gentlemen were then, without ballot, admitted as Honorary Corresponding Members, viz.—The Conte Giuseppe Sacconi, Architect, Member of the Superior Council of Fine Arts, Ministry of Public Instruction, Rome; Signor Michele Ruggiero, Director of Monuments and Excavations for the Kingdom of Italy, Member of the Royal Academy of Naples; and Signor Giovan Battista Filippo Basile, Professor of Architecture at the University of Palermo, Member of the Academy of St. Luke, Rome.

The following members were elected by ballot, viz.—As Fellows: Mr. C. H. Samson, Taunton; Mr. T. H. Sapsford, City Architect, Sydney, New South Wales; Mr. Edward John May (Associate), Hart-street, Bloomsbury; Mr. H. Hall (Associate), Southampton-street, Bloomsbury; Mr. Hugh Stannus (Associate and Ashpitel Prizeman), Larkhall Rise, Clapham; Mr. Thomas William Aldwinckle, East India-avenue, Leadenhall-street; Mr. John Butler, Redcliffe-gardens, South Kensington; and Mr. Fred. Bath (Associate), Salisbury. As Associates: Mr. W. A. Gelder, Savile-street, Hail; Mr. A. B. Mitchell (Soane Medallist, 1885), Pembury-road, Clapton; Mr. A. Hayes, Clyde-street, Chelsea; Mr. S. Perks, Wandsworth Common; Mr. G. E. T. Lawrence, Ealing Common; and Mr. Henry Thomas Hare (Ashpitel Prizeman), Regent's Park-villas, Gloucester Gate.

The following Hon. Associates were elected by acclamation:—Professor G. Baldwin Brown, M.A., F.S.A. (Scot.), the University of Edinburgh; Mr. Edwin Lawrence, LL.B., B.A., Assoc. Inst. C.E., King's Ride, Ascot; and Major-General Richard Clement Moody, Fairfield, Lyme Regis.

#### Mud Architecture.

Mr. William Simpson, R.I., F.R.G.S. (Hon. Associate), next read a paper entitled "Mud Architecture: Notes made in Persia and other Countries." We give an abstract of the paper, and some notes of the discussion thereon, on another page.

**Messrs. Perry & Co.'s Government Works Unemployed Relief Fund.**—The committee of this fund have met weekly for the past ten weeks to distribute the balance of 43*l.* remaining from the fund of last winter. We are informed that they have relieved forty-two most deserving cases, and the funds getting low, they appealed to the men employed on these works, with the result that 19*l.* 7*s.* 8*d.* was subscribed in a fortnight, with the promise to continue the subscriptions for four weeks longer if necessary.

## Illustrations.

### "A CLASSICAL CHURCH."

**WE** give this week the design by Mr. F. W. Simon, which obtained this year the Tite prize at the Institute of Architects. The Tite prize was founded, as most of our readers are aware, by the late Sir William Tite, for the encouragement of the study of Italian architecture, at the time when the Italian style was apparently entirely succumbing to the inroads of modern Gothic. Times have changed since then. The author has chosen a square type of plan, with a large central area, as the type specially suited for modern worship, in which we concur with him.

The design is a successful treatment of recognised and orthodox features in the Italian Renaissance style, the introduction of the headed two-light windows, with a dividing shaft, being a reminiscence of the earlier Renaissance manner, which breaks the coldness of the prevalent type of detail very agreeably, but which Sir W. Tite probably would not have approved. From our point of view, on the other hand, it is a pity to see such poor and worn-out features as the festoons and urns reproduced once more. Cannot the aspirants for the Tite Prize exercise themselves in attempting to improve upon and develop the details of the style a little? There is plenty of room for it.

### "THE BRAZEN SERPENT."

#### SCULPTURE.

WE give illustrations of the two sketches in clay of this subject, which obtained the first and second prizes respectively, the former being by Mr. W. H. Totterdale Venner, the latter by Mr. George J. Frampton. We commented on the designs at the time of the exhibition of the students' drawings.

### MORTUARY BUILDINGS AND FIRE-ENGINE STATION, HORNSEY.

WE illustrate this week two sets of buildings, viz., mortuary buildings and fire-brigade station, which have been recently erected by the Hornsey Local Board, and the business-like manner in which they have been designed and carried out speaks well for the care that the Board is taking in providing for the ever-increasing wants of the large and important area under their control, comprising as it does the districts of Hornsey, Highgate, Crouch End, Stroud Green, Fortis Green, and Muswell Hill.

The site of the mortuary is on a short private road, out of the High-street, Hornsey, and in the arrangement of the plan the greatest care has been taken to ensure that the buildings and premises generally shall be isolated, nonobtrusive, and, as far as possible, concealed from the public view.

The mortuary buildings are in four distinct blocks, the first comprising coroner's court, witnesses' rooms, and caretaker's rooms; the second, two mortuary chambers, with viewing lobby and shell-store; the third, a *post-mortem* room and laboratory; and the fourth, disinfecting rooms and offices in connexion with same.

The coroner's court is a spacious well-lighted and ventilated room, about 27 ft. by 18 ft., fitted with benches for the jury, and a raised platform for the coroner, and with waiting-room for witnesses adjoining.

The caretaker's rooms comprise two bedrooms, kitchen, and scullery, bath-room, &c.

The mortuary building consists of two chambers, each containing three slate slabs on iron standards, one chamber being reserved for those who have died from infectious diseases.

The chambers are separated by a viewing lobby which has a small window and blind opposite each mortuary slab. From this lobby the jurors, or others interested, can view the bodies without entering the chambers. This lobby is also provided with an exit door, so that the jurors after their inspection may pass along the open passage in rear, and return by the side entrance into the court, as indicated by the arrows on the plan. On the outside of each chamber is a glazed closet or press, in which are hung the clothes of the deceased, as a means of identification.

The walls of the mortuary are lined with

white glazed bricks, and all internal angles are formed of hollow bricks, to prevent the accumulation of dust.

The floor is of Granolithic concrete, and the ceiling of iron joists and concrete, finished in Keene's cement.

A small room is provided adjoining the mortuary for an ambulance-shed and shell-store.

The *post-mortem* room and laboratory adjoining are lighted and ventilated from the roof, and lined with white glazed bricks, and contain the usual fittings and appliances.

This building is kept entirely distinct from the others, in compliance with section 143, Public Health Act.

The disinfecting-room contains a Lyon's patent disinfecting apparatus, manufactured by Messrs. Manlove, Alliott, & Fryer, of Nottingham. The infected clothing is brought in a covered van (kept for this sole purpose) into the disinfecting-room, and the infected articles are placed direct into the disinfecting-chamber, which consists of an oval cylinder 5 ft. long, with door at each end, and in which works our runners a galvanised-iron wire cage; the steam-tight doors being closed, steam is injected into the cylinder from a vertical boiler adjoining, at a pressure of 25 lb. to the square inch, and the articles, after remaining a sufficient time in the chamber, are withdrawn through the door at the opposite end of the cylinder into a second room, which is fitted with a copper, and other appliances for washing and cleansing, and from thence are returned to the owners,—a separate van being kept for this purpose.

Adjoining the disinfecting-rooms is a destructor, for destroying all articles which it is necessary so to treat.

The fire-engine station is situate in the Tottenham-lane, Hornsey, and being in a more prominent position than the mortuary, more attention has been given to the external appearance; the stock brick fronts being relieved by red-brick quoins, moulded cornices, and pediments, and terra-cotta enriched string courses.

Accommodation is provided on the ground-floor for two fire-engines, the large doors to engine-rooms opening automatically. On the upper floors are chambers for resident firemen, and in the rear of the main building are stables, and also a large depot for the scavenging and watering appliances of the Board. At the side of the fire-engine house is a shed for housing the steam-roller. These works have been designed and carried out by Mr. T. de Courcy Meade, A.M.I.C.E., the Surveyor and Engineer to the Board.

The mortuary buildings were erected by Mr. Wm. Tongue, of Plumstead, and the fire-brigade station by Mr. J. W. Dixon, of Highgate.

### ELECTION OF A DISTRICT SURVEYOR.

At the meeting of the Metropolitan Board of Works on the 25th ult., the election of a District Surveyor for the District of Charlton, Lee, and Kidbrooke, in the room of the late Mr. James Collis, was proceeded with. There were thirty-eight candidates, but for voting purposes these were reduced to thirty-five, three out of the total number of candidates not being present,\* in accordance with the requirements of the Board. The results of the preliminary voting on these thirty-five candidates, to reduce the number to six, were as follow:—Edmeston, J. S., 38 votes; Hardcastle, W. J., 32 votes; Lovegrove, H., 32 votes; Saunders, M. L., 38 votes; Stock, H. W., 37 votes; and Woodthorpe, E., jun., 31 votes. The subsequent voting, which was taken by ballot, was as hereunder:—

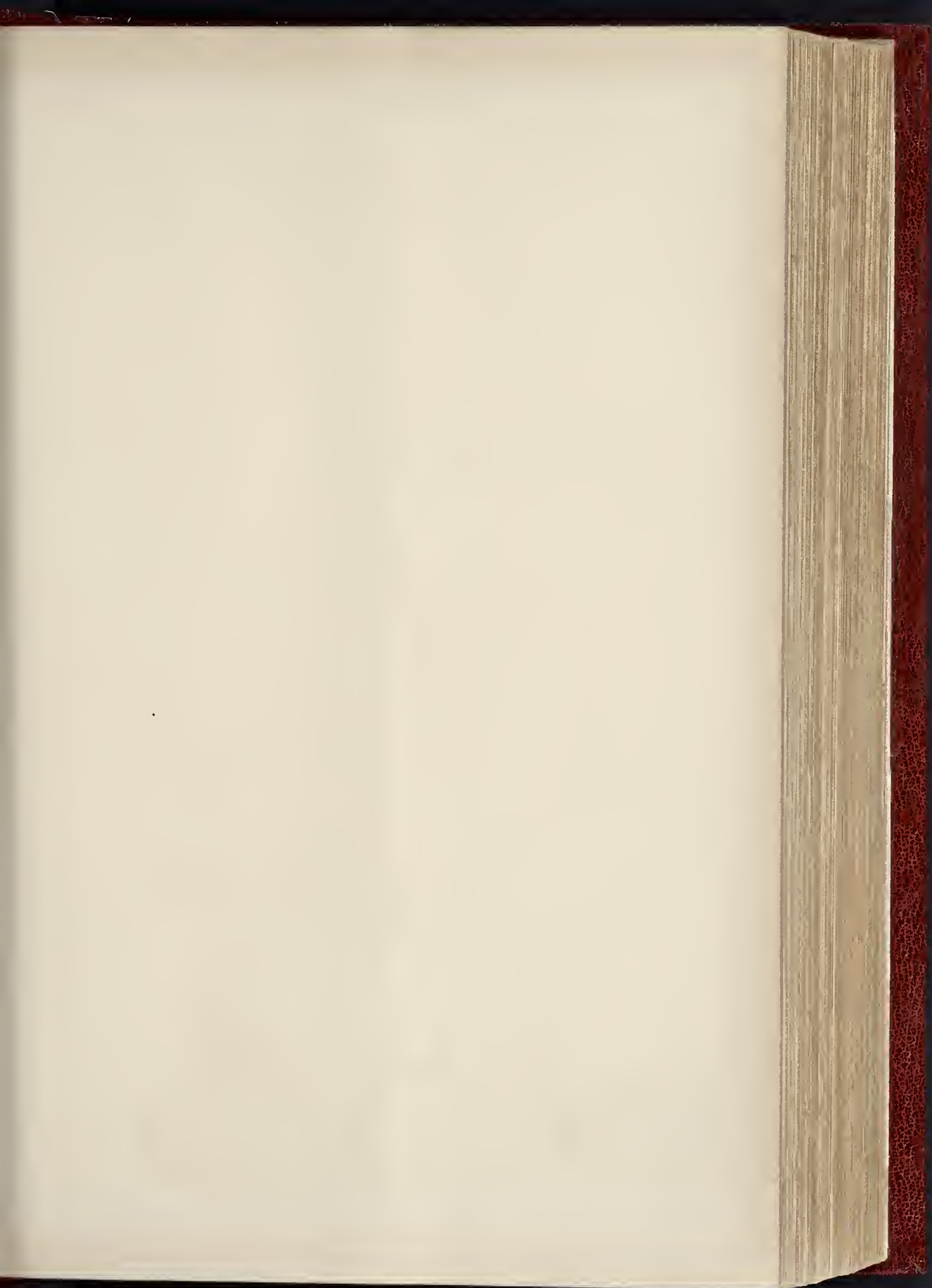
|                     | Second | Third | Fourth | Final |
|---------------------|--------|-------|--------|-------|
|                     | Vote.  | Vote. | Vote.  | Vote. |
| Edmeston.....       | 20     | 25    | 26     | 34    |
| Hardcastle.....     | 7      | 4     | —      | —     |
| Lovegrove.....      | 10     | 11    | 11     | —     |
| Saunders.....       | 10     | 10    | 14     | 17    |
| Stock.....          | 5      | 4     | —      | —     |
| Woodthorpe, E. Jun. | 2      | —     | —      | —     |

Mr. Edmeston was therefore declared to be the successful candidate, and thanked the Board for his election.

**Ingram House, Fenchurch-street.**—Mr. N. Maurice, of West Green-road, Tottenham, writes to say that he supplied the stoves, grates, fireplaces, tile-hearths, &c., for this building, as well as the marble columns and pilasters to shops.

\* One of the absentees, Mr. W. Hilton Nash, wishes us to state that he was unavoidably absent.



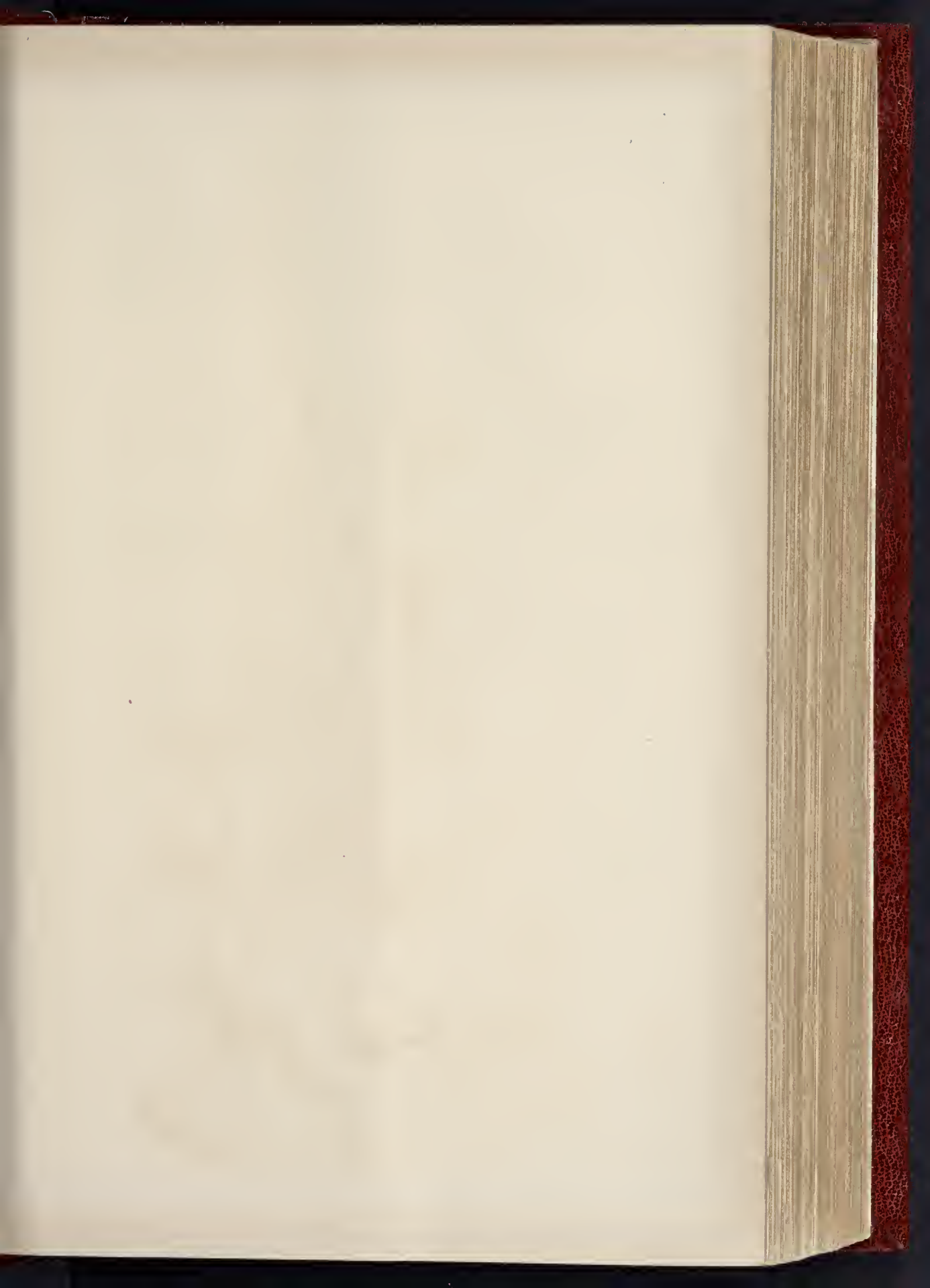




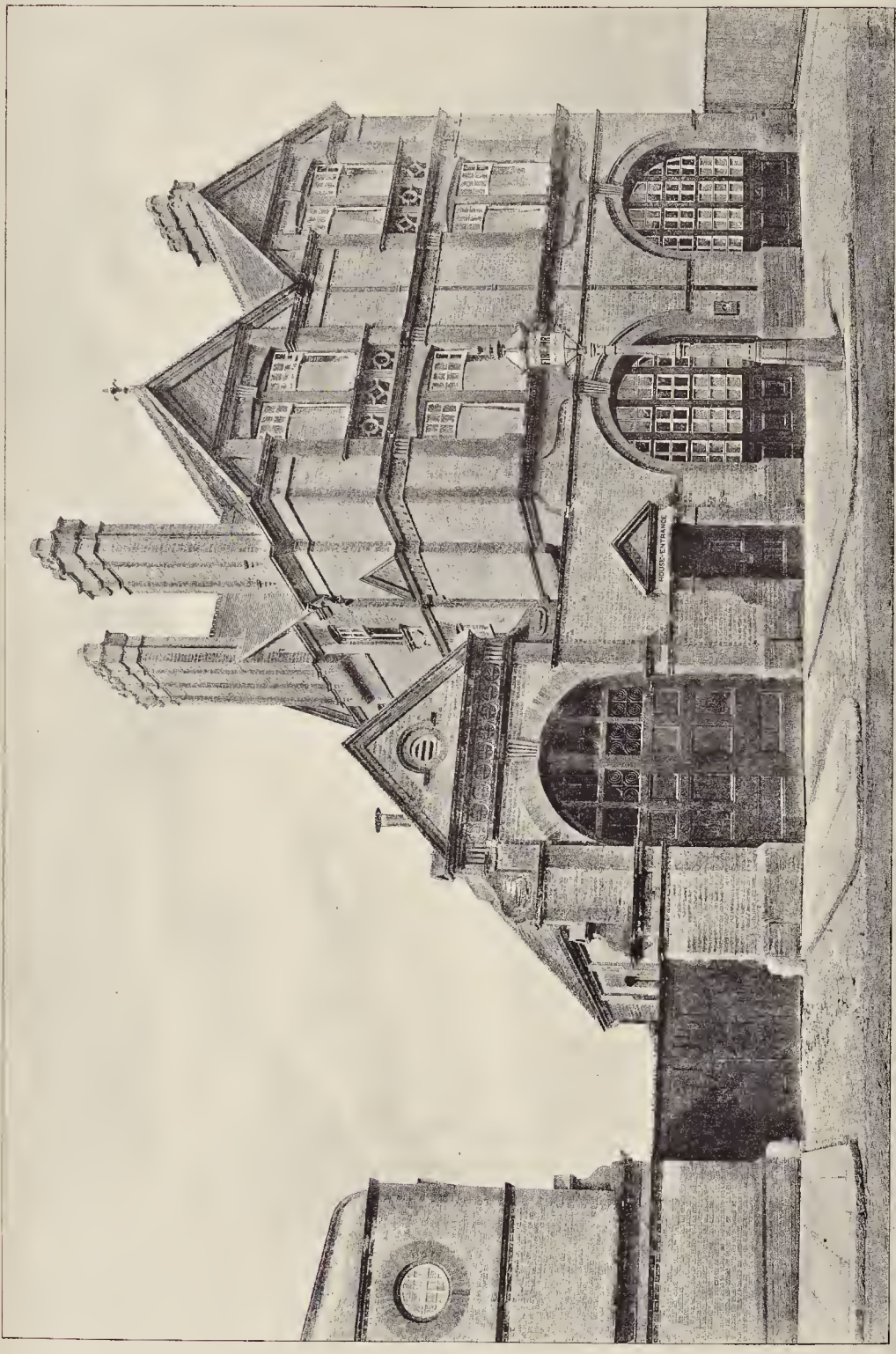
THE PHOTO. SERAP. E. & C. 22, MARTIN LANE, CANON B. LONDON, E.C.

"THE BRAZEN SERPENT," SKETCH BY MR. W. H. TOTTERDALE VENNER.

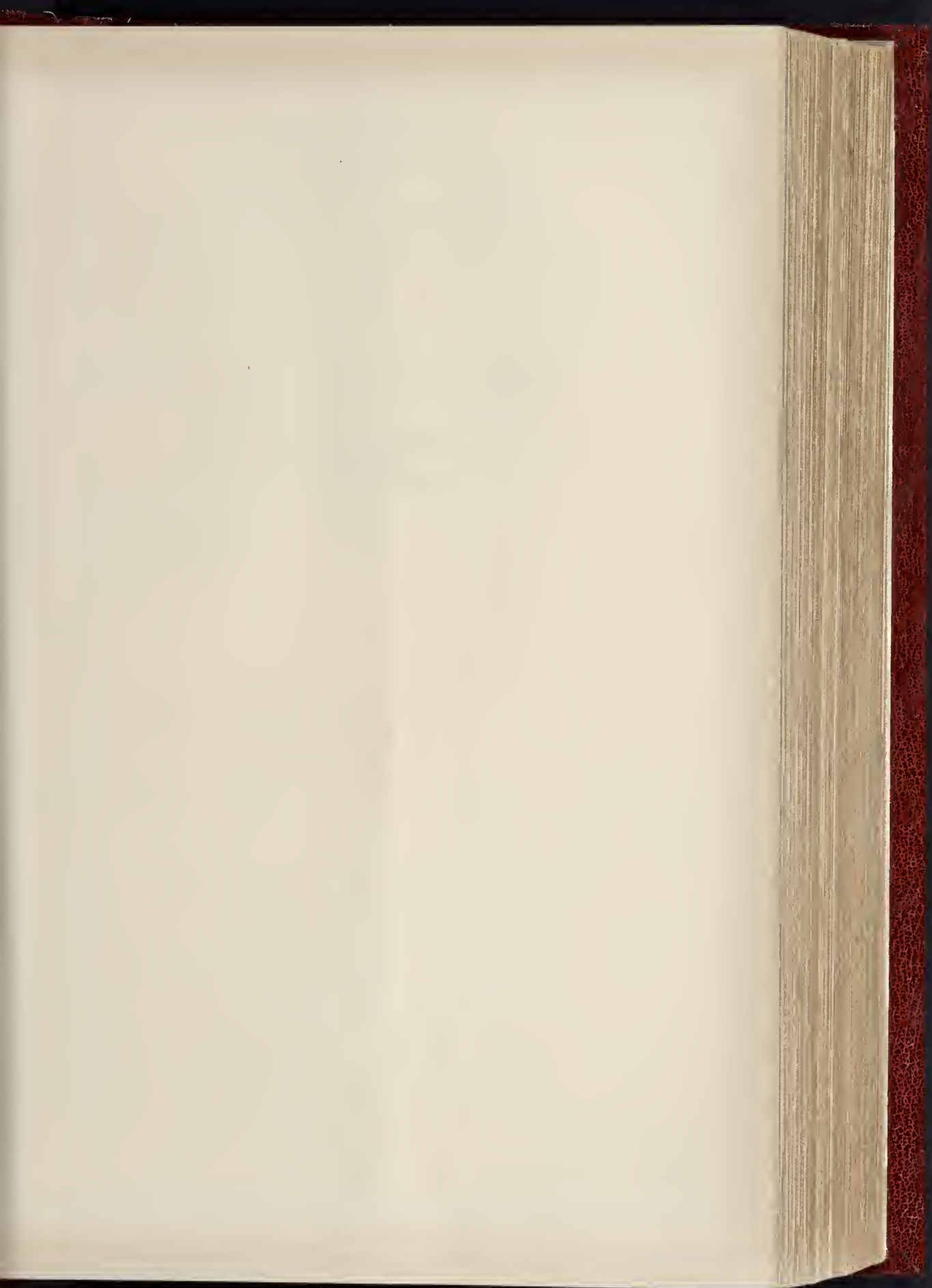
*Awarded First Prize, Royal Academy, 1886.*

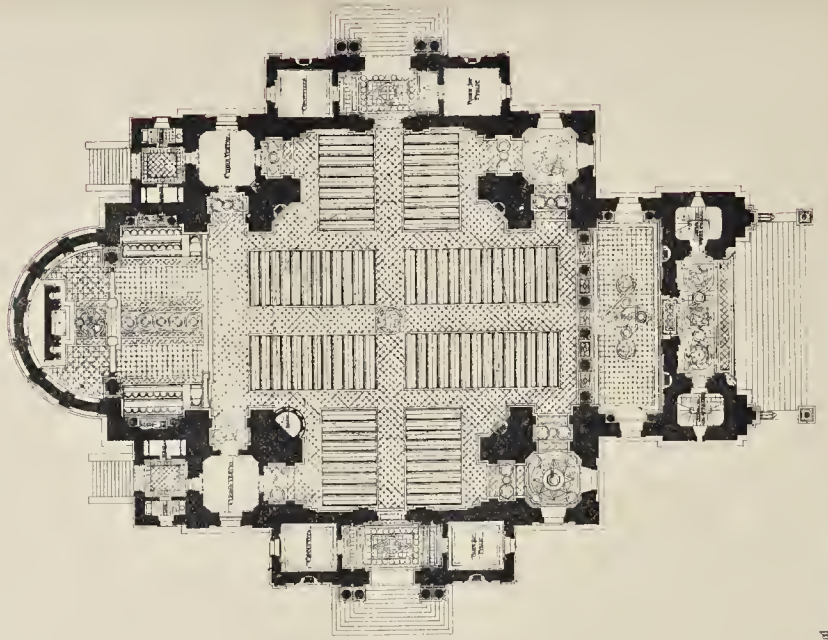


THE BUILDER, FEBRUARY 5, 1887



"INK PHOTO" SPRAGUE & CO. 27, MARK LANE, LONDON E.C. 3. CANON B. LONDON, E.C.





GROUND PLAN



Kell PL. 1. 1. & 1. 1. 1.

AWARDED THE TITE PRIZE R.I.B.A. 1887

"A CLASS"



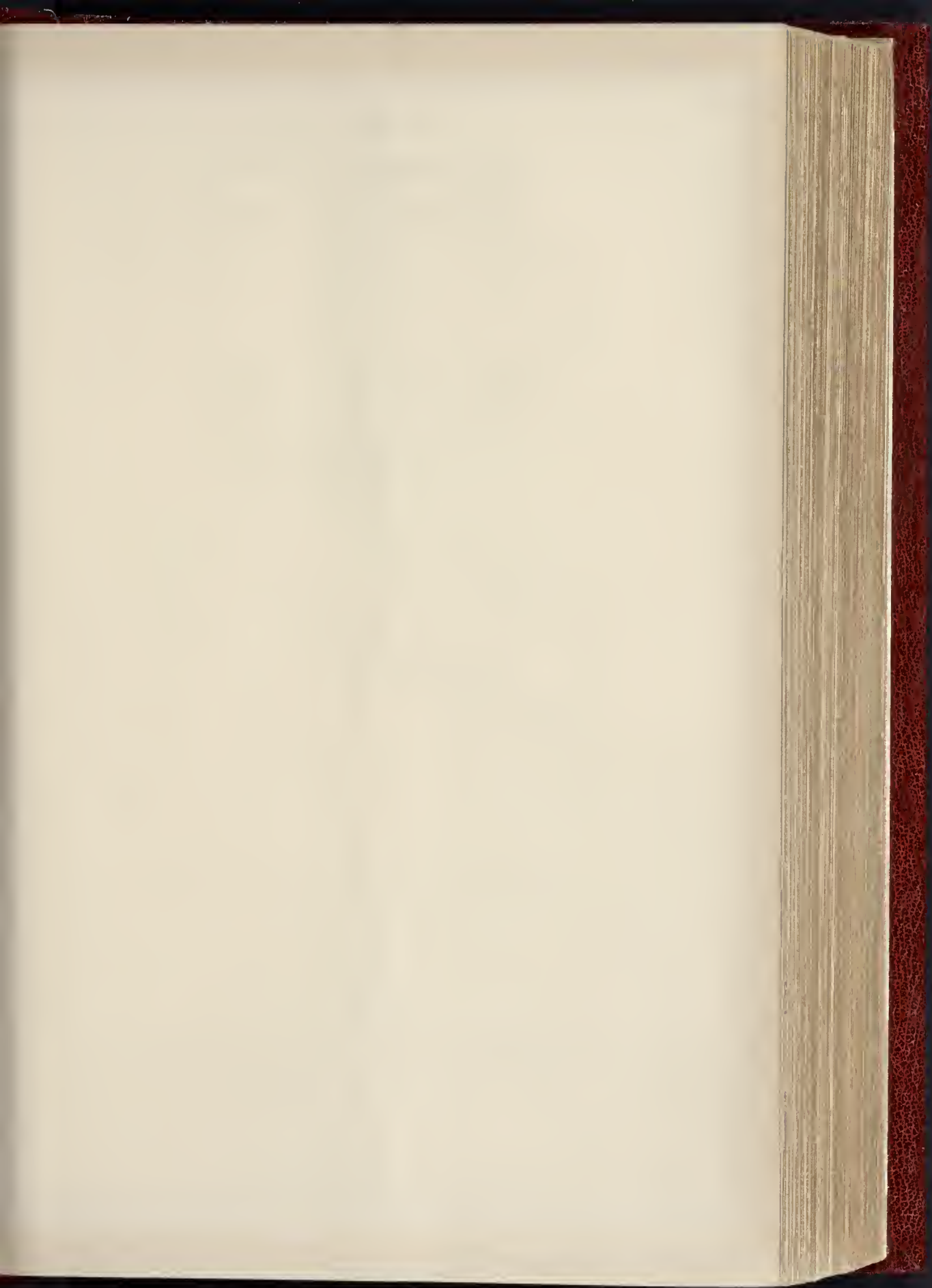
J. H. B. [unclear]

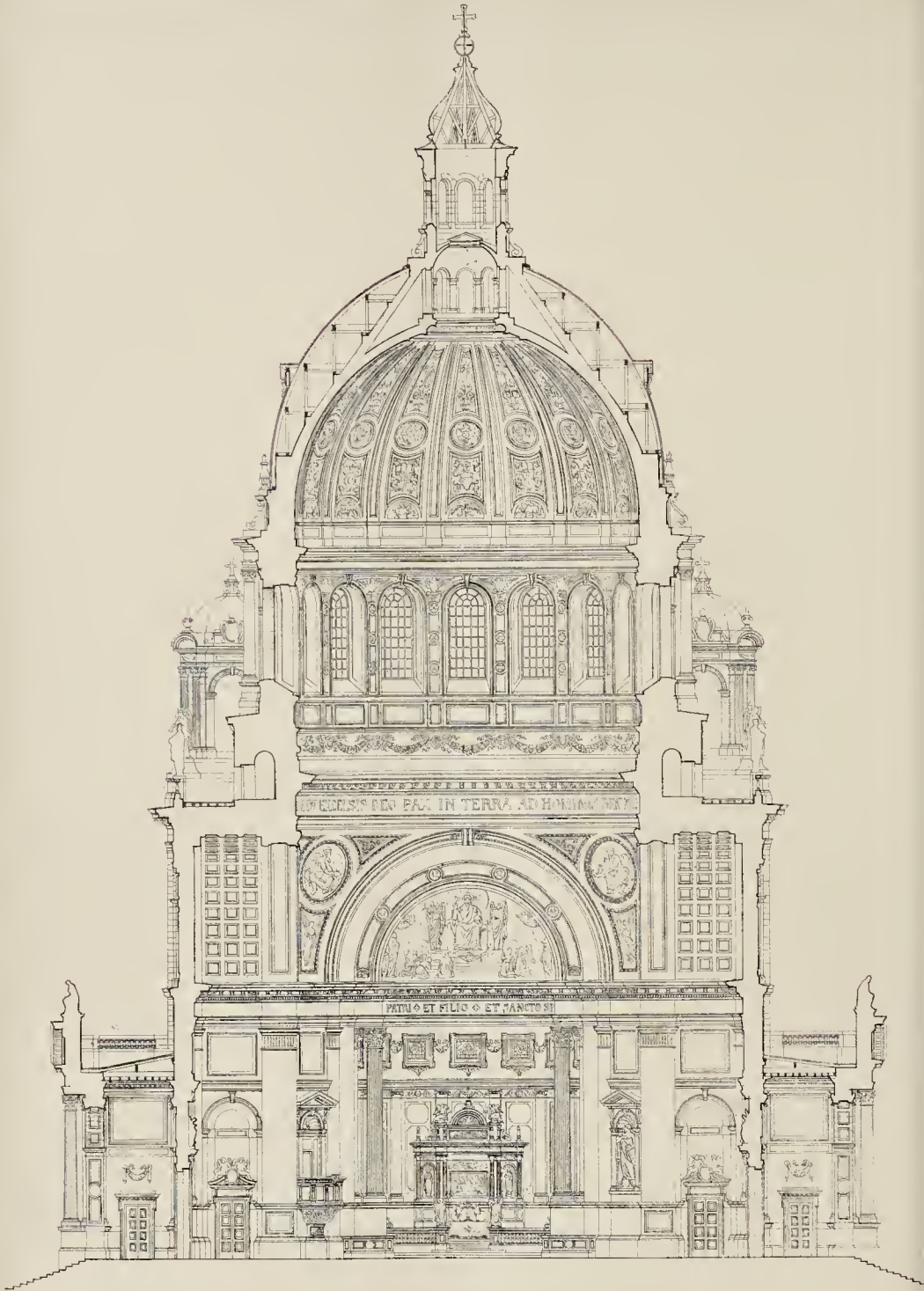
**SOUTH ELEVATION**

CHURCH.—DESIGN BY MR. FRANK W. SIMON.



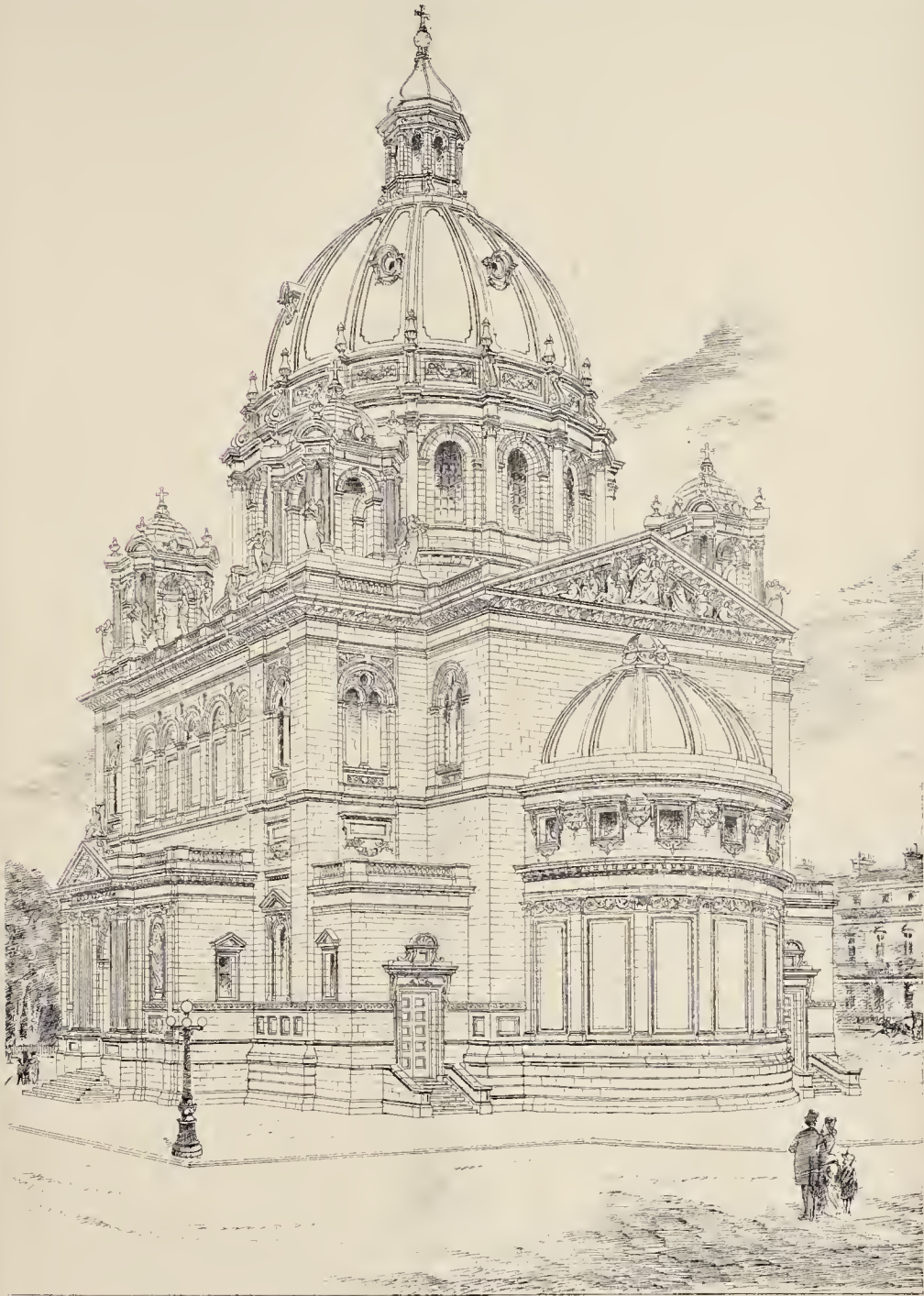






SECTION

"A CLASSICAL CHURCH."—DESIGN BY MR. FRANK W. SIMON.



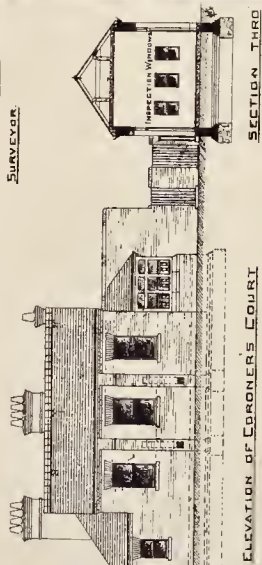
PERSPECTIVE VIEW.

"A CLASSICAL CHURCH."—DESIGN BY MR. FRANK W. SIMON.



**MORTUARY BUILDINGS FOR THE  
HORNSEY LOCAL BOARD**

THE COURNEY MEADE AMICE  
SURVEYOR



ELEVATION OF CORNER'S COURT



SECTION THIRD  
VIEWING LOBBY

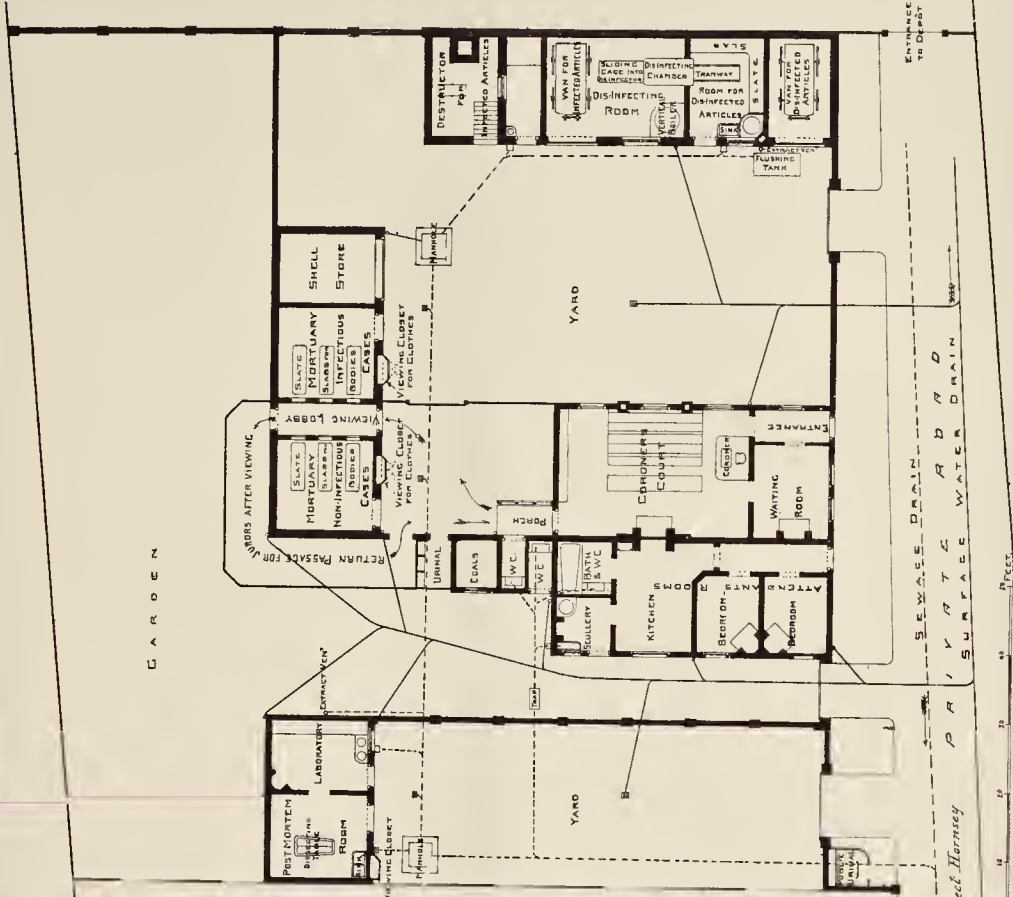


SECTION  
POST-MORTEM ROOM



ELEVATION OF MORTUARY

**SANITARY DEPOT**



PHOTOGRAPHED BY MR. J. H. MARTIN, LONDON, E.C.





THE PHOTO APPARATUS BY J. BARTHOLOMEW, 15, MARK LANE, LONDON, E.C.

"THE BRAZEN SERPENT": SKETCH BY MR. GEORGE J. FRAMPTON.

*Awarded Second Prize, Royal Academy, 1886.*





## MUD ARCHITECTURE IN PERSIA AND OTHER COUNTRIES.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

At the meeting of the Royal Institute of British Architects on Monday evening last, Mr. William Simpson, F.R.G.S., of the *Illustrated London News*, read a paper on "Mud Architecture," being notes made in Persia and other countries.

The author explained that his paper treated of mud when used directly in building, as well as when formed into bricks and dried in the sun. His information was collected in the winter of 1884-85, when he was attached as a special artist to the Afghan Boundary Commission. Starting from Resht, on the Caspian, he travelled to Sarrahs and Kuhsan by way of Persia. The winter was spent at Bala Murghab, and the return journey was made *via* Meshed, Shahrud, Astrabad, and Keneri Gez, on the Caspian. Throughout the whole of this district mud is, to this day, the principal material used in building; buildings of burned brick are rare, and the ruins of such still more so. Where old towns or cities stood, all that now remain are mounds. In Persia he came across one or two examples of mud architecture, which served to show to what perfection the process might be carried, and the use that was made of glazed pottery in embellishing this class of building.

Pursuing his journey eastward, about 100 miles from the Persian capital Tehran, Lasgrid was reached. Here is a very remarkable specimen of mud building, in the form of a village erected on a circular mound of mud raised some 30 ft. above the surrounding level. There is but one entrance to this block of buildings, capable of admitting only one person at a time. This village is probably the remains of the stronghold of a town, and the object of this peculiar mode of construction is to provide a refuge inaccessible to the Turkoman horsemen, the ruthless raiders of Central Asia, and the Eastern frontiers of Persia. As they were unable to besiege a place, rapidity of movement was necessary to the success of a swoop upon a village, and the chief object of the inhabitants was to put themselves as rapidly as possible into a safe retreat.

Near Mazinan are the remains of two towns now deserted and in ruins. One of these, he stated, was similar to that at Lasgrid, but only 20 ft. in height, and had now become a quarry, from which mud was extracted for other buildings. Here he found a small room, 15 ft. by 10 ft., which was a great surprise to him, and which showed what it was possible to do with this material. The walls were perfectly square, and at right angles, and had been finished off with a layer of *gutch* or gypsum, which had been run into delicate mouldings and stamped, whilst wet, with a raised pattern.

Two miles south of Nishapur, a large town of mud houses, and mud walls, he found a large square mound, and traces of the mud walls of an ancient town. At Meshed, the capital of Khorassan, is the tomb of Iman Reza, the eighth Iman, who died in 818 A.D. This is inaccessible to any but the faithful, but the author obtained a good view from a neighbouring house. The dome over the tomb and the tips of the minarets are of copper thickly gilt, and the interior was described to him as being richly decorated with gold, silver, alabaster, marble, precious stones, and beautiful tiles. On the road from Meshed to Sarrahs he passed through a desolate country where are the remains of mud villages and walls in various stages of ruin. At Sarrahs, the Persian town or New Sarrahs, built as a fort for the accommodation of troops, the walls and houses are entirely of mud. At Old Sarrahs, on the right hand of the river Tejed, though no doubt a very ancient, and probably in former times a large, place, he found only a square mound, each side of which was about 300 ft. The top of the mound was covered with fire-burned bricks, the remains of substantial buildings. About a mile to the north-west of New Sarrahs are the remains of a burned-brick tomb, decorated with beautiful plaster ornament, which seemed satisfactory evidence that similar results had been obtained in the plaster ornamentation of mud buildings, in which it was known that plaster had been employed for finishing. From Sarrahs to Kuhsan, a distance of 140 miles, the country once fertile and populous is a desert, in which are slight traces of the ancient water-courses. From Kuhsan, the author crossed over the ancient Badghiz to

the Khushk Valley, in the centre of which is a large mound with ruined towers of burned brick on its summit, and ruins of mud walls at its base. So recently as 100 years ago this valley was well peopled. At Kara Tappah Kurd, and Kala-i-Maur, he found mounds, apparently square on plan, and on the latter the remains of a burned-brick fort.

Near the junction of the Khushk and the Murghah rivers stands Ak Tappah, or the "White Mound," by far the largest mound seen by the author. Roughly speaking, it is triangular in form, the longest dimension being about 300 yards, the greatest width 100 yards, with a total height of about 100 ft. With the exception of a modern mud parapet, this was found to be a bare hill. On both banks of the river for a considerable distance south of Ak Tappah he found a succession of mounds, many of them probably of great age, indicating where prosperous towns have stood in this once fruitful valley. The whole distance of about twenty miles from Penjeh to Meruchak is covered with similar ruins. Among nearly all the mounds examined, the author found innumerable fragments of pottery, the remains of the beautiful glazed tiles with which it was no doubt customary to decorate the most important mud buildings, such as mosques, tombs, &c.

He managed to pick up a few details of the manner of construction of mud buildings in Persia and India. In good houses, the foundations often 3 ft. or 4 ft. deep, are formed of rough uncut stones or burned bricks. Walls are from 2 ft. to 4 ft. in thickness,—thickness of wall ensuring coolness in the house. The mud is built in layers, 2 ft. or 3 ft. in depth, it being necessary to allow one layer to dry before another is put on. The upper parts of the walls are sometimes formed of sun-dried bricks, and are occasionally built "hollow." A mixture of mud and chopped straw, called *kahgill*, is applied as a coating on the outside of walls to preserve them from the weather. In Indian villages the mud houses stand on a *chabutra*, or raised platform, which is washed at regular intervals with a mixture of mud and cow-dung. In India flat roofs covered with mud are common; but in Persia, wherever wood is scarce, the roof is carried on arches or domes of mud bricks, laid in *gutch* or gypsum.

The author's interest in the mud buildings of Persia arose from their similarity to the Afghan villages with which he had become familiar in 1878-79. An Afghan village is surrounded by four walls with a tower at each corner, and an entrance gate at one side; and he found the same arrangement and mode of construction to exist on the whole route followed by him from the Caspian to near the banks of the Indus. He considered that this similarity found in methods of building, although in such a primitive material as mud, should give greater confidence to those interested in tracing a connexion between the arts of Persia and those of India. He noticed on the Heri Rud, and at other places near, some rock-cut caves, which he believes to be clear evidence of the spread of Buddhism from India towards Central Asia, and possibly further westwards. The mud crenellated walls, with towers at the corners, and occasionally at intervening points, seen by the author in Central Asia in ruins, and in course of construction at the present moment in Persia, are the exact counterpart of the walls shown on the Assyrian sculptures in the British Museum, which it is known were built of mud. Such walls have existed in Mesopotamia for thousands of years, and the identification includes a long period of time and covers a large geographical space.

His examination of these mud buildings has led the author to think that the idea of the arch, for the invention of which the Romans have been credited, is all but co-eval with mud building, and that its invention, as is shown by Egyptian remains, is lost in the past. The dado also, he considered, was only a direct evolution from the simple mud wall of primitive times, which required protection along its base. Our investigations into the origin of architectural forms have, he stated, up to now been almost exclusively confined to early wooden construction, to the exclusion of the more primitive method of building in mud. The oldest civilisations that we know of were in Egypt and Mesopotamia,—two countries where mud building has existed from the earliest times, and is the mode of building still employed. The author had himself sketched

the mud houses discovered by Dr. Schliemann at Hisarlik in Greece, and quoted Miss Yule's description of the present method of building "cob" walls in Attica.

As far back as the year 385 B.C., the year in which Agesipolis took Mantinea, mud walls were used for defensive purposes, and were usually found more effective than walls of stone. The author thought that translators of Greek works had used the word "brick" when "crude brick" would have been a more faithful rendering; hence the extent to which mud was used by the ancient Greeks has not been quite understood. The late explorations at Olympia revealed at one spot some data upon which a theory has been based, which, if correct, will add much to the importance of mud in relation to architecture in the past. The discovery has led to the suggestion that the cella walls of temples were sometimes built of sun-dried bricks, a suggestion on which the author did not venture to pronounce a judgment of his own.

In many parts of the world "wattle-and-dab," is to be found, and the author was indebted to an article in the *Quarterly Review* for the knowledge that in at least one part of England mud is a building material. The writer of the article came to the conclusion that the city Cain built was of "cob"; and that the tower of Babel was principally formed of the same material. The importance of this subject was illustrated by references to it in early mythology. A divine origin was generally given by the primitive religions to whatever was of high value to man; architecture, or building, on this account, was supposed to be derived from the Deity, and Sanchoniathon, as well as Berossus, gives a mythic origin to sun-dried bricks, and to building houses with mud. A similar expression of idea is found in the Shah Nameh of Firdusi, where Jemshid is said to be the first teacher.

In the discussion which followed, Mr. Alexander Finn, H.B.M. Consul at Resht, in Persia, said that he had been in Persia for eleven years, and while out on shooting excursions he had often put up in villages the houses of which were entirely constructed of mud. In fact, it would be said that north of the Elhurz range, which ran through the north part of Persia, every village was built of wattle and mud, and every village to the south of mud without any wattle. Indeed, he did not know of a single town in Persia not built of mud, with the exception of some of the principal buildings, which were constructed of stone or kiln-dried bricks. He was sorry that he could not quite agree with one of Mr. Simpson's remarks about the dado. This, he believed, was not intended to protect the walls from the men's backs, for during all his sojourn in the East, he could not remember once seeing an Oriental with his back touching the wall. The dado was intended rather to protect the lower part of the wall from damp. The floors being made of the same muddy material as the walls were apt to become dusty, so that each time they were swept the watering-pot had to be used. These mud walls, generally speaking, did not last very long, and the moment a house was deserted, or left for any reason, it seemed to begin to tumble down. In the plain of Verameen could be seen the walls of an old city called Erig still standing, though nothing whatever of the town remained.

Professor Kerr proposed a vote of thanks to Mr. Simpson for an exceedingly appropriate, useful, and learned paper. The subject might be of more interest to them than Mr. Simpson would suppose, because they, as architects, fully appreciated what he had called mud building, only they did not like to use the word "mud." Indeed, he almost wished Mr. Simpson had not used the word. For himself, he should prefer to call it "earth-concrete." He merely suggested the term, and he would tell them why. There was a certain dignity,—and he spoke advisedly,—of building involved, which dignity had been the theme of Mr. Simpson's discourse throughout, but which was not indicated by the manner of the application of the term "mud." Might not he put it historically in this way,—first, they had "earth-concrete"; secondly, soft brick; thirdly, hard brick; and fourthly, lime-concrete, stone not being involved here at all? These four materials looked at historically constituted a complete series of scientific building materials, and if Mr. Simpson would only consent to abandon the use of the word "mud," and adopt another more dignified term, the series was one which might be studied with

considerable interest and profit. He had ventured to apply the term "earth-concrete" quite on the spur of the moment, because they had reverted at last to the same form in their lime-concrete. He would suggest that the vault had probably its origin in the use of "earth-concrete," but not the arch. The arch, he believed, was proved by the remains of Egypt and Mesopotamia to have proceeded originally from the contact of two stones laid at an angle, and meeting together at the top, where the abutment at each end was sufficient to maintain them in position. They could follow the introduction of the arch as a stone feature from the beginning to the end, but they were not able to trace the origin of the vault to its very commencement, and he was therefore disposed, on the spur of the moment, to accept Mr. Simpson's suggestion that it had its origin in the use of "earth-concrete." With respect to unburned bricks there was a singular illustration of it in the legend of the building of the Tower of Babel.

Mr. Hugh Leonard seconded the resolution. Having been a good deal in India, and having seen many mud buildings, he could appreciate the learned and scientific paper they had listened to that evening. He did not like to object to the use of the word "mud," as the poor natives of India made much of it, and the darning of the floor was really a modification of what the servants in this country did when using a white mixture to clean steps and floors. He happened to have a brick he had brought from the most perfect part of the Great Wall of China, which was there composed of sun-burned bricks, covered with parapets of burned bricks, and with a terrace of tile between them. Other portions of the Wall, which were built of stone, were by no means so strong as the parts constructed of sun-burned bricks.

The Chairman (Mr. Thomas Worthington, Vice-President) said that not the least interesting part of Mr. Simpson's communication was the exceedingly fine series of drawings exhibited on the wall. Mr. Anderson had made a personal reference to him (the Chairman), and to an essay he wrote in early life. He little thought when he received the medal from Earl de Grey, in the old rooms of the Institute in Grosvenor-street, that forty years afterwards he should occupy the chair on an occasion of this kind. He could remember that the researches necessary to produce a work consisting of some 200 quarto pages were very lengthy. He came across a great deal of mud architecture at the time, and sometimes found himself very much stuck in the mud. Indeed, the *Athenæum* of that day stated that he had exhausted the subject from the days of the Deluge down to the middle of the nineteenth century.

The vote of thanks was then put, and carried by acclamation. Mr. Simpson, in replying, expressed his satisfaction at the manner in which the paper had been received. He was afraid Professor Kerr's recommendation had come too late. He (the speaker) would have no objection to changing the title, though he preferred the one he had adopted. Professor Kerr's title might be a little more scientific, but his own, he believed, would be better understood.

The Chairman announced that the next meeting would take place on the 14th inst., when a paper entitled "Notes made during Tours in Greece, 1881 and 1884," would be read by Professor T. Hayter Lewis, F.S.A., Past Vice-President.

**Hygienic Exhibition at Warsaw.**—Arrangements have been made for holding this year a hygienic exhibition at Warsaw. The exhibition will be divided into five groups, comprising, respectively, the hygiene of food, of dress, of dwellings, of schools, workshops, and hospitals, and, finally, statistics and meteorology. The opening is fixed for May 15th, the closing for July 1st.

**The Cheap Application of Electricity.**—The *Journal Officiel* contains a decree of the French Minister of Education appointing a Commission charged with considering a prize of 50,000 francs to the inventor of a cheap application of electricity to heating and lighting, chemical action, mechanical power, transmission of telegrams, or the treatment of the sick. The chairman of the Commission is M. H. Bertrand, Permanent Secretary of the Paris Academy of Sciences.

#### NATIONAL ASSOCIATION OF MASTER BUILDERS OF GREAT BRITAIN.

This Association held its half-yearly meeting on the 25th ult., at the George Hotel, Nottingham. Mr. W. H. Cowlin, of Bristol, presided, and representatives from London, Bristol, Bradford, Bolton, Birmingham, Manchester, Liverpool, Derby, Hull, Walsall, Lincoln, and Nottingham, were present.

The report and accounts for the past half-year were adopted and passed, and

The following gentlemen were appointed officers and Council for the ensuing year:—*President:* Mr. Robert Neill, jun., Manchester; *Vice-Presidents:* Mr. J. H. Colla, London, and Mr. Robert Dennett, Nottingham. *Hon. Vice-Presidents:* Mr. Stanley G. Bird, London, and Mr. W. H. Cowlin, Bristol. *Hon. Treasurer:* Mr. J. C. White, Liverpool. *Hon. Auditor:* Mr. Jos. Stevenson Jones, Liverpool.

The following gentlemen were appointed to serve on the Committee:—Birmingham, Mr. John Bowen and Mr. W. Sapote; Bolton, Mr. Joseph Henry Marsden; Bradford, Mr. William Monson and Mr. John E. Bealand; Bristol, Mr. A. Krass; Edinburgh, Mr. Thomas Bonnar; Hull, Mr. R. Bevers; Lancaster, Mr. William Huddington; Leeds, Mr. C. Tomlinson; Lincoln, Mr. William Henry Close; Liverpool, Mr. James Bronly and Mr. James Pendleton; London, Mr. Thomas Rider; Manchester, Mr. William Southern and Mr. William Browne; Northampton, Mr. W. H. Smith; Nottingham, Mr. Enoch Hind; St. Helens, Mr. R. Belshor; Wigan, Mr. Charles B. Holmes; Wolverhampton, Mr. G. Higham; and the Presidents of the Local Associations as Members of the Council, *ex officio*.

In the evening the representatives of the various Associations were entertained at dinner by the President of the Nottingham Association.

It was resolved to hold the next meeting of the Association in Glasgow.

#### THE INSTITUTE OF BUILDERS.

The annual general meeting of this Institute was held at the Offices, 31 and 32, Bedford-street, Strand, on Tuesday last, Mr. George Dnr, J.P., in the chair. The secretary, Mr. Richard S. Houshaw, read the report, from which we extract the following passages:—

"The Council, in presenting their Third Annual Report, are pleased to be able to state that during the past year the number of members has been increased by twenty-eight, making a total of seventy-one. They also have to announce that Mr. Robert Mitchell, President of the Melbourne Builders' Association, has been elected an honorary member, but they regret to have to record the death of Mr. George Eban.

The advisability of the admission to the Institute of Associates was discussed at the commencement of the year, but it was considered by the Council that the time had not arrived for the extension of the Institute in that direction. The matter is, however, to be again brought forward at an early date.

The question of the 'Non-acceptance of the Lowest Tender,' in limited or select competitions, was referred to the Institute by the Council of the Central Association of Master Builders of London, and the matter has been left to two members of the Council to draft a resolution to be presented to the Royal Institute of British Architects, calling the attention of that body to the subject.

Two Amendment Bills to the Employers' Liability Act (1880), having been introduced into the House of Commons, they were referred to a Select Committee of the House for consideration and report. Evidence was given by the President and Mr. W. H. Cowlin as to the working of the Act, especially with the object of showing the necessity for retaining the clause compelling notice of accident to be given to the employer within a reasonable time of its occurrence, and having the meanings clearly defined of the words 'employer,' 'contractor,' and 'sub-contractor.' The Select Committee have since reported to the House in favour, generally, of the proposed Amendments, and as the Act expires with the present year the Government have announced their intention of introducing a new Bill.

The Metropolitan Board of Works introduced a 'Water-wood' Bill (calculated to effect the storing of timber by builders, &c.), but the former did not reach a second reading, and the latter was withdrawn.

The Council saw no reason to object to the new By-laws as to Concrete Buildings introduced by the same body. It is generally understood that a 'Sanitary Registration of Buildings Bill' will be brought before Parliament next session, rendering it obligatory on the part of the 'owner, lessee, sub-lessee, or occupier' in towns of over 50,000 inhabitants, to deposit with a 'Registration Authority' a certificate that the sanitary condition of any building, occupied or intended to be occupied, is satisfactory. The Council are watching this Bill closely, and will consider their duty to oppose any such measure unless very considerably modified as to the manner in which its provisions are proposed to be carried out.

As the members are doubtless aware, a Benevolent Fund has for several years been in existence in connection with the late Builders' Society; this has now been transferred to the Institute in the names of Messrs. George Pincknett, Stanley George Bird, and Frederick John Favon, trustees, and is invested in New Three per Cent. Consolidated Annuities. . . .

Mr. Benjamin Hansen having resigned his trusteeship of the funds of the Institute, Mr. John Howard Colla was appointed to fill the vacancy thus occasioned.

The Council, being desirous of establishing a library in connection with the Institute have the pleasure to announce that a special fund has been started for that purpose. The Council, after due consideration, have decided that a course of papers on subjects of interest to the building trade shall be read at the Institute. . . .

In accordance with the Articles of Association, the President, Mr. Stanley G. Bird; one of the Vice-Presidents, Mr. George Burt; the Treasurer, Mr. George Pincknett; one of the Auditors, Mr. Herbert H. Bartlett; and the members of the Council, Mr. Woodman Hill, Mr. W. S. Horner, Mr. Robert Neill, jun., and Mr. Joseph Rendall, retire, but are eligible for re-election.

The Chairman, in moving the adoption of the report, said he was pleased to be able to say that a standing committee on Practice had been appointed by the Royal Institute of British Architects, who had under their consideration the Conditions of Contract.

The motion for the adoption of the report having been agreed to

Mr. J. Howard Colla was elected President for the ensuing year; Mr. H. T. Ashby as Vice-President; and Mr. Woodman Hill, Mr. W. S. Horner, Mr. R. Neill, jun., and Mr. Joseph Rendall were re-elected on the Council. Mr. G. Pincknett, J.P., and Mr. H. H. Bartlett were re-elected as treasurer and auditor respectively. Mr. Stanley G. Bird was elected a member of the Council, in the place of Mr. H. T. Ashby, after having filled the office of President for two years, for which service he was accorded a very cordial vote of thanks.

#### ELECTION OF SUPERINTENDING ARCHITECT:

##### METROPOLITAN BOARD OF WORKS.

At the meeting of the Metropolitan Board of Works on the 25th ult., Mr. George Edwards (Deputy Chairman) moved the adoption of a report of the Works and General Purposes Committee, submitting the names of the following six candidates for the office of superintending architect, and recommending that the Board do proceed to elect one of them to fill the vacant office.—Mr. T. Blashill, Mr. H. Gundry, Mr. A. Peebles, Mr. R. Plumbe, Mr. P. G. Smith, and Mr. E. J. Tarver.

After it had been decided, on the motion of Mr. Williams, to take the voting by ballot,

The Chairman of the Board (Sir James McGarel-Hogg) read a paper detailing the duties of the office as follows:—"To be Superintending Architect of Metropolitan Buildings, and to be Architect and Superintending Architect of work to the Board, at a salary of £500l. per annum, payable quarterly. To perform all the duties, statutory or otherwise, of the above-mentioned offices, and such other duties as have hitherto been performed by the Board's architects, and also to perform all such duties as the Board may from time to time direct. To be removable at the Board's pleasure. And the Board authorises the persons appointed to exercise the powers of entering and inspecting, and all other powers exercisable by Architects of the Board, and by virtue of the 21st Section of the Metropolitan Management and Building Amendment Act, 1878, or otherwise, under any statute or bye-laws."

The voting was then proceeded with, and a very tedious business it was. The following is a record of it:—

|                       | First Vote. | Second Vote. | Third Vote. | Fourth Vote. |
|-----------------------|-------------|--------------|-------------|--------------|
| Blashill, T. . . . .  | 14          | 17           | 20          | 27           |
| Gundry, H. . . . .    | 3           | 20           | 22          | 25           |
| Peebles, R. . . . .   | 19          | 20           | 10          | —            |
| Plumbe, R. . . . .    | 13          | 12           | 10          | —            |
| Smith, P. G. . . . .  | 4           | 3            | —           | —            |
| Tarver, E. J. . . . . | 0           | —            | —           | —            |

Mr. Blashill was therefore declared to be duly elected, and on the motion of Mr. Edwards the common seal was ordered to be affixed to the deed of appointment.

Mr. Blashill, addressing the Board, said,—Sir James Hogg and Gentlemen,—I beg to thank you most heartily and sincerely for the honour you have done me in electing me to this highly important office. No one can understand better than I do how it is that my majority is so narrow. It was because my good friend against me was so well worthy of the appointment. I hope that under the circumstances I shall so perform the duties of my office as to give

\* This was not the way in which the recommendation was put on the Board's agenda paper, owing to the quantity of which we were last week beguiled into announcing that the election would take place till Feb. 4.

satisfaction to every member of the Board. I am now about to enter on a most honourable office, and I hope I shall be able to carry it out with great cordiality with all the other officials of the Board of whatever degree.

[Mr. Thomas Blasbill, it may be mentioned, was a pupil of Mr. T. E. Knightley. He has been for twenty-five years in practice, and for the last ten years a district surveyor. He was elected an Associate of the Royal Institute of British Architects in 1866, and a Fellow in 1877. He is also a Fellow of the Surveyors' Institution, and some years ago he was President of the Architectural Association, in whose work he has continued to take a very active interest. We cordially re-echo the congratulations which were given utterance to at the Institute of Architects on Monday evening last, and which are reported in another column.]

#### THE USE OF MORTAR DURING FROST.

SOME time ago the police authorities of Berlin issued an order forbidding the construction of brickwork, should the temperature fall to or below 2° R. (26° Fahr.). This order being based on the supposition that mortar freezes at that temperature, and does not set, Herr Krause, architect, of Stropp, sent a communication to the *Baugewerke-Zeitung*, in which he publishes his experiences, which by no means seem to bear out the necessity for issuing the order. We give a résumé of Herr Krause's remarks, as well as of the opinions of some other German architects upon the matter. Herr Krause states that in the winter of 1856 he was compelled to erect a small building during a very sharp frost, the temperature being down to from 4° to 5° R. (23° to 14° Fahr.). As bricks and sand were frozen, his workmen had great trouble in properly setting the bricks, the mortar freezing under their hands. It would have been too expensive to warm all the materials previously. He, therefore, had the lime slaked in small quantities, mixed the mortar hot, and had the brickwork liberally pointed. He fully expected to find the mortar perished in the spring; but he was greatly mistaken, for the work was as firm as if it had stood for several years. In 1880 he had to take the same building down, when the mortar was found so firm that the bricks broke, and could be cleaned only with difficulty. Herr Krause subsequently had outer pointing done at several degrees of frost, and always found that, if lime mortar had been subjected to frost for about ten days, it had set as firmly as mortar made in the summer in as many months. The architect in question says that, if it freezes, and the frost continues for some time, it is much firmer than when applied in the height of the summer. It is different when a sudden thaw sets in after a sharp frost. Herr Krause had executed, during an alteration, a wall 10 metres high and 3 metres wide, with three windows placed over each other, and joined to an old brick wall, when suddenly a thaw set in. The wall settled about 6 centimetres, and bulged out, so that he had great trouble in preventing it from collapsing. A sudden frost, however, made it firm again. After twenty years the wall is as good as ever, and there are no cracks. In that case, however, he had omitted to use unslaked lime, employing only hot water. The bricks had been stored in a heated room. Herr Krause has come to the conclusion that continued frost has the contrary effect upon mortar to what is generally supposed. Herr A. Klemm, architect, of Stuttgart, expresses the same opinion in a communication which he sends to the *Deutsche Bauzeitung*, in which he says that in the winter of 1848-9 the works required for altering and fitting up the Prussian House of Deputies had to be carried out during a most severe frost. Notwithstanding this fact, the brickwork, executed with freshly-slaked hydraulic lime, was found to be so firm in 1867, when alterations had to be made, that in some portions wedges had to be used in breaking it up. Herr Klemm adds that in his country (Württemberg) it is the general opinion that frost not only does not injure the brickwork, nor the plastering, but it improves its quality. The frost, however, should continue for some time. Herr Klemm expresses surprise that doubts could be entertained on the subject. A Berlin firm of builders, Herren Ende & Böckmann, writing on the same subject to the *Deutsche Bauzeitung*, state that, in the autumn of 1864, they had orders to erect a warehouse

near Unter den Linden during the winter. They were at first indisposed to undertake such work in that season; but circumstances demanded speed, and building operations were continued during the frost. They fully expected to find the brickwork faulty in places when the spring came, and had made up their minds that they would have to replace some of it. They were agreeably surprised to find the brickwork perfectly sound; in fact, it seemed to have set exceptionally well. Since that time, the above Berlin firm of builders have not hesitated to continue bricklayers' work as long as they could; that is to say, as long as the water did not freeze on the bricks or the mortar in the pans. It should be added that the lime mortar used at Berlin is said to be of exceptionally good quality.

#### ARCHITECTURAL SOCIETIES.

*Birmingham Architectural Association.*—The members of this association made a visit on Saturday afternoon last to the new Conservative Club, Temple-row, Birmingham. The building is erected in the Roman Renaissance style, and has every convenience and comfort of a modern club. Messrs. Osborn & Reading, the architects to the club, met the members and kindly conducted them over the new premises. Messrs. Barnsley & Sons, of Birmingham, are the builders.—The sixth ordinary meeting of the current session was held at Queen's College on Tuesday evening last. Mr. E. F. Tihley was nominated for membership. A paper was read by Mr. W. Henman on "Terra Cotta and Stone." A discussion ensued in which Messrs. H. Clerc, John Cotton, E. Wood, W. H. Bidlake, and Victor Scruton (Hon. Secretary), took part. A vote of thanks, proposed by Mr. H. Clerc and seconded by Mr. W. H. Kendrick, was unanimously accorded to Mr. Henman for the very able manner in which he had set forth the respective merits of the two materials. After a response from Mr. Henman the meeting terminated.

*Manchester Architectural Association.*—At the ordinary fortnightly meeting, held at the Diocesan Buildings, on the 25th ult., Mr. L. Booth in the chair, Mr. J. E. Phythian read a paper on "Mr. Ruskin's Writings on Architecture," in which he said criticism in England was pre-eminently associated with three names, John Ruskin, Matthew Arnold, and P. G. Hamerton. The last two writers were by many people considered safer guides than Mr. Ruskin; but, without entering into comparisons of that kind, it might be noticed that Mr. Ruskin's criticisms covered a much wider range of subjects than did those of the other two. He never seemed contented to consider any branch of art or life detached from the rest, but strove to bring all into what he considered their relation with each other. It was not to the erection of large public buildings we were to look for establishing a school of architecture, but through our domestic buildings, Gothic architecture had developed from the burgher's house, and without the domestic architecture of the Middle Ages the glories of the minster would have been impossible. Every profession was dependent on its clients, and a demand for noble architecture was much to be desired to-day. Mr. Phythian then referred to Mr. Ruskin's definition of architecture, which, he said, was generally considered too narrow. Mr. Ruskin drew a sharp line between building and architecture, and relegated to the former much that was usually included in the latter. It was no use disputing over definitions, but assuredly this was true, the greater the part that sculpture and painting played in architecture, the higher was the position it took as a fine art. Soundness of construction and beauty of proportion were essentials, but sculpture and painting were the crowning glory, and although they were not wedded in every building, yet no great school of architecture could exist if the architects were not masters in both arts. Mr. Phythian then discussed "The Seven Lamps of Architecture" and the "Stones of Venice," dealing at length with Mr. Ruskin's preference for Gothic, which preference, he said, arose from, amongst other things, the greater opportunities which that style gave for developing the higher intellectual power of the workman. Classical architecture was satisfied with a narrower perfection. Messrs. Colley, Hodgson, Mee, Hewitt, and the Chairman took part in the discussion which followed.

#### THE ACCIDENT AT ISLINGTON WORKHOUSE.

SIR,—I have read with some surprise a report in the *Times* of remarks made by the Coroner for Central Middlesex on the gallery which lately fell, with fatal results, at Islington Workhouse. That officer is reported to have said at the inquest,—“Such a case does not come under the Building Act. It was erected in a private room. Any one could have a gallery erected in his private house without having it inspected by a surveyor.”

Supposing this to be correctly reported,—and if it be incorrect, the report uncontradicted is equally likely to mislead,—it is worth while to point out that a workhouse is a public building, and that every part of it, including galleries, is to be constructed as the District Surveyor may approve, and, in the event of disagreement, as the Metropolitan Board may direct; and that the builder (in this instance a foreman) consequently was bound to give notice, and his employers are culpably negligent in not having given directions that notice should be given. As the gallery appears to have been movable and taken down and rebuilt within six months, it is to be hoped that the District Surveyor will see it to be his duty to proceed against the builder in question, not for the sake of pressing hard upon a poor fellow who has the consciousness of a grievous calamity upon him, but as a public warning that notice must be given in all such cases.

#### A DISTRICT SURVEYOR OF TEN YEARS' STANDING.

#### "SANITARY INSTITUTE OF GREAT BRITAIN EXAMINATIONS."

SIR,—I have read with interest the correspondence of the 8th, 22nd, and 29th ult. There is one matter touched upon by "W. H. Colbran," which I think it well to emphasise, and that is the amount of the fee payable upon entrance for examination. I certainly think that five guineas is excessive, and specially so, considering it is paid whether a candidate passes or not.

The fee charged by the Royal Institute of British Architects to candidates for the examination for the District Surveyorships in London, or the Building Surveyorships under Local Authorities, is two guineas. The Association of Municipal and Sanitary Engineers and Surveyors' examination fee is three guineas; and, judging from the papers set, these are far superior to those held by the Sanitary Institute.

Some time ago I addressed the secretary upon what, in my opinion,—and, I doubt not, in that of many others,—is an excessive fee, and the advisability of consideration by the Council of lowering the same. It would certainly interest many intending applicants to know whether anything is likely to be done in this direction. F. T. R.

#### A NEW SAFETY MINING CARTRIDGE.

SIR,—This invention, described in your issue of January 22nd, 1887, p. 142, appears to be based upon erroneous chemical data.

The inventor claims (see *Gluckauf*, No. 16, 1886) that in a cartridge 180 mm. long and 25 mm. diameter, whose cubical contents are 90 cm<sup>3</sup>, the production of hydrogen from 12 grammes of zinc will be 3.37 m<sup>3</sup> and the pressure 37,000 atmospheres.

According to formula  $Zn + H_2SO_4 = H_2 + ZnSO_4$ , 65.2 grammes of zinc will produce 2 grammes 22.32 litres of hydrogen. 12 grammes of dust will contain about 10 grammes of zinc, and the volume of hydrogen produced will be 3.425 litres. If this volume be compressed into a space of 90 cm<sup>3</sup>, the pressure will be 38, and not 37,000 atmospheres.

It is somewhat extraordinary that the description of this invention and the above-named inaccuracy has appeared in many English and foreign papers without correction. J. MALTON BROWN.

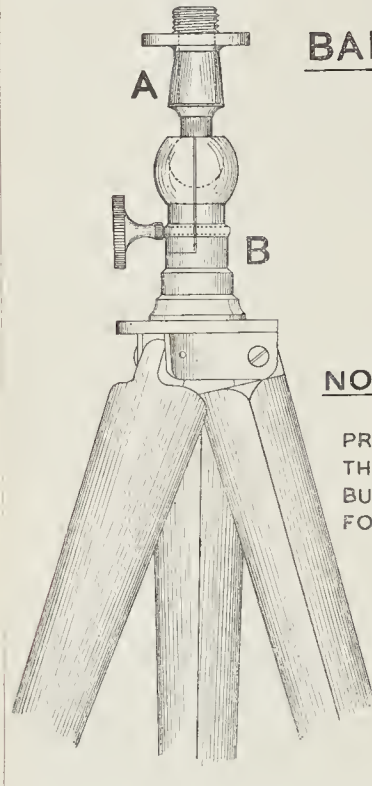
#### "MASONS' WAGES."\*

SIR,—As one of the delegates appointed by the Masons of London to investigate the system of working, and wages paid to the masons employed at the restoration of Buckingham Palace I send you the following facts for publication in your next issue.

It was reported to one of our London Lodges, that the masons working at the above job was receiving one penny per hour under the current rate and also that they were working 24 hours per day overtime, it was decided to send a deputation to Messrs. Pery & Co. the contractors to ask them if they would stop the overtime, so that more of the masons who were out of work might be employed, and also if they would discontinue paying at this reduced rate, as we did not consider it just to the

\* See letters, pages 132 and 165, ante.

FIGURE 1



## BALL AND SOCKET STAND

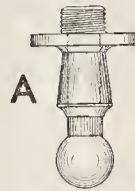
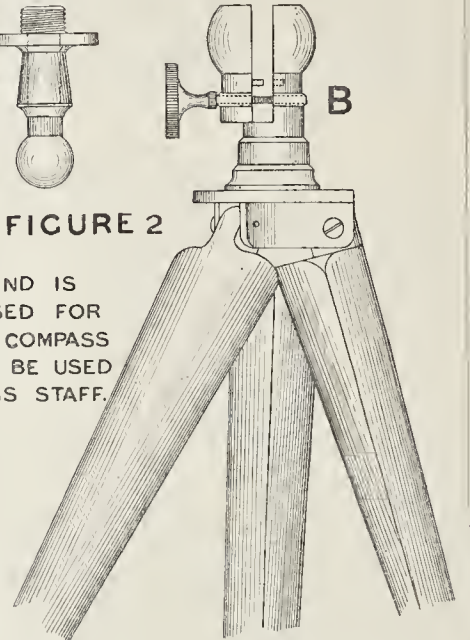


FIGURE 2

## NOTE

THIS STAND IS  
PRINCIPALLY USED FOR  
THE PRISMATIC COMPASS  
BUT CAN ALSO BE USED  
FOR THE CROSS STAFF.



employers who had done the Government work before they received the contract, and who had paid the full wages to the masons employed for the different Government jobs, we saw one of the Firm who told us that he was not aware that the masons were working overtime, but he would enquire into the matter and if he could he would put a stop to it, for he did not agree with men working overtime. We then went into the question of wages, and he told us that the men employed were on the staff, and were old and infirm men, who were more than the price they were paying them, this we know to be wrong, for the Foreman had given men (who were not Old and infirm) work, and had told them that they was not paying the full wages, he said if such was the case they had not set the men on at the yard and he seposed the Clerk of Works had done so, and he could not do anything in it, so we left him and then proceeded to the Palace to see the Clerk of Works, and after waiting an hour we saw him come in from Buckingham Palace Road, and ran after him but he would not deign to see us, although he did not know what we had come about he referred us to Messrs. Pery & Co we told him we had seen this Firm, but that they could not do anything in the case and that we had come to consult him, but he said he would not have anything to say to us and kept walking away, so the London Lodges Committee decided to send a deputation to the first Commissioner of works, we was unable to see that Gentleman, but was received by Mr. Primrose, his Secretary, and Mr. Taylor, Surveyor, who received us with every respect, and, after explaining our mission they promised that the affair should be investigated and if the overtime could be stoped it should be done, and I received a letter the next day from Mr. Primrose, to say that overtime would be discontinued on that job we then went into the Question of wages, but they were unable to do anything in that, for they said that although the contractors was paid a price for the work that would enable them to pay men the proper wages, never the less if the Contractors got the work done to the Satisfaction of the Surveyor and only paid the men 2d. per hour they could not interfere but of course it would be more profit for the contractor, and they also told us that in some cases were extra skilled labour was required, they (the Government) paid extra wages for the work

done to the contractors, but weather they paid the man or men anything extra, they could not say; and if they did not, this again would be extra profit. With regard to the Clerk of Works putting on men, Mr. Taylor said that he had nothing to do with that, nor yet with what wages they should receive, but he said that he would find out weather the Clerk of Works had put men on or not. We thought it would be advisable to see Messrs. Pery & Co, again, which we did the following day. At first we was refused an interview, but after sending in word to the effect that we had been to whitehall, we was admitted, and after telling him what Mr. Primrose and Mr. Taylor had said about his having a price for his work that would enable him to pay proper wages he said that was his business but with regard to the men working on this job he had nothing to add to what he had already said, but when he employed masons at any of his other jobs he always paid the full amount.

One of the delegates reported to the particular Lodge, that first found out what was going on at Buckingham Palace, and the members thought they was quite rs able to judge who was old and infirm men, as Messrs Pery & Co was and therefore acted in what they thought was just to the employers who had done the work for the Government before Messrs Pery & Co got the Contract and also to the Members of Our Noble Society, who when they got Old and infirm like A. B. C. they have a fund that pays them so much a week and so prevents them from having that dread of what the employers will do to them.

Secy London Lodges Committee

O. S. M.

\* \* \* We give the above, spelling and all, as the "Noble Society's" statement on their side of the dispute, leaving our readers to form their own judgment as to the social and economic aspect of the affair.

"How to Ensure Healthy Homes"—This was the subject of an able lecture recently delivered by Professor Henry Robinson, C.E., at Swanage, a place which, judging from an official report recently mentioned in our columns, would seem to be in some need of the instruction which Professor Robinson is so well able to give.

## The Student's Column.

FIELD WORK AND INSTRUMENTS.—VI.  
*Surveying Instruments.*

VI.—THE PRISMATIC COMPASS (continued).

THE reading upon the card described in our last article gives the magnetic azimuth of the object observed. The term "azimuth" is used to express the horizontal angle by which the direction of a vertical plane passing through a station point and a given object, deviates to the right of another vertical plane, which passes through the given station and the north pole. When magnetic azimuth is specified, the angular deviation is reckoned from the magnetic meridian instead of the true meridian. The plane in which the needle remains at rest is called the magnetic meridian. As the magnetic poles which attract the magnet do not correspond with the poles of the earth, it is plain that the needle cannot point due north and south except in those countries where the true and magnetic meridians coincide. The deviation between these two directions is different in different places, and continually varying in the same place. The circle which divides the eastern and western hemispheres is called the astronomical meridian, because, when the sun appears to the south part of it, it is then meridian, or mid-day. At midday the sun has attained its greatest altitude for that day, and as the sun is never at this altitude at two places east or west of one another at the same time, each of these places has its own meridian, and these pass through different degrees of the Equator.

The circle or horizon is divided into thirty-two parts, each subtending an angle at the centre of  $11\frac{1}{4}$  degrees. The four cardinal points are termed north, south, east, and west. The intermediate points will be best remembered by attending to those in one quadrant, say, from north to east, and afterwards repeating the whole. They are as follows,—N, N by

E. N. N. E., N. E. by N., N. E., N. E. by E., E. N. E., E. by N. E. From a map published at the Admiralty, under the superintendence of Capt. F. J. Evans, F.R.S., in the year 1880, it appears that in the eastern hemisphere there is little or no variation on a line drawn through St. Petersburg, passing west of Moscow and east of the Black Sea, thence proceeding by the south-west coast of India through the territory of Western Australia. To the east of this neutral line the variation increases eastwards, being in the year 1880 about 3° E. at Calcutta, 8° E. at Melbourne, 13° E. at Tobolsk, in the north of Asia, but afterwards decreases further east to zero between Canton and Amoy, upon the south-east coast of China, the curve of no variation running between Formosa and the Philippine Islands, passing through the North Pacific Ocean, the east coast of Asia, and the north-east of Siberia. To the west of the neutral line in the eastern hemisphere the variation increases westwards, being 15° W. between the islands of Majorca and Minorca, 19° W. at Cape St. Vincent, and 20° W. at Sierra Leone. In Iceland the amounts vary from 34° W. upon the south-east coast, to 42° W. upon the north-west coast. In Cape Town the variation is about 30° W.

At the present time upon the east coast of Ireland, and in the North Channel, the variation of the needle will amount to about 22° W. Upon the west coast of Wales, the east coast of the Isle of Man, and the centre of Scotland, 21° W. On a line drawn through Lancashire, Glamorganshire, Devonshire, and Cornwall, 20° W. On a line drawn through the East Riding of Yorkshire, Nottingham, Gloucester, and Dorsetshire, 19° W. On a line through Norfolk, Suffolk, Surrey, and Sussex, 18° W., being 17° 50' at London.

In the western hemisphere in the year 1880, there was little or no variation upon a line drawn through the west coast of Hudson's Bay, the east coast of Lake Superior in North America, the west coast of Lake Erie, between Canada and the United States, thence passing through Washington and Charleston, Puerto Rico among the West Indian islands, and between Barbadoes and Trinidad, to the north-east coast of South America, crossing that continent to the South Atlantic Ocean at San Paulo. To the west of this neutral line the magnetic curves increase eastward in variation being 10° E. at the Fiji Islands, decreasing thence towards zero at a point in the mid-Pacific Ocean. It increases also to 23° E. to Vancouver's Island, decreasing to a line of no variation along the China coast. To the east of this line in the western hemisphere the magnetic curves increase westward in variation, being 13° W. at Montreal and at Pernambuco. Jamaica, at the present time, is about 3° E.

These angles of deviation from the true or astronomical meridian are continually varying. At Greenwich, in the year 1576, the magnetic variation was 11° 15' E.; and between 1657-62 there was no variation. In 1820 it was about 24° 11' W. The needle is also subject to diurnal fluctuations, the north end being drawn most to the west at about 2 p.m., and most to the east during the night or early morning. The amounts, however, are inconsiderable, except when magnetic storms occur, which produce great disturbances.

In fig. 5 of the illustration given in our article last week, two positions of the needle are indicated, one direction reading 34° and the other 337°. The difference between these two azimuths would express the angle taken in the direction of the hands of a watch, which the objects viewed, would subtend at the point of vision. An azimuth exceeding 180° denotes that the direction of the object to which it is measured lies to the left of the direction from which azimuths are usually measured. For practical purposes a surveyor may express these two directions as being in one case 34° E., and in the other case 23° W., of the magnetic meridian, the excess of 360°, above the angle read, being taken when that angle is greater than 180°.

The prismatic compass is generally made as shown in figure 4 of our illustration last week, to be held in the hand for sake of portability, but it can also be made of larger diameter with an uncovered glass top, as shown in fig. 3 of the annexed illustration, and constructed to fit on to a hall and socket stand, the details of which will be clear upon reference to figs. 1 and 2. Fig. 2 shows the parts which are fixed together in fig. 1. When the prismatic compass is thus

set up, horizontal angles can be measured from the magnetic meridian upon level ground with sufficient accuracy for filling in the minor portions of a survey. It should be borne in

Sometimes a mirror, marked K in fig. 3, is supplied with a prismatic compass, and is intended for the purpose of reflecting objects above or below the level of the observer. The mirror can be placed with its face upwards or downwards, and can be removed at pleasure. It is made to slide up and down with sufficient friction to remain at any part of the back of the vane C that may be required.

VII.—THE COMPASS CLINOMETER.

Figs. 4 to 6 illustrate a combined prismatic compass and clinometer, the former to record horizontal angles, the latter to record vertical angles. Fig. 4 shows a plan of the additional arrangements which are fitted on to the underside of the prismatic compass for this purpose, so that when the prismatic compass shown in fig. 3 is turned over, its side elevation will be as indicated in fig. 5. The sight-vane C being turned down upon the box in the direction indicated by the arrow upon the dotted line in fig. 5, the compass card is thrown off its bearing. A short sight-vane marked E, equal in height to the depth of the box, is raised at right angles as shown. When not in use as a clinometer the sight-vane E folds back outside the box, and when thus folded back upon the edge of the box, it clamps the clinometer card D in the same way as the folding down of the sight-vane C clamps the compass card A. The same prism, marked B, is available for reading both the compass card and the clinometer card, the prism being made to turn upon a pivot, half way round in one direction, and is provided with a stop in the other direction to enable the surveyor to place it at right angles to the box in the positions shown by full and dotted lines in figure 5. When taking vertical angles the instrument is held between the thumb and the first and third fingers in the position shown in fig. 6, the second finger being placed upon a button marked F, which presses a spring, by which the swing of the clinometer card is regulated. This card, D, is provided with an attached lead weight marked H in fig. 7, and is graduated as shown from zero upon a horizontal line to 90° at the top and bottom of the card. The figures upon the card are reversed so as to be read by the prism in the same manner as the figures upon the compass card. Either hand is selected according to the light. In fig. 6 the face of the clinometer is to the right. It is recommended that in taking vertical angles the line of sight should be directed at first upon some object in the same vertical plane, either above or below that which it is desired to observe, and the card brought to rest by the employment of the regulating button, F. When perfectly steady gently raise or lower the sight-vane E, until the central hair or wire cuts the line of sight ranging between the eye and the point observed. In order to change the instrument into a prismatic compass it is only necessary to fold down the sight-vane E, to turn the prism B to the reverse side of the box, and to raise the sight-vane C. This combination of compass clinometer has been patented by Lieut.-Colonel O'Grady Haley.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

1,126, Cements. C. D. Alison.

The cement which is the subject of this patent is claimed to be waterproof and fireproof, and is particularly applicable for internal decorations and as a lining for kilns and such-like purposes. The principal ingredient is a non-diatomaceous silicious earth, found in a natural condition in the West of England, and which the inventor calls siesine.

2,419, Fixing Door Handles. J. Hicken.

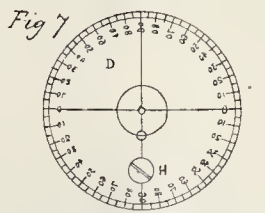
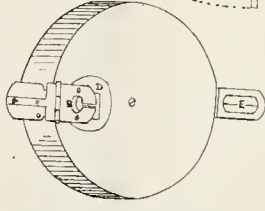
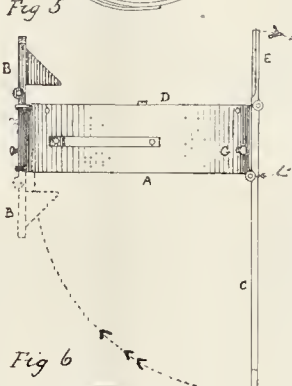
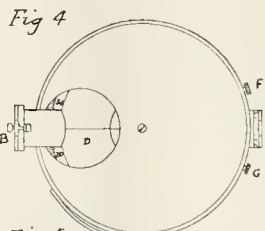
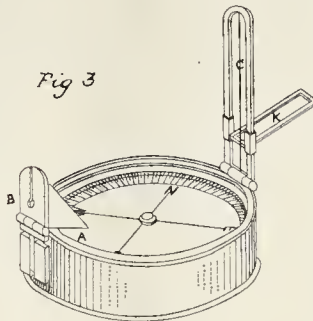
According to this invention the square spindle is screw-threaded in the ordinary way. One handle is permanently fixed to the spindle, and the other is fitted with two small projecting buttons or studs. When a disc with slots is forced against these projections they engage the spindle and handle, being afterwards further secured by a screw on the outer edge.

2,727, Fire Stoves, Ashpans, &c. A. W. Woodhead.

This invention consists in simply rolling or bending the mouldings used in place of casting them. For corners and bends a special method of bending and rounding is devised by means of a block curved to the radius required with the pinch or head cut thereon. A roller with a similar configuration is then used with it.

4,103, Setting Saws. R. Elliott.

The appliance which is the subject of this invention acts by setting the teeth of a saw at different



mind that the presence of iron, whether in the shape of heavy keys or of an iron chain lying along the ground or the vicinity of an iron bridge, may exercise an influence over the observed bearings to a very important extent.

angles to the blade by striking them with a peculiar tool, which is divided at its lower end into a number of parts corresponding in length to the pitch of the teeth, and out away alternately to right and left angles. Or a metallic disc cut away in a similar manner is used.

12,857, Securing Screws, or Nails, to Brackets, &c. H. Munslow.

This invention consists in utilising an ordinary wooden screw or an ordinary nail in manufacturing brackets, cup-hooks, hat and coat hooks, and such like articles, especially where one screw or nail will support the article. The nail or screw is either fastened to the article by a die which spreads the head a little, or by a washer and riveting.

11,983, Locks and Latches. F. T. Davies.

The bolt or catch of these locks and latches is of a peculiar pear-shaped form, and the mechanism is ingeniously adapted for throwing back this latch by a movement of the door-knobs, while the key locks the action with but very few parts, and in a very simple manner.

11,555, Attachment to Shafts, Tools, and Picks. T. Brown.

The insertion of a double wedge in the handle or shaft of the tool, and the affixing of a peculiarly-formed shield over the top of the said shaft, are the chief features of this invention.

NEW APPLICATIONS FOR PATENTS.

- Jan. 21.—943, J. Stewart, Flushing Valve for Water-closets.—462, W. Thompson, Door Locks.
Jan. 22.—1,010, Hurdle and Miles, Ventilators for Walls, Ceilings, Roofs, &c.—1,024, A. Illidge, Indicator and other Fastenings for Doors.—1,032, W. Griffith, Clip or Holder for Roofing, &c.—1,039, C. Schlickey, sen., Moulding Bricks, Tiles, &c.
Jan. 24.—1,083, B. Bryer, Fire-grates.—1,111, J. Colbran, Fire-places.
Jan. 25.—1,143, A. Butt, Window-sash Fasteners.—1,151, C. Pleisticker, Plato Glass.—1,178, W. Sinclair, Spiral Staircases.—1,188, E. Ellington, Hydraulic Lifts.—1,191, Walker & Mills, Securing Wood Flooring-blocks.—1,193, W. Eckstein, Ventilators.

Jan. 23.—1,219, W. Lunt, Door or Finger Plates.—1,224, Roberts and Osborne, Valveless Syphon Flushing Cisterns.

Jan. 27.—1,272, E. Cietart, Door Locks.—1,294, T. Brown, Raising, Lowering, and Balancing Sashes.—1,327, C. Williams, Covering Ironwork with Fireproof Encasements.

PROVISIONAL SPECIFICATIONS ACCEPTED.

- 15,825, H. Hill, Barrel and other Bolts.—15,875, J. Coppard, Preventing the Rattling or Jarring of Windows or Doors.—15,293, J. Irvingell, Securing and Ornamenting Parquetry.—16,697, W. Buchanan, Feed Mechanism for Vertical Saw Frames.—176, Wilson & Johnson, Ventilating Apartments.—178, Murgatroyd & Turner, Device for Paint Brushes, &c.—366, T. Sterne, Ventilating Rooms or Buildings.—437, J. Thompson, Ventilators and Chimney Cowls.—15,793, M. Crofton, Attaching Sash-lines to Window Frames.—15,925, S. Rogers, Preventing the Rattling of Window Sashes.—16,213, W. Murray, Window Sashes and Frames.—16,390, L. Oppenheimer, Wood Block Flooring.—16,514, Wendenby & Dodd, Chisels, Screw-drivers, &c.—16,520, T. Lowcock, Door Springs.—16,570, Abercrombie & Hall, Door Knobs.—17,139, Abraham A. Laver, Automatically Opening and Closing Doors.—78, J. Gray, Automatic Door Holder.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

- 3,123, H. Rothery, Locks and Latches for Doors, &c.—3,481, H. Owens, Locks and Latches to suit either Right or Left Hand Doors.—3,941, W. Macvicie, Attaching Door Knobs and Handles to Spindles.—4,101, S. Bamford, Chimney Tops.—14,984, S. Robson, Ventilating Rooms.—16,522, C. Grelmann, Apparatus for Drawing or Painting upon Walls, Ceilings, &c.—16,920, I. Bright, Water Meters.—3,645, O. Lindner, Decoration of Wood, &c.—4,243, J. Brierley, Ornamenting Wooden Floors, &c.—4,331, G. Couch, Roofing and Flushing Tiles.—4,493, J. Sharp, Chimney Cowl and Ventilator.—16,024, St. Aubury & Spencebury, Chimney Tops and Ventilators.—17,916, O. Flagstad, Window Construction.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JANUARY 13.

By BECKLUND & SONS.

West Drayton, Horton-lane.—An enclosure of freehold land, 8a. 2r. 2p. 42,250

JANUARY 21.

By DENBHAM, TAYSON, & CO.

Kensal Green—37 to 67 odd, St. Margaret-road, freehold 2,871
54 to 68, even, Earlsmead-road, freehold land 1,477
Felixstowe-road—Fourteen plots of freehold land 1,697
Earlsmead-road—Twenty-one plots of freehold land 92
Hiley-road—Seven plots of freehold land 322
Hazel-road—Two plots of freehold land 102

JANUARY 25.

By DENBHAM, TAYSON, & CO.

Britten—81, Holland-road, 36 years, ground rent 6l. 6s. 450

By BROAD & WILSHIRE.

Holloway—8 to 14, even, Seven Sisters-road, 74 years, ground-rent 120l. 4,600

Table with columns for location, description, and price. Includes Kensington, Russell-road—Ground-rents of 220l., reversion in 74 years... 48,385

JANUARY 26.

By C. C. TAYLOR & SON.

Poplar—8 to 14 even, Willis-street, and 1, 2, and 3, Greenfield-street, freehold 850

Heggeston—13, 14, and 15, Edith-street, freehold 1,050

By H. HAINES & SON.

Piccadilly—The freehold premises known as "Hatchett's Hotel," and "White Horse Cellars," with the goodwill 65,000

Stafford—The lease of the "North-Western Hotel" 4,000

By DALE & SON.

Mill End—63, Duckett-street, freehold 290

By NEWBORN & HARBING.

Horton—44, New-street, 44 years, ground-rent 4l. 4s. 330

14, Cluger-street, 23 years, ground-rent 3l. 4s. 185

New North-road—32 and 34, St. Faith-street, 40 years, ground-rent 2l. 10s. 720

Canonbury—66, Marquis-road, 59 years, ground-rent 8l. 420

Islington—24, 30, Highway New-street, 69 years, ground-rent 13l. 10s. 1,000

Dalston—228 and 230, Queen's-road, 28 years, ground-rent 12l. 18s. 530

Holloway—39, Junction-road, freehold 870

By E. SIMSON.

Brixton—326, Cold Harbour-lane, 65 years, ground-rent 8l. 620

Barnet—26 and 27, Hatfield-street, 69 years, ground-rent 8l. 440

Lambeth—107, Lambeth Palace-road, 22 years, ground-rent 8l. 400

Blackfriars—22 to 26, Salisbury-street, 22 years, no ground-rent 255

JANUARY 28.

By GREEN & SON.

Shoreditch—103, High-street, 74 years, ground-rent 65l. 1,390

By MESSRS. ELEGON.

St. Marylebone—35, Welbeck-street, 13 years, ground-rent 30l. 890

Holloway—94 and 96, Elthorne-road, freehold 560

By W. B. HALLETT.

Wapping—113, High-street, freehold 720

City—118, Fore-street, the lease of, term 99 years 245

Hackney—5, Annis-court, 78 years, ground-rent 4l. 4s. 225

Sandhurst, Victoria rd.—Seven plots of freehold land 39

MEETINGS.

THURSDAY, FEBRUARY 5.

Association of Public Sanitary Inspectors.—Fourth annual dinner, Guildhall Tavern. 6 p.m.

MONDAY, FEBRUARY 7.

Royal Academy of Arts (Lectures in Architecture).—Professor J. H. Middleton on "Methods of Decoration as applied to Greek Architecture." 8 p.m.

Society of Engineers.—The President, Professor Henry Robinson, will deliver his inaugural address. 7.30 p.m.

Society of Arts (Cantor Lectures).—Dr. J. H. W. Thudichum on "The Diseases of Plants, with special regard to Agriculture and Forestry." 11l. 8 p.m.

Surveyors' Institution.—Mr. T. A. Dickson on "Artificial Manures." 8 p.m.

Clerks of Works' Association.—Mr. R. Wheeler on "Stonefield Slating." 8 p.m.

Liverpool Architectural Society.—Mr. G. H. Morton on "Colour." 7 p.m.

Leeds and Yorkshire Architectural Society.—Mr. E. H. Jacob, M.D., on "Architectural Treatment of the Organ." 8 p.m.

TUESDAY, FEBRUARY 8.

Institution of Civil Engineers.—Further discussion on Mr. W. J. Dibb's and Mr. W. Santo Cimp's papers on "Sewage Sludge and its Disposal." 8 p.m.

Manchester Architectural Association.—Paper by Mr. Stelfox. 7.30 p.m.

WEDNESDAY, FEBRUARY 9.

York Architectural Association.—Mr. T. Stockton Worthington on "Decoration." 7.45 p.m.

THURSDAY, FEBRUARY 10.

London Institution.—Professor Silvanus Thompson on "Electric Bells." 7.6 p.m.

Society of Telegraph-Engineers and Electricians.—8 p.m.

FRIDAY, FEBRUARY 11.

Royal Academy of Arts (Lectures in Architecture).—Professor J. H. Middleton on "Methods of Decoration as applied to Roman Architecture." 8 p.m.

Society of Arts (Indian Section).—Dr. Watt, C.I.E., on "The Economical Condition of India." 8 p.m.

Draft Historical and Antiquarian Society.—Mr. J. Lester, M.A., on "Gleanings from Old Halifax Life." 7.30 p.m.

SATURDAY, FEBRUARY 12.

Architectural Association.—Visit to Church at Wimbledon. 3 p.m. (Postponed from Feb. 5. See advertisement.)

Surveyors' and Auctioneers' Clerks' President Association.—Annual Meeting, Auction Mart. 3 p.m.

Edinburgh Architectural Association.—Visit to Magdalen Chapel and High-street clozse.

"A Reversible Rim Lock."—Referring to our notice a fortnight ago (Builder, January 22, p. 162) of the new reversible rim lock introduced by Mr. James Hill, we would correct a slip of the pen which occurred in the last line but one of the second paragraph, where, for "inwards," the word "outwards" should be substituted.

Miscellaneous.

Handicraft Instruction.—A valuable series of lectures in handicrafts is being delivered weekly to School Board masters, at the Guilds Institute, in the theory and practice of carpentry and joinery, so as to enable them to teach these crafts to their pupils. The lessons are alternatively devoted to theory and practice. Professor Unwin was invited to lecture to the Board School masters on the scientific knowledge connected with carpentry; and, in doing so, presented to his hearers a model of didactic style more important to them than even the subject treated. The lesson which was given last Saturday was purely practical. In front of the professor's desk in the large lecture-hall of the Guilds Institute was placed a carpenter's bench; and, instead of a learned professor, an intelligent, practical carpenter, Mr. Robertson, instructed the class. At first sight, there does not seem to be much to be said about the use of a saw and a plane; and most people would think themselves capable of using both without any teaching. Yet, there is a right and a wrong way of handling tools; there is also, what is even more important, a methodical system of working which leads safely to a satisfactory result, whereas a haphazard system, or, rather, the absence of a system, is the fruitful cause of bad work. After the lecture, the members of the class went down to the workshop to practice what had been explained to them.

Sanitary Registration of Buildings Bill. A special meeting of the Council of the Sanitary Assurance Association was held on Monday last for the final revision of the above Bill before presentation to the House of Commons, Sir Joseph Fayer, K.C.S.I., F.R.S., in the chair. The new measure was adopted by the Council, and in the absence from England, of Dr. Ferquharson, M.P., it was decided to ask Mr. C. C. Leachin, M.P., to take charge of the Bill in the House of Commons. The Bill, as introduced in 1886, consisted of ten sections, and it will be remembered, made the sanitary registration of all buildings compulsory in towns of 50,000 inhabitants and upwards. The new Bill consists of seventeen sections, and is to apply to all towns or districts of 2,000 inhabitants, but it is only to be compulsory in the case of schools, colleges, hospitals, asylums, hotels, and lodging-houses. An important feature of the new Bill is that the local authorities will have to keep a sanitary register in which any building certified in accordance with the proposed Act may be registered, so that a stranger visiting any district would be able to ascertain at the office of the Local Authority whether any particular house was or was not certified as in a satisfactory sanitary condition. By the provisions of the new Bill, all persons entitled to certify must first obtain a licence from the Local Government Board, and examining Boards are to be appointed. Persons entitled to sign certificates are to be designated "Licentiates in Sanitary Practice."

Birmingham Students of the Institution of Civil Engineers.—The Association of Birmingham Students of the Institution of Civil Engineers held their first Meeting at the Colonnade Hotel, Birmingham, on the 27th ult., to hear a paper read by Mr. R. Peirce, Stud. Inst. C.E., upon the "Kidderminster Sewerage and Water Supply." Mr. E. Pritchard, M. Inst. C.E., the President, was in the chair. Mr. R. Peirce, in his paper, gave a very interesting description of the past and present sanitary condition of the town of Kidderminster, upon which had been expended in 1874 over 100,000l. in the construction of sewerage and water-works.

London and County Banking Company (Limited).—The report and balance-sheet of this company, for the half-year ending Dec. 31st, which are published in extenso on our last page of advertisements this week, show that, after paying interest to customers and all charges, making provision for bad and doubtful debts, and allowing 37,000l. odd for rebate on bills not due, the net profits amount to 215,870l. 19s. 10d. The directors, at the meeting held on the 3rd inst., recommended a dividend of ten per cent. for the half-year, making twenty per cent. for the year 1886. This was adopted.

The Court of Common Council on Thursday decided to place in the Guildhall a bust of the late Earl of Ellesleigh.

Nineteenth Century Art Society.—Saturday, the 12th inst., has been appointed for the Private View of the Spring Exhibition of this Society, at the Conduit-street Galleries, and the Exhibition will open to the public on Monday, the 14th instant.

PRICES CURRENT OF MATERIALS.

Table listing prices for various materials including Greenheart, Teak, Sequoia, Ash, Canada, Birch, Elm, Fir, Dantiac, Oak, Pine, Lath, Dantiac, St. Petersburg, Wainsoot, Deals, Riga, St. Petersburg, Sweden, White Pine, Canada, Spruce, Fir, Redwood, Flooring, Second, Cedar, Honduras, Australian, Mahogany, and St. Domingo.

Table listing prices for timber and metals including Mahogany, Honduras, Maple, Rose, Box, Sain, Porto Rico, Walnut, Iron, Brass, Lead, Yellow Metal, and Silesian.

Table listing prices for various oils and turpentine including Limesed, Cocoonut, Palm, Rapeseed, Turpentine, and Stockholm.

HADLEY WOOD.—For houses on the Beech Hill Park Estate, Mr. Edwin T. Hall, architect, Moorgate-street.—Foster & Dicksee, Rugby\* ..... £14,682 0 0 \* Accepted.

HOLLOWAY.—For alterations and enlargement of warehouses, Holloway, for Messrs. Mummery & Co. Mr. F. Borcham, architect, Finsbury-pavement.—Bradford, Richards ..... £1,172 0 0 Oldis Bros. .... 1,070 0 0 Roberts ..... 1,045 0 0 Grover & Sons ..... 372 0 0 Ward & Lambie ..... 893 0 0 J. Anley ..... 870 0 0

ISLINGTON.—For erecting partitions in all departments at Hasover-street Board Schools, for the School Board for London. Mr. T. J. Bunley, architect.—E. Green ..... £218 0 0 W. Oldrey & Co. .... 372 0 0 N. Richards ..... 353 10 0 C. Deering & Son ..... 313 0 0 A. W. Derby ..... 297 0 0 G. S. Pritchard & Son ..... 293 15 0 Cowley & Drake ..... 254 10 0

KEMPSTON (Reds).—For additions to vicarage, for the Rev. A. Whitmarsh, Mr. John Dmy, architect and surveyor. Quantities supplied.—J. Smith, Bedford ..... £360 0 0 F. G. Chery, Bedford ..... 780 0 0 G. Haynes, Bedford ..... 725 0 0 Thos. Spencer, Bedford ..... 749 0 0 W. Warton, Bedford ..... 729 0 0 J. P. White, Bedford ..... 709 0 0 S. Foster, Kempston ..... 679 0 0

KENSINGTON.—For alterations and additions to the Laundry, &c., of Kensington Workhouse, for the Guardians of St. Mary Abbots, Kensington. Mr. H. H. Bridgman, architect, Poultry. Quantities supplied by Mr. F. Thomson.—Wall Bros. .... £749 0 0 S. R. Lambie ..... 724 0 0 Cooper & Leakey ..... 720 0 0 North Bros. .... 698 0 0 J. W. Dixon ..... 688 0 0 Campkin & Son ..... 653 0 0 Richardson Bros. .... 634 0 0 W. Oldrey & Co. .... 630 0 0 J. M. Goodwin ..... 611 10 0 F. R. Tozer ..... 606 10 0 Harper Twelvetyrees ..... 600 0 0 C. Simmons ..... 594 0 0 G. Stephenson ..... 592 0 0 H. L. Holloway ..... 577 0 0 Neave & Neave ..... 555 0 0 Newton & Idle ..... 553 0 0 E. R. Turtle ..... 543 0 0 Webb & Rosser ..... 537 0 0 E. Wildman ..... 505 0 0 H. Haynes (accepted) ..... 475 0 0

KENSINGTON.—For sundry alterations and additions to the Doctor's House, Kensington Workhouse, for the Guardians of St. Mary Abbots, Kensington. Mr. H. H. Bridgman, architect, Poultry. Quantities supplied by Mr. F. Thomson.—H. Haynes (accepted) ..... £115 0 0

KENTISH TOWN.—For bar fittings at the Black Cap Public-house, Kentish Town. Messrs. Furniss & Thorpe, architects.—J. Anley ..... £256 0 0

LONDON.—For additions, alterations, and decorations at 32, York-terrace, Regent's Park, for Mr. F. Davis. Mr. H. H. Collins, architect, Old Broad-street.—J. Morris ..... £1,268 0 0 Shoobred ..... 1,264 10 0 Woodman ..... 1,249 0 0 Vernon & Griffiths ..... 1,240 0 0 Clark & Manchoff ..... 1,190 0 0 Rosenberg ..... 1,123 0 0 Ashby Bros. .... 1,044 0 0

LONDON.—For rebuilding Nos. 123 and 124, Tottenham-court-road. Mr. George Edwards, architect. Quantities by Mr. H. Lovegrove.—Stevens ..... £2,640 0 0 Martin, Wells, & Co. .... 2,536 0 0 Vears & Co. .... 2,517 0 0 Charles Wall ..... 2,478 0 0 W. Shepherd ..... 2,474 0 0 Scharier ..... 2,449 0 0 G. & J. Green ..... 2,218 0 0 O. Craske ..... 2,187 0 0 Simpson & Co. .... 2,180 0 0 Brass & Son ..... 2,133 0 0 Scrivener & Co. .... 2,087 0 0 Ward & Lambie (accepted) ..... 2,065 0 0

LONDON.—For alterations and repairs to No. 15, South-street, Finsbury, E.C., for Messrs. J. Arnefield & Son. Mr. T. H. Smith, architect, Basinghall-street.—General Instructing Cement Works, Front, &c. A. W. Hammond ..... £985 0 0 W. Greagar ..... 947 0 0 W. Rosset ..... 792 0 0 H. S. Foster ..... 693 0 0 Holliday & Greenwood ..... 720 0 0 J. Woodward ..... 768 0 0 Alhm & Sons ..... 650 0 0 J. W. Faulkner (accepted) 617 0 0 755 0 0

LONDON.—For alterations to the Earl of Aberdeen, Roman-road, Old Ford.—Gould & Brand (accepted) ..... £169 0 0

LONDON.—For bar fittings at the Three Tans Public-house, Hatton-garden. Mr. Ansell, architect.—J. Anley ..... £164 0 0

MONMOUTH.—For the erection of a public hall, for Mr. John Allan Kolls. Mr. F. A. Powell, architect.—David Roberts (accepted) ..... £1,014 12 0 [No competition.]

MONMOUTH.—For alterations at No. 13, Monnow-street, for Mr. John James. Mr. F. A. Powell, architect.—W. Simmons (accepted) ..... £125 0 0

COMPETITIONS AND CONTRACTS.

Epitomes of Advertisements in this Number.

COMPETITIONS.

Table with columns: Nature of Work, By whom required, Premium, Designate to be delivered, Page. Includes Re-Seating Chapel and New Schools, Imperial Institute of the United Kingdom, &c.

CONTRACTS.

Table with columns: Nature of Work, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes Granite Curb, Lamp Columns, Works and Materials, Sewerage Works, Watering and Cleansing Roads, Burning Ballast, Road Materials, Road Making, Carrying-ways, Reconstruction of Drainage, Hospital Building, Paving and Making-up Road, Schools, Alterations to Langley Lodge, Alterations to York Gate House, Finishing 8 Houses, &c.

TENDERS.

ACTON.—For the erection of six houses in Shad-road, East Acton, for Mr. George Wright. Mr. Edward Monson, architect, Acton.—G. Lyford, 266, Uxbridge-road\* ..... £7,200 0 0 \* Accepted.

CLAYGATE (Surrey).—For erecting residence for Mr. Alfred Pearce Jones. Mr. Owen Lewis, architect, 79, Mornington-road, Regent's Park.—Williamson ..... £3,683 17 0 J. Grove & Co. .... 3,435 0 0 Henley & Co., Norwood ..... 3,238 0 0 Roberts, Norwood ..... 3,150 0 0 Marriott Brothers, Barnet ..... 3,000 0 0 Okenden, Anerley ..... 2,873 0 0 Masters, Roberts, & Rice, London ..... 2,788 0 0 W. & J. Crocker, London ..... 2,730 0 0 Langley & Co., Crowley ..... 2,730 0 0 Snell & Co., London ..... 2,645 0 0 Tinson, London ..... 2,615 0 0 Simms & Son, London ..... 2,585 0 0 Patters, Horsham ..... 2,500 0 0 Bull & Son, Southampton ..... 2,490 0 0 Woodgar & Son, Horsham ..... 2,453 0 0 Gossin, London ..... 2,453 0 0 Riley, London ..... 2,180 0 0 King, Rudgwick ..... 2,158 0 0

CLERKENWELL.—For erecting a warehouse, and repairs, at No. 12, Red Lion-street, Clerkenwell, for Mr. Lewis. Messrs. New & Son, architects.—Colwill ..... £1,284 0 0 Tenant ..... 984 0 0 H. Pickergill & Co. .... 924 0 0 Banford ..... 875 0 0 Killingback ..... 865 0 0 Longmire & Purge ..... 855 0 0 Mark ..... 848 0 0 Munsey & Son (accepted) ..... 845 0 0

NOTTING HILL.—For repairs to 132, High-street. Mr. Edwin T. Hall, architect, Moorgate-street:— Head & Son (accepted)..... £193 0 0

PAIGTON.—For the erection of two business premises at the Palace Estate. Mr. G. Soudon Bridgman, architect, Torquay:— King & Son..... £1,300 0 0 M. Bridgman..... 1,420 0 0 J. Labbey..... 1,100 0 0 Drew Bros..... 1,080 0 0 Henry Webber..... 1,060 0 0 Henry Rabich (accepted)..... 1,000 0 0 [All of Paigton.]

ST. MARY CHURCH (Devon).—For a residence and surgery for Dr. W. S. Steele. Mr. G. Soudon Bridgman, architect, Torquay:— E. P. Bovey, Torquay..... £1,770 15 0 F. Matthews, Babacombe..... 1,720 0 0 A. Harris, St. Mary Church..... 1,073 0 0 \* Accepted.

SANDY.—For proposed new business premises. Mr H. Young, architect, Bedford:— Potter, Bedford..... £1,800 0 0 Foster, Bedford..... 1,355 0 0 White, Bedford..... 1,300 0 0 Smith, Bedford..... 1,250 0 0 Harrison, Bedford..... 1,250 0 0 Haynes, Sandy..... 1,270 0 0 Woodman & Barle, Potton..... 1,160 0 0 Bondfield, Sandy..... 1,156 0 0 Ellwood & Son, Sandy..... 1,145 0 0

SOUTHALL (Middlesex).—For converting the old laundry, &c., for the purposes of store rooms, &c., at the St. Marylebone Schools, Southall, for the Guardians of the Parish of St. Marylebone. Messrs. H. Saxon Small & Son, architects, London:— Wall Bros., London (accepted)..... £387 0 0

TORQUAY.—For additions to the Imperial Hotel, Torquay. Mr. G. Soudon Bridgman, architect, Torquay:— Vansions & Mumford, Torquay..... £4,830 0 0 J. Smerdon, Torquay..... 4,800 0 0 R. W. Rowe, Plymouth..... 4,290 0 0 Crocker Bros., Torquay..... 4,145 0 0 A. Harris, St. Mary Church..... 4,120 0 0 J. Reed, Devonport..... 4,120 0 0 W. McKellar, Torquay..... 4,120 0 0 W. A. Goss, Torquay..... 4,090 0 0 F. Matthews, Babacombe..... 3,990 0 0 E. P. Bovey, Torquay (accepted)..... 3,945 0 0

TUNBRIDGE WELLS.—For houses, Sandhurst-road. Mr. Edwin T. Hall, architect, Moorgate-street:— A. A. Gale, Woking..... £5,280 0 0

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# The Builder.

VOL. LIII. No. 2297.

SATURDAY, FEBRUARY 15, 1897.

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### Art at the Society of Arts.



THE elaborate paper read by Mr. T. Armstrong at the Society of Arts on the 1st of this month, on "The Condition of Applied Art in England, and the Education of the Art Workman," marks,

if not a new departure in principle, the formation of a new section for the special promotion and consideration of the class of subjects which are called "artistic" in the now usually understood sense of the word. For, in spite of the treatment of such subjects, from time to time, in some of the series of "Cantor Lectures," the Society of Arts has more generally been occupied with subjects which belong rather to what would now be called "Science," and which are Arts only in the sense of the word, glanced at in Mr. Armstrong's paper, which was prevalent in the last century, when, as the lecturer reminded his audience, the only absolute *artiste*, in common parlance, was the chemist, who laboured at *le grand art*; others were "artists in tapestry," "artists in metal-work," &c.; while in the present day the word "art" is supposed to apply only to painting, engraving, etching, drawing, and sculpture.

This consideration of nomenclature bears directly on an important point in the lecture in question, one of the objects of which was to urge that the "art-workman," as he is usually called, should be more distinctly and generally recognised as an "artist," and honoured as such in company with those who at present specially enjoy the title by common consent. One reason urged in favour of this view by the lecturer was, that if better recognition were accorded by Society to the art-workman, there would be much more probability of persuading men of original power and earnestness to devote their efforts to decorative and applied art. Many of the art-workmen, Mr. Armstrong tells us, who come to the training school at South Kensington to receive such instruction in design as will better qualify them for carrying on the handicraft they have already worked at, and propose to devote themselves to, "are strongly moved to give up their trades on leaving us after a period of two years, and take to the painting of pictures and the modelling of busts"; and Mr. Armstrong, as a painter, naturally in some sort sympathises with them, though regretting the course they adopt, of which the result must often be to produce mediocre sculptors and painters in place

of good decorative workmen. He adds:—"I have a firm conviction that much could be done to keep them in the trades to which they belonged if they could receive the consideration in their respective callings which is given to the painter of a picture which is exhibited."

Up to a certain point this is perfectly true, and we are more particularly with Mr. Armstrong in his suggestion that the actual designer and executor of decorative or applied art should receive credit by name for his work, and not be suppressed by the dealer who sells his productions: a view which we have frequently urged. But it would not do to encourage the idea that the best carpet design, for instance, can ever rank as an intellectual effort with a work of genius in painting or sculpture. The latter includes not only design and execution, but the expression of thought and feeling, which is beyond the power of applied art. All that can be properly demanded is that the occupation of making common things so as to impart beauty and interest to them should be recognised as a noble and dignified calling, and as something quite above a mere mechanical trade. There is a certain move in this direction in popular opinion, though a very limited one. The further development of it, perhaps, rests in some degree with the art-workers themselves. Let those who are conscious of special ability remain in their calling and raise it, rather than mistakenly seek to raise themselves by quitting it,—an old story, illustrated in many departments of modern life.

A great part of Mr. Armstrong's paper was taken up with remarks on the Cantor Lectures, on a nearly similar subject, given by Mr. Burges twenty-three years before. Burges summed up then the hindrances to future progress as follows:—

- (1) A want of distinctive architecture, which is fatal to art generally.
- (2) The want of a good costume, which is fatal to colour.
- (3) The want of sufficient teaching of the figure, which is fatal to art in detail."

The second subject Burges gave up, as beyond our own control, and only to be left to Providence; but he recommended the increase of Government schools of design, and the multiplication of local museums.

Both these recommendations have been to a great extent carried out, and it appears from Mr. Armstrong's paper that a great amount of annual work is done in connexion with the Government schools of design, as last spring more than 800,000 drawings and models were sent up for inspection, being an increase on the previous year of about 38,000, and it is even suggested that the increase in the numbers is progressing so fast that it may soon be neces-

sary to localise the examinations, instead of having the whole sent up to London. Yet Mr. Armstrong repeats Mr. Burges's former complaint, that "the artisan has not taken so much advantage of the schools of design as he might have done."

"It is true that in many,—I may say most,—towns in the United Kingdom, there are hardly any trades depending on the arts of design; but there are no towns in which the building trade is not represented, and those belonging to it, including house-painters, might certainly be convinced that the teaching to be had in art-schools and art-classes would make them better workmen, and would open the way to promotion. Until there is some such conviction, the mass of working men will not be persuaded to attend school in the evening, after a day spent in hard manual labour, for mere love of knowledge or skill in the abstract. They must be shown that the probable gains of the self-denial required for this will rapidly lead to higher wages and greater consideration."

This is a perfectly reasonable statement of the matter from the point of view of the artisan, and it is to be feared that these higher wages and this greater consideration do not at present await him in return for any knowledge of design and drawing which he may add to his handicraft attainments. If his employer has any consciousness that his work is of more value for being better designed, the public have not. We are speaking now not so much of things which are generally recognised as work with a specially artistic object, such as stained glass, but of things made for use, but which will bear artistic treatment (as almost everything made for use will, except, perhaps, a dynamo). Endeavour to get, in a London shop, such a thing as a gold or silver watch-guard artistically designed. There is not such a thing to be had, except by furnishing the design and giving a special order. We heard, the other day, of an intending purchaser wishing for something with a little character and design in it, instead of the curb-chain patterns usually made for watch-guards, whereupon he was shown a chain made of mimic horse-shoes, and on expressing his opinion freely on this piece of vulgarity, met with the response (in an injured tone) "Well, you wanted a fancy pattern, and this is one!" Occasionally in shops where a little more knowledge exists you will be told, "Yes, we quite understand what you want, and we can get it made for you; but it is useless to keep anything of the kind, as there is no sale for it." Our experience in this respect exactly tallies with what was stated by Mr. Hunter Donaldson in the discussion on Mr. Armstrong's paper: he was in the show-room of a man who obtained a gold medal at the Paris Exhibition of 1878, and seeing some inferior work there, he spoke to him about it, and received the reply that "it was

no use making superior articles, for the public would not buy them." That is the really most serious bar to progress. There is a certain improvement in public taste, and a great improvement of late years in design, in regard to such things as furniture, textiles, and wall-papers, and in regard to these a kind of standard of taste has been established to a certain extent, and people who have no real artistic culture have acquired a general knowledge as to what kind of thing they ought to get, though few of them can give a reason for their choice beyond the fact that these things are in fashion. When it comes to any class of article in which an artistic fashion has not yet been established, they are as much at sea as ever. The study of jewellers' windows and cases is enough to show the depths in which we still are in this respect. It is not too much to say that it is rare to find anything among their wares which a person of sensitive artistic tastes would care to purchase.

It is the demand, then, for better work that is first wanted; but meantime, is the artistic establishment at South Kensington, with its 800,000 subjects sent up yearly, really in the path to do all the good claimed for it? We doubt it. Who are the students who send up all these things, to begin with? A great many of them, we imagine, are amateurs, especially ladies, who wish to amuse themselves with a little art and to have the gratification of showing a prize or two. The system of training in "the Department" is supposed to be a very rigid one, compelling the pupil to go through a regular course, from first elements; but Mr. Armstrong, who ought to know, seems to admit that these rules are tacitly relaxed, as in cases where the student has already acquired some power of drawing they may very well be. But this admission seems to indicate that there is a considerable amateur contingent who do not come to the schools for any serious work. Then, as to the standard of work shown in the premiated and annually exhibited students' works: is that altogether satisfactory as representing "the best work of the country during the year?" The life studies are usually good; the oil paintings poor; the decorative design is often good; the architecture nearly always bad. Mr. Armstrong took the position that architecture was the central art, and the architect the central artist, who should control everything. Accepting this position, how does it come about that the architectural element in the annual exhibitions of premiated drawings is so defective that none of the drawings to which prizes are given would have any chance of such a distinction at the Institute of Architects or the Architectural Association? Not long since we were asked to print an essay on architecture sent by a correspondent who stated that he was a certificated teacher under the Department. The first page of it disclosed an entire ignorance of all that had been brought forward on the subject of the lighting of Greek temples during the last quarter of a century, the writer simply re-stating the old "hypæthral" theory. It is impossible to suppose, under these circumstances, that the art teaching of the Department is all that it should be. We are glad to learn that Mr. Armstrong accepts the view which we have repeatedly urged, that prizes given for highly-finished and stippled drawings from casts, do not conduce towards rapid or real progress in figure drawing. But the conversion of the authorities on this point is certainly of very recent date, if we may judge from what we have seen at the exhibitions of students' drawings.

Mr. Walter Crane's contribution to the discussion was a rather curious one. He said the Art Department carried the students carefully "through all the grades," and it was not their fault if there were not more inventive artists, but he in the same breath condemned "the system under which we were forced to live." Every child began to draw, and would naturally begin to draw the figure, as the most interesting subject, but "all that was crushed out of him, and he was set to draw corners and angles, and rounds and squares, which had absolutely no meaning to his mind, and his invention was

never set to work." We should have certainly supposed that this was an indictment against the South Kensington system; we believe it was meant so, only Mr. Crane was too polite to say so on the occasion in question. Then Mr. Crane referred to the case of an artist who was asked why he did not do something worthy of himself, and replied, "My dear fellow, I have eight children"; and the speaker said that "in a properly-constituted society he would have had no anxiety about his children." We should certainly like very much to know what is, in Mr. Crane's mind, the idea of this "properly-constituted society" in which an artist is to be placed above or apart from the ordinary responsibilities of life. We fear it is only to be found in Utopia.

We have read Mr. Armstrong's summary of the situation with much interest, but it does not lead to any very definite conclusions. What we gather from it is that the art-teaching machinery of the Art Department, even if it were more perfect than we think it is, would not avail in itself to produce first-class artists in applied art, unless there were so strong and intelligent a demand for better work on the part of the public that a definite and tangible reward was before the craftsman who would give his extra time and labour towards obtaining a knowledge of and training in design. This public demand we cannot create or compel; we can only protest and preach, in the hope of leavening the public taste in time. The most tangible point in the paper is the suggestion that a better class of artists would be induced to give themselves to decorative and applied arts if the value and importance of these branches of art were more generally recognised. Here, again, we cannot force public opinion, and something rests with the art-worker himself. Let him show that he respects and values his art by giving his best mind to it, not by trying to quit it for some branch of art supposed to be higher, and for which he has less qualification, and he will command respect for it and for himself in turn, from the outside public, who will learn to consider more seriously what may be the value of an occupation to which a man of abilities and high character is content to devote his life. But this respect for the decorative worker will not be brought about by self-glorifying speeches about "jumping on architects," such as a well-known decorative artist had the bad taste to indulge in at the meeting in question. That is not the way to do it.

#### HOUSE AGENTS.

EN are accustomed to speak of the "red tapeism" of Government officials, but it is more than equalled by that of house-agents. For there are probably no class of business men who are more tied and bound by various useless and troublesome customs than are house-agents. The functions of house-agents as intermediaries between vendors and purchasers, or lessors and lessees of houses, are capable of being so considerable a convenience that it is a matter of surprise that house-agents do not more thoroughly grasp their position. As a matter of fact, in a very large number of cases the house-agent is solely of use as an advertising medium, and business between the parties to the bargain would be carried through more quickly and more satisfactorily after they have been brought together, could the house-agent be eliminated from the proceedings. After the would-be hirer has, through a house-agent's list, been put in possession of the salient facts in regard to a house, the remaining work when transacted through the agent is necessarily prolonged at an expense to both parties. In many cases also the agent, so far from facilitating a bargain, rather hampers it from being consummated, because one of the leading ideas of house-agents is to keep up prices in a locality. Of course, in the long run, it is an impossibility to prevent rents or premiums from descending if the supply of houses is overdone or the demand slackening, but while this is in progress many are the bargains which are lost. A house-

agent will positively declare that his client will not take less than 300l. premium for a lease. He thinks the intending assignee of the lease may be worked up to take the premium, and meanwhile the latter, choked off by the firm tone of the house-agent, takes another house, when all the time the actual lessor would have been willing to take a smaller premium. This happens over and over again, the lessor in the result being out of pocket by the agent's tactics. It may be said that in some cases the agent succeeds in obtaining a better bargain for his client, but unless he is thoroughly acquainted with all his client's views and his whole position there can be no question that the disadvantages of this idea of the house-agent's are more numerous than the advantages. Again, a house-agent throws every obstacle in the way of any personal communication between the interested parties. Not content with having brought them into communication, he tries to play the part of a diplomatist. If the hirer or buyer asks a question about the sanitary state of a house, he gets no information but the very vaguest. He is told an inspection by a surveyor will be permitted, and so on, when the owner of the house can give all information of a *prima facie* kind which the hirer wishes. One of the maxims of his trade is also to keep his client in the dark as to his proceedings. He is very reluctant to give information as to the number and nature of the demands for the property; the consequence being that the owner has much difficulty in thoroughly grasping his position and the probabilities in regard to the disposal of his property. If there have been few or no inquiries, he will endeavour to make out that they have been of a very encouraging nature and that he has great hopes of soon letting or selling the property, while he knows all the time that there is no substantial prospect of a bargain. In truth, the house-agent will not realise that his primary function is merely to bring two parties together, and that any other work should only be done as an exception and not as a rule, and only when fully authorised by the client, and fully informed of his wishes and position. If this principle were acted on, a very large amount of trouble and annoyance would be saved to the householding community in general, and when agency work was undertaken it would be satisfactorily carried out. Again, the house-agent is fond of trying to take the place of a solicitor by drawing up agreements, or of charging a comparatively exorbitant fee for an agreement, the form of which can be bought for sixpence at any law-stationer's. He will declare that it is an invariable custom for such and such a thing to be done as, for example, that the owner of a furnished house always pays the water-rates, when it is merely a practice of a few house-agents in some particular locality, who, for some reason best known to themselves, choose to try and keep it alive. There is also another curious and illogical custom among house-agents, namely, that when a valuation of fixtures or furniture is made, they will not state the value they have placed on particular items. This is often a cause of much inconvenience when furniture is taken over, because the buyer, not being aware of the value at which he takes the various pieces of furniture, is unable to know what price he should obtain for any part or piece when he wishes to dispose of it. But unless a special arrangement is made with the house-agent to state the value of each item in his inventory he absolutely refuses to do so, and even when such an arrangement is proposed he will, if possible, refuse to agree to it. We are convinced that by this red-tapeism and want of flexibility, and desire to keep all the things in their own hands, house-agents do much to drive away business from their offices. It causes persons to advertise in papers, to give information to builders and decorators, and to try to find hirers or purchasers by what we may term illegitimate means. The public, as a whole, regard house-agents with suspicion and with dissatisfaction. A franker and less pretentious manner of carrying on business, a willingness to promote personal communication between parties, and a

more complete mastery of the client's position when agency work has to be done, a determination to give no countenances to trifling and absurd customs, and to study as much as possible the wants and wishes of the public, would place the business of house-agents on a sounder and more satisfactory footing.

## NOTES.

**T**HE appeal made by Major Flood Page and Sir George Grove in the *Times* of Wednesday, on behalf of the Crystal Palace, will not come as a surprise to any who have observed the indications for some years past that the Palace is in the wane of its career. We are not disposed to dispute any of its claims made by Major Page in regard to the part which the Crystal Palace has played as a centre of recreation for London. All that he says about it in this respect is justified. For ordinary recreation for the masses it has been, according to the season, a summer park or a winter garden, the immense size of the building making it an unequalled promenade in bad weather, with a certain degree of higher recreation in the shape of its really fine collection of casts. The architectural courts, we fear, have never been of interest to the masses, while by the more learned they have long been regarded as somewhat gewgaw productions, not up to the present archaeological standard. The fireworks have always been very good; the picture exhibitions nearly always very bad. In regard to music alone the Palace has taken the highest artistic standard; the fame of the Saturday concerts is European; the Handel festivals, despite the unsuitability of the building, have been among the most glorious memories in the lives of many lovers of music. It is difficult to know how these could be replaced. But the falling off in attendance at the Saturday concerts is easily accounted for by the present multiplication of high-class concerts in London, and more easy of access. Major Page's appeal is curiously illogical in pleading for the Palace as "the most popular resort" of the people, in face of the fact that the falling off in the attendance, and consequently in the receipts, is what has rendered the appeal necessary. The suggestion that dwellers in London should continue to take season-tickets to the same extent as formerly, to keep up a place in which they have lost their interest, is even more unfortunate. The one logical appeal in the letter, financially, is to the debenture-holders, to forego part of their lawful interest rather than run the risk of greater and more permanent loss. The prophecy of the fall in value of house property at Sydenham if the Palace ceases to exist we do not think much of. The Palaces made the neighbourhood, no doubt, but it is now a well-laid-out and "desirable" suburb, and may hold its own as such with other outlying residential neighbourhoods. But we imagine that the big structure has pretty well played its part. "Temporary" is marked on its whole character and appearance; it has had, on the whole, a fairly long lease of life for an erection of that nature, and we have long considered that its demolition was an event not far off. It would be a grand thing, no doubt, to erect a more permanent people's palace on the site around which so many associations cluster, but this could only be done as a national affair and by a Government subsidy. Our impression is that in a few years people will be living in red brick houses in "Crystal-Palace Gardens" and "Handel Avenue."

**I**N view of the expected railway legislation in this country, considerable interest is taken in the Inter-State Commerce Bill of the United States, which attempts to remedy the evils arising from the bad management and reckless competition of some of their lines. The chief point aimed at is the abolition of "discrimination," as the Americans significantly describe the preferential rate system, but our own railway authorities seem to think that in

drawing a strict line as to equal mileage rates the Congress is making a mistake that will be self-evident directly the new rules are put into operation. Mr. Grison, of the Great Western, who, when interviewed upon the subject a week or two ago, said that this legislation would have to be modified if not entirely reversed, has devoted a considerable portion of his work on English and foreign railway rates to this branch of the subject. He adduces many arguments to show that equal mileage rates would sometimes act unfairly, and quotes a New Zealand correspondent of the *Economist*, who declares that many trades are much hampered by their Government tariff, which does not admit of differential rates. Another English railway official, writing from Cleveland, Ohio, says that the American managers consider that a little experience of the proposed legislation will teach Congress to let them alone in future. Always hearing in mind the great difference between the conditions of our lines and those of other countries,—which make it difficult to institute comparisons, and which our railway champions always make a great point of,—it will be instructive and interesting to watch the result.

**E**XPERIENCE seems to have proved indubitably that the Model By-laws of the Local Government Board with respect to buildings, upon which the by-laws of Local Authorities generally are based, are, in many instances, ambiguous in their language, and in others, where they are explicit enough, unnecessarily stringent. The correspondence which has taken place between the Local Government Board and a Local Board in the western suburbs clearly shows this to be the case in regard to such important points as the thickness of dividing walls of smoke-flues and of chimneys when they come back-to-hack in domestic buildings; also the excavation of cellars or basements in old properties, the covering over of areas at the back of business premises, and the distances separating buildings which should require parapets erected on their external walls. The Local Board in question was placed in a dilemma because the present surveyor was disposed to uphold what was generally regarded as a more stringent interpretation of the by-laws than his predecessor put upon them. The present officer insisted upon a thickness of 9 in. for the dividing walls of smoke flues and 18 in. for those of chimneys back to hack. An appeal was made to the Local Government Board for an authoritative interpretation of certain by-laws, and it has sanctioned an alteration now making it clear that only half the thickness just mentioned, in each case, is required. A vexed point with the Local Authority and the builders has thus been for the present settled.

**T**HE Local Government Board has conceded one important point sought, in adding to its model by-law relating to cellars, "that where a cellar is within one-third of the area of the site of the building it shall not be deemed a story," and, consequently, the requirements as to additional thickness of walls in the upper story do not apply. But the Central Authority has refused to assent to the proposal to allow the back areas of buildings, which at present must have an aggregate open space of 200 square feet, to be covered in. Many domestic buildings are transformed into business premises, and it seems hardly necessary for sanitary or other purposes to restrict owners or builders from erecting extensions or warehouses upon these open spaces in the rear. With regard to parapets on external walls, the Central Authority has fixed 10 ft. as the limit of distance between each house instead of 15 ft. as formerly. But it seems ridiculous to fix any limit of distance when these Model By-laws do not prohibit owners or builders from putting windows in their gable-walls, which would thus present a very vulnerable point with regard to the spread of fire. There are many other points in these by-laws which are destined to be materially altered, not by the tinkering emendations of the Local Govern-

ment Board, but under the operation of a comprehensive Act of Municipal Reform.

**A**N experiment appears likely to be soon tried of some importance in the purchase of the railways by the Swedish Government. Of the 4,284 miles at present constructed in that country, 1,483 already belong to the State, leaving 2,841 to private companies; and this railway interest of late years, just as it has in other countries, has been very much depressed, the principal traffic being of a heavy nature, and not able to bear the expense of a long rate. The private lines would be very happy of themselves to make a reduction; but the shareholders naturally feel that they could not do this, with the competition of the State lines. The result of the inquiry into the question is that the Government is advised to buy up the private lines, if they can be had at a price which would not be unreasonable. Once that is done, the rates can be adjusted as is thought proper for the circumstances and the locality.

**C**OLDBATH FIELDS PRISON and its site of 8½ acres are, like to the neighbouring House of Detention, offered for sale. The prison, whose cells have received 1,800 male prisoners at a time, is now being shorn of its portable fittings. The big clock, and chapel and office furniture, for instance, are destined for removal to the new convict settlement at Dover; the records, extending over nearly 100 years, to the Stationery Office. The tread-wheel machinery will be reconstructed at Pentonville. The vast wheel-shed stands on the north-eastern side of the main building, having been set up there to replace a still larger one, on the south-western side, that was burned some years ago. The four tread-wheels, clogged one into the other, and connected with the adjacent flour-mill, accommodated 350 men working together, each in his own box or compartment. To that number might be added the one "off" man for each three at labour, taking his five minutes' rest on a stool every quarter of an hour in turn with his own party. Three of the angles formed by the five radiating arms of the principal building are railed off for exercise-grounds. These, now turfed and gravelled, were until lately, like to those at Newgate, paved. On either side of the southern main gallery, with its five floors of cells, stand certain portions of the older prison, including the original chapel, since appropriated to the Roman Catholic inmates. These earlier portions (1794) are easily to be distinguished by their excellent red-brick masonry, dressed with Portland stone, and the vaulted roofs of the "solitary" cells. These cells were some of the first of their kind, and were originally unwarmed. The modern building that towers from within over the entrance-gates on Mount Pleasant is the chapel and offices, the latter being upon the ground floor.

**A** MOVEMENT has been set on foot to raise a fund wherewith to erect a monument to the great Marquis of Montrose over his grave in St. Giles's Cathedral, Edinburgh. A committee has been formed, including, amongst others, the Duke of Montrose, the Marquis of Lothian, the Marquis of Breadalbane, Lord Napier and Ettrick, the Lord Justice-General, and Sir William Fettes Douglas, P.R.S.A. A circular has been issued inviting subscriptions and stating that "attention has lately been directed to the fact that there is no monument or even commemorative tablet over the grave of the Marquis of Montrose in the Cathedral Church of St. Giles. On the restoration of the monarchy the scattered remains of the 'Great Marquis' were reverently collected, and after lying in state at Holyrood they were interred at St. Giles's by order of Charles II., with all the ceremonial of a State funeral, on May 11, 1661. They were buried behind the tomb of the Earl of Athole, in what is now known as the Montrose Aisle. A monument over the grave was contemplated at the time, but never executed, and this omission it is now proposed to repair." The monument will contain a figure of the Marquis, and, if funds admit, the window beside it will be filled with appropriate

designs. The estimated sum for carrying out these requirements is 1,500*l.* Towards that sum subscriptions have been received to the amount of about 1,000*l.* The subscription list contains the names of the Duke of Montrose, 150*l.*; the Marquis of Breadalbane, 25*l.*; and the Marchioness, 25*l.*; the Duke of Hamilton, 50*l.*; the Earl of Powis, 50*l.*; T. Graham Murray, 50*l.*; &c.

IN regard to the new Free Library at Edinburgh the following suggestions have been made, viz., that the building shall have a frontage of 98 ft. towards George IV. Bridge and 87 ft. towards the Cowgate, leaving a space of 30 ft. to the rear for light and air. That the lowest flat be appropriated for electric dynamos and the necessary machinery for lighting. That the second flat be utilised as workrooms for binding, &c., and sanitary accommodation. The third flat to be used as a newspaper room. The fourth flat, being that on the level of the bridge, to be the lending library. The floor above to be the magazine department, with a separate room for ladies; and the uppermost flat to be a reference room. The idea of the Committee is that a handsome and suitable building can be erected for 25,000*l.* or 30,000*l.*, and that the balance of Mr. Carnegie's gift of 50,000*l.*, after payment of the value of the site estimated at 11,000*l.*, be devoted to the purchase of books and the starting of the library. It is expected that the operations connected with the clearing of the site will be commenced shortly after Whit Sunday, and that the plans will be thrown open to competition.

THE archaic sculptures recently found in the Acropolis have excited abundant interest. The fragments of archaic vase-paintings, of no less importance to the history of art, are only just beginning to be known about. In the last issue of "Εφημερίς Αρχαιολογική" (iii., 3), Dr. Studniczka publishes a few of the most interesting. Of these, one represents the birth of Athene from the brain of Zeus, and is by far the earliest bit of work we have embodying this scene. The goddess springs full-armed from the head of the god; she carries an enormous shield on the left arm, and, from the attitude of the left, must have been swinging her spear. Behind Zeus appear the uplifted hands of the birth goddess, Eilithuia, perhaps the most primitively-drawn hands ancient art has left us, but full of vigorous expression. It is still possible that further fragments of a composition which, in its entirety would settle some interesting problems, may be found. With it Dr. Studniczka publishes another archaic Athene of later date, beautifully drawn, somewhat in the style of Amasis, and also the fragment of a dedicated pinax, with part of the dedication still legible. Together with these may be studied with advantage an archaic bas-relief, published in the same number, representing a very early type of the worship of Athene. The goddess is standing unarmed except for her helmet, her right hand uplifted and her left holding back her drapery. The head, hand, and drapery are, in spite of their extreme stiffness, of the greatest possible delicacy. The waist is of quite unnatural smallness. The goddess in those early days was not, as later, the patroness of the Rational Dress Society. Two full-grown figures are approaching to worship, and with them they bring two tiny children, also a sow for sacrifice. The relief is the earliest of its class as yet known, and is specially interesting because of the analogy of the women types,—goddess and mortal,—to the large figures in the round which have been found in such numbers in the Acropolis excavations.

IT seems hard that an inscription of such great interest as that now published by Dr. Kabbadias should have been found last year, on the 16th of July, and only now, after seven months, be accessible to the educated public. Since the Delos excavations, the name of Archermos of Chios, who "first gave wings to Nike," and the praise of whose works exceeded even that of the Chian wine, has had

an actual substantial interest denied to his shadowy contemporaries. It is true that since the inscribed plinth and the figure of Nike have been brought from the local museum at Myconos to Athens, doubt has been thrown on their supposed connexion; but this only makes the inscribed column published in facsimile by Dr. Kabbadias of greater interest. The inscription written in the fittings of the fragment runs as follows:—

"... (Α)ρχερμος ἰποίησεν ἡ χι(αυ)  
... (ἀνά) θεκεν Αθηνάι πολιόχο(ι)."

Of course, theory will be rife as to the statue that once stood on the column, and Dr. Kabbadias thinks it may possibly be a curious female figure of non-Attic type recently discovered. This awaits confirmation.

ON the evening of Friday of last week Professor Baldwin Brown lectured to the members of the Edinburgh Philosophical Institution on "Art and Nature," in place of Mr. Holman Hunt, who is indisposed. He said that a faithful transcript of nature might, in painting, be both beautiful and interesting, but in sculpture would be so tasteless as soon to become intolerable. It was not nature, pure and simple, of which we desired a literal transcript, but only of that side of nature which had beauty or interest, or sympathetic charms. The principle of "Truth to nature" had actually been taken up and made the watchword of a school of novelists and painters who dwelt with revolting minuteness of detail on all those aspects of nature from which in actual life we were glad to divert our eyes. This latest development of naturalism in art, which had its chosen home in Paris, was, at any rate, of value in showing that it was no true touchstone of art to inquire simply whether or not it adhered closely to nature. The true arbiter of art was not nature, but mind.

THE Dudley Gallery Art Society seems to have followed the lead of the Institute of British Artists in restricting (vertically) its hanging space and draping the upper portion of the walls. The effect is good, and the exhibition does not suffer. The exhibition is strongest in landscapes, and contains some fine works by Mr. Goodwin and some very good architectural subjects by Mr. Hubert Medlicott, as well as some good landscapes bearing names we are not so familiar with.

WE received the intimation, just too late for our last issue, that Mr. Waterhouse has been appointed assessor in the matter of the Edinburgh Municipal Building Competition. The appointment of Mr. Waterhouse in such cases seems to be becoming almost a foregone conclusion now, but we cannot suggest that any better man could be found.

THE advertisement of the competition for the Imperial Institute, which appeared in our columns last week, inviting architects who wished to compete to send in their names, stating what public buildings they had carried out, is a foolish sort of business. The architects of public buildings that are worth anything are well known, and might just as well have been selected at once; and it is a very lame conclusion that those who have not had such an opportunity hitherto are necessarily of inferior capacity to those who have. It is rumoured that some candidates intend to send in a list of some public buildings which they have not designed, as a claim, at all events, better than that of having perpetrated them.

Lectures at the Royal Academy.—In lieu of the three lectures which were announced to be given by Professor Newton on "Terracottas" (see pp. 168, 204, ante), arrangements have been made for two lectures by Professor Middleton on "Early Medieval Sculpture," to be given on Feb. 21 and Feb. 25, and for one lecture by Mr. R. S. Poole, Keeper of the Coins at the British Museum, on "Medals." The date fixed for this lecture is Wednesday, March 9th.

#### THE "SUPERINTENDING ARCHITECT" AND HIS POWERS.

IN regard to the Brixton-rise and Trent-road case, to which we referred last week, Mr. Broadhurst addressed a question in the House of Commons to the Chairman of the Board on Thursday week with regard to the powers of the Superintending Architect with respect to the general lines of the buildings in the metropolis. The Chairman, in replying, stated that the Board have no control over the Architect with reference to his decisions as to general lines of buildings, and that he was not aware that the Board proposed to initiate any legislation this Session with a view to an alteration of the existing law. The exceptional powers possessed by the Superintending Architect in this respect were confirmed by an Act of Parliament passed in 1862, and they have been exercised with almost universal approval up to the present time. The Lord Chancellor (Earl Selborne), in the course of giving judgment in the House of Lords in the case of *Spackman v. The Plumstead District Board*, speaking of the Superintending Architect, said,—“He is a statutory officer, who the makers of the same statute which constitutes the Metropolitan Board of Works, and gives their powers, think is a proper officer to take part in the execution of those powers. He must be a man of intelligence and a man of position. I think that all this presumption is against the idea that when upon himself, and not upon his employers, a duty is imposed by the Legislature he would discharge that duty partially for the purpose of pleasing his employers.”

And the Lord Chancellor further remarked,—“If there is a row of houses . . . built in a regular mathematical line . . . the fact is already determined, and there is no room for a judgment. But if the buildings are irregular, if one house projects beyond another, or one block of houses projects beyond others, or if there is anything breaking the line, then in the nature of the case there is need of a judgment. And what better than that of the Architect of the Board, an expert in matters of this description, can he conceive? Is it *a priori* so plain as to alter what otherwise would be the proper construction of the statute, that a Justice of the Peace is a better and more competent judge of these matters than an architect?”

On the same occasion, Lord Watson remarked,—“That one tribunal is preferable to another is no reason whatever for disregarding the words of the statute, and when the Courts are of opinion that the Legislature has chosen the worst of the two tribunals, it is an opinion which I can only say does not exist in my own mind. I am by no means satisfied that a decision by a gentleman in the position of the Superintending Architect of the Metropolitan Board of Works is likely to be less favourable to the interests of all parties concerned, or is less likely to attain the ends of justice than a series of decisions by a number of district magistrates. I concur in all the observations which have been made by the Lord Chancellor on this part of the case.” Similar opinions were expressed by the Law Lords in giving judgment in the *De Venning* case (*Barlow v. The Vestry of Kensington*).

Mr. Broadhurst does not state precisely what alteration he desires should be made in the existing law with regard to lines of frontage, but it may be reasonably assumed from the manner in which his question is framed that he desires to transfer the duty of deciding general lines of buildings from the Superintending Architect to the Metropolitan Board of Works. If this is his intention it is not at all likely that he will be supported by public opinion. At present the power of deciding general lines of buildings is in the hands of an independent officer, whose decision on matters of fact is practically without appeal, and to transfer this power to a heterogeneous body of fifty or sixty members with widely different capacities and interests would open the door to endless confusion, and invite suggestions of favoritism and corruption. The decisions would be probably left in the hands of one or two members of the Board who make a trade of these matters, and no fairness or consistency could be hoped for from such a tribunal.

The Work of some Unknown Designers.—Want of space obliges us to postpone this paper till next week, rather than divide it.

ENGINEERING AND ARCHITECTURE:  
IN RELATION TO SANITARY SCIENCE.

This was the subject of a paper read before the Parkes Museum and Sanitary Institute two or three weeks since by Mr. M. Ogle Tarbotton, M. Inst. C.E., Borough Engineer of Nottingham. Captain Douglas Galton, F.R.S., was in the chair. Want of space compelled us to defer noticing it earlier; but as both the paper and the discussion on it are of considerable importance, and the discussion has not hitherto been reported at all, we give them now, as containing matter of permanent value.

Mr. Tarbotton, in the course of his paper, said:—

Engineering and architecture take an important status in the operations which are necessary for the practical application of sanitary measures. It is difficult to say where, in many branches, the former ends and the latter commences. There is, in the details of sanitary work, such a necessary fusion of the two, that any one entrusted with the execution of health works, should have special teaching and experience in both engineering and architectural construction and practice. Architects have lived and maintained their powerful influence in all ages.

At the present day it is well known that in buildings, commercial and monumental, the architect seeks the assistance of the theoretical and practical engineer; for it would be impossible, in these times, for an architect to obtain in his education, or acquire by his experience, or even sustain in his mind, a correct and practicable knowledge of many of those constructive and mechanical problems which are involved in the raising of a monster edifice, as it would be for an engineer to design a Westminster Abbey or a Rheims Cathedral.

Until within the last forty years the sanitation of dwellings was very little understood by architects, and ventilation and drainage were looked upon with comparative indifference. Since the great inquiry into the health of towns conducted by the Royal Commission issued in 1843 by Sir Robert Peel, considerable advances have been made in sanitary science, not only in England but in most parts of the Continent, and those who knew the state of Paris or Berlin thirty years ago and are intimate with those cities now, can testify to the radical change for the better sanitary works have produced in external appearance, in public health, in decreased mortality, and in advanced prosperity. The result of the Royal Commission was the passing of the Metropolitan Commission of Sewers Act in 1847, and the first Public Health Act in 1848. Since that time many sanitary Acts have been passed by Parliament, the Public Health Acts have been extended and consolidated, and numerous collateral Acts of great value, such as the Artisans' and Labourers' Dwellings Acts, have been brought into existence.

Concurrently with the aforesaid legislation the principles of water supply, sewerage, house drainage, ventilation, &c., have been deeply studied and carried into effect by both engineers and architects; the latter are now, as a rule, giving very much more personal attention to hygienic matters, and architectural students are making them part of their professional education.

Architects are now enabled to specify, with increased confidence, the materials and character of the work required to be used for the various sanitary appointments, not only of an ordinary dwelling-house, but of the most palatial edifice; also for the, sometimes, complicated appointments of asylums, gaols, workhouses, barracks, and other large buildings.

The publications issued by the Local Government Board, and by professional societies and private practitioners, give most valuable information as to the best means of carrying out ventilation, heating, drainage, water supply, and the like, for public and private buildings, the abatement of nuisances under the Nuisance Removal Acts, the formation of street surfaces and external pavements for various purposes, and for floors for men and the so designated, inferior animals, all of which, with many others, are distinctly sanitary work.

The branches of engineering are exceedingly numerous, and it would be impossible to collate many of them with architecture. It is generally understood that the practical separation of the two divisions of constructive science and art took place about 300 years ago, when the Dutch

commenced their large works of land reclamation. Then a body of hydraulic engineers sprang up, and these were strengthened afterwards by the engineers of canals and railways in various parts of Europe. Subsequent enterprises caused a further combination, and thus was established the now recognised distinct body called Civil Engineers.

It is with the sanitary engineer, however, that this Institute is mostly engaged, and a few words may be said as to the difficult and contested problems he has to encounter.

When sanitary work is carried out in a proper spirit, and on correct bases, the practice of it increases in interest, in proportion to its recognised results. It is allied with the physician, the chemist, the architect, and the geologist; and the engineer must, in addition to considerable constructive knowledge, possess more than the rudiments of that technical knowledge which belongs to the above professions.

The greater fields of labour for the sanitary engineer are those of water supply, sewerage, and drainage. On the subject of water supply, Great Britain may be considered to be fortunately situated, when compared with many Continental areas, and no district in this land of ours need be destitute of a supply, derived from a healthy and continuous source, if proper and thoughtfully-devised means be adopted to acquire it.

Water, in nature, is never absolutely pure, that is, having the qualifications of distilled aquafaction, and need not be; but the great object is to secure immunity from carbonaceous and nitrogenous impurities, and to avoid sources where there is the slightest possibility of organic contaminations, especially when water is and should be mostly consumed *Asperes* (or prandium) *vis uera*. The relative qualifications of hard and soft water have always had a prominent position in pathological debate, but the subject has many surroundings. It is impossible in some districts to obtain soft water, and in the chalk beds and in the Keuper beds of the New Red Sandstone formation, and some others, the water is invariably hard, varying from 20 to 60 degrees and more. The chalk waters can, however, be reduced from their initial to a comparatively low permanent hardness, by simple chemical processes. Water derived from the igneous and aqueous and some of the metamorphic rocks, and from a great part of the carboniferous system, is usually soft, and this class of water is to be found in Wales and Cornwall, on the Yorkshire and Lancashire moors, in the great lakes of England, and in the lochs of Scotland, also in most parts of Ireland. For potable purposes, the public taste is decidedly in favour of hard water. Such water is usually bright, pleasant to the palate, and refreshing, whilst soft and puer water is insipid, tasteless, and gives no feeling of exhilaration. It has been contended that soft water causes imperfect development, and that hard water is essential to the formation of tissue in the human frame. It has also been shown that in towns where the hardness exceeds 10 degrees, the death-rate is much lower than in those supplied with softer water. In manufacturing districts the softer waters, i.e., those from 2 degrees to 5 degrees, are all important, but perhaps the most palatable and useful waters for all purposes are those derived from the Bunter beds of the New Red Sandstone, when the hardness is, initially, about 6 degrees, and infrequently exceeds 12 degrees or 14 degrees, except where the gathering reservoirs are washed out, at which time the supply therefrom should be abandoned.

This country is so full of well-executed water-works, and of literature bearing thereupon, that the sanitary engineer, having a fundamental knowledge of geology, meteorology, and hydraulics, should never fail in bringing to a successful issue a system of public water-supply in any part of this country. The rock-cut temples of India and the well-known aqueducts of Rome express in the strongest physical language our ancestral demonstration of the value of a pure atmosphere and an unpolluted water.

On the subject of water-supply to our large communities, a few words may be said on the real value of water and the modus of its distribution. At one period, not especially recent to some I am now addressing, the water-supply, by defective mains, services, and fittings, particularly the latter, was most extravagant, or, rather, wasteful. In many towns the consumption reached so high as 40 to 50 gallons per

head per diem, and no thought appeared to be bestowed upon the proper and economical distribution of one of the most, if not the most, valuable elements of existence.

By the agency of engineers of the last thirty to fifty years a great change has been effected in most of our great towns, large towns mainly, but not excluding many subordinate districts, the most careful measures have been designed to secure freedom from wanton and needless expenditure of water. The public, I fear, do not, in any class of life, recognise properly the expense of obtaining and delivering water, excepting when the cost is expressed in terms of rates, and when these are applied for, there is, of course, pronounced and popular discontent evolved from either absolute ignorance or imperfect experience in the management of communistic undertakings.

As to the influence on the rates of a town, where water is suffered to be improperly used, or, in other words, wasted, the public little knew what a differential advantage would ensue if a cautious and sensible use of water were maintained. Of course, the consumption in cities and water districts varies much, and the greatest variation occurs in manufacturing towns; but a community can, apart from manufacturing supplies, be well served by a provision of from 12 to 14 gallons per head per day; that is, if proper fittings be employed, and a proper supervision thereof be regularly exercised.

These latter remarks are applicable to the subject of town and general public sewerage, which, in some respects is more complicated than that of water supply. The Government Blue Books and the Reports of the several Royal Commissions on Sewage and the Pollution of Rivers, which have, *in se*, much greater value than the public are in the habit of attaching to them in ordinary municipal life and conversation, with many other professional publications, give, in the aggregate, much information on the modern plans of urban sewerage; but, perhaps, the best practical information is to be gathered from a personal examination and study of the sewerage works in the metropolis, and in several of the larger towns of the kingdom. In these places the most precise care and study have been given to the numberless details which surround the construction of a system of town sewerage, and those details are now fairly well formulated and established.

After making provision for the drainage of the subsoil to a sufficient depth, to allow the basements and lower floors of the buildings and houses to be freed from water and damp, the points then to be considered are the lines and gradients of the outfall (having reference to the ultimate disposition of the sewage), the volume of sewage to be provided for, the amount of rainfall to be dealt with, the size and materials of the outfall and internal sewers, the modes of ventilation and flushing, and the methods of forming junctions and means of access, so that the whole system may be under most immediate control. The house-drain connections with the public sewers should receive more attention than has hitherto been given to them, if the subsequent internal house drainage is to be made beyond suspicion of danger. The above being satisfactorily arranged, the collected refuse will have to be disposed of, and the *modus operandi* will have to be determined upon. Here commences the sewage difficulty, but one which has been greatly mitigated, by past and late experience. The cardinal principles of any system of appropriation must be non-contamination of the atmosphere, non-pollution of any river or stream, and the recovery from the discarded and disorganised fabrics of nature, of all the powers of compensation that can be extracted from a pre-acknowledged nuisance. By an almost general consensus, it appears that the safest and cleanest, and, in the end, most economical method of extracting the compensation referred to, from town refuse, is to restore it to the soil from whence it came, and this is done in the form of land-irrigation, or, in other words, the application of effete organic matter, in a soluble form, to the resuscitation of vegetable life, and the subsequent sustentation of animal life and human existence greatly depends upon the consumption of vegetable substance. The success of this process is now so almost uniformly established that most towns, large and small, cities of great magnitude, and hamlets of the humblest size, are resorting to irrigation, sometimes called land filtration; and compelled so

to do to dissolve their sewage difficulties, and to recoup to some extent the great cost which attends the extinguishment of a gigantic and inevitable social nuisance. Other processes have been tried, with results more or less good, but in many cases they have been abandoned in favour of irrigation. It would be absurd to declare that no chemical process is capable of deodorising and disinfecting sewage, and rendering it innocuous, but the cost is great, the results are not satisfactory, and it is totally unremunerative.

Towns vary much in the character, volume, and value of their sewage, and to lay down a rigid and absolute rule would be preposterous; but in the majority of cases irrigation is found to be the natural, safest, and most rational. In some few places the sewage may be cast into the sea, distant from the shore, with impunity; but in the majority of cases where the physical configuration of the country is favourable, where the land is light, porous, and well drained, where the population is extensive and the markets or farms are near for the sale or use of vegetable produce, and where, most importantly, the management is competent, irrigation and sewage farming should not involve a loss to any community greater than it can reasonably bear, considering the objects of the undertaking. We hear that in King Solomon's time the sewage from the Temple was used for the fertilisation of the market gardens in the Valley of the Kidron, and the latest and largest similar work, of modern times, is the utilisation of the sewage of Berlin, on about 1,500 acres of sandy land, north and south of the city and many miles away, the extreme distance of the farms being nearly twenty miles.

With regard to house drainage, great advancing movements and works have taken place during the last few years, and the public appear to be more fairly aroused to the importance of having their dwellings absolutely secure from the influences of sewer gas and bad air. The great point, clearly, is to have the principles of drainage properly taught to and understood by all classes of the people; and, secondly, to secure thoughtful and honest work in carrying out the necessary operations. This is an important branch of a sanitary engineer's labours, and sometimes a very tedious one, but it must be remembered it is quite as important in a sanitary sense as the larger works of public sewerage.

The solid and miscellaneous refuse should be collected and carried outside, and buried, or consigned to the flames of a destructor, which can, and should, rapidly and effectually annihilate them. This process has the merit of cleanliness and common sense, is coming into popular use, and its prototype is described in the earliest records of human sanitary teachings, and especially in those of the city of Jerusalem, from whence it appears that all matter, effete and deleterious to health, was consigned to the fires of *Hésva*, or the "Furnace of Hell."

Another sphere of work for the sanitary engineer, is to be found in the superintendence, if not in the designing, of houses, hospitals (general and epidemic), barracks, and such-like buildings. In this branch of labour the technique of construction must be thoroughly understood, combined with the nature of materials and the most economic methods of employing them, aération, and ventilation, warming and lighting, cubical capacity in relation to all classes of occupation, width of streets and internal areas in reference to light and air, and the manifold minor concomitants of a structural and sanitary character. Without such knowledge no sanitary engineer can raise a building of integrity, or advise upon the defects of those which may unfortunately exist. Some architectural art culture is also desirable, for no building at the present time, of any social pretensions, dare raise its head without some legitimate accentuation.

In the discussion which followed,

Sir Robert Rawlinson said that Mr. Tarbotton, whom he was proud to call his personal friend, had told them that engineering and architecture ought to be allied. He agreed with him; and Mr. Tarbotton was a capital example of the alliance. He was himself both an able architect and an able engineer. He had designed and put over the Trent one of the most beautiful bridges in England; and as for sanitary arrangements, he (Sir Robert) knew no engineer who had done better work, or had executed works

and devised means more perfectly than his friend. The paper was so wide and so discursive that he would not attempt, even briefly, to follow it. But Mr. Tarbotton had touched on a subject which was of very great interest to London at this moment, namely, the question of sewage treatment,—whether it was to be treated in one way or in another. He hoped he might be pardoned for bringing in a subject outside the paper, but which was one of general interest at the present moment, namely, the best, cheapest, and most beneficial method of dealing with the sewage of London. They knew that it had been taken by the Metropolitan Board of Works down to Barking and Crossness, and they knew it had been poured in a crude state into the river, they having been told by Parliament to carry out the main sewerage work in such a manner as to prevent the river being polluted. The Board was now proceeding, he believed, to continue the establishments at those points, shirking altogether the question of irrigation, and persisting in treating the sewage with chemicals in some infinitesimal quantity, and then, it was said, the residuary sludge was to be taken out in hopper-barges and deposited in the sea. Speaking as an engineer, he ventured to say that that was the most hopeless, helpless, and extravagant and costly method that could be devised. Mr. Tarbotton was too modest to tell them what he had done; but he had most successfully carried out sewage irrigation on a grand scale in Nottingham, where he was Consulting Engineer. In Berlin, sewage was being applied to the land, and only that week he had received two volumes from the engineer-in-chief at Paris, M. Dorand Clay, showing that in that city the sewage was being extended to the land. In England they rather prided themselves in setting examples than in following them, and he was heartily sorry that in such great works as the disposal of the metropolitan sewage they were not leading rather than lagging behind; because he held that the entire sewage of the metropolis could be taken down through the intervening agricultural districts from the present outlets to the sea, and such arrangements might be made that in a very few years the greater part of that sewage would be taken voluntarily by the landowners on either side of the conduits to produce those crops which we knew a proper application of sewage would produce. The conduits should have an outlet for winter discharges to Canvey Island or to the sea, when the sewage might not be applicable to the land. As to the so-called movable-pit system adopted in some towns in England, Mr. Tarbotton had said that it was only a slight advance upon the asphalt system. His (Sir Robert's) opinion was that it was a very long advance backwards, and was in some respects worse than the asphalt system. It was, in fact, a most detestable practice. There were those who poured ridicule upon the water-carriage system, because, they said, it was a wasteful system, but that was not the teaching of experience. What did water-carriage mean? It meant that whatever the volume, whatever the weight, whatever the magnitude in volume of the sewage, make conduits for it to flow along and we should not require either horses or other motive power, as the sewage by means of water could be carried to any point, there to be disposed of as might be best advisable.

Mr. E. C. Robins, F.S.A., said they were much indebted to Sir Robert Rawlinson for the lucid way he had put the matter before them. He thought it was quite clear that there were a sufficient number of lands irrigated by sewage to prove that it was not an impossible or impracticable method, and it was the one method which seemed to have realised some return for the money expended upon it. The subject of Mr. Tarbotton's paper was most interesting, and, as an architect, he was very glad to have heard it, and to reciprocate Mr. Tarbotton's idea as regards the association of architects and engineers. It would be foolish for an architect not to take advantage of the services of an engineer as to a subject with which he was more particularly informed. On the other hand, he thought that engineers might sometimes benefit by the advice of an architect, more especially on the fine art side of construction and house sanitation.

Mr. Scott Moncrieff thought the Institute was very much indebted to Mr. Tarbotton for the valuable paper which had been read, and also for the very valuable remarks made by Sir Robert Rawlinson. He endorsed the remarks

made by Sir Robert, and thought his views were of exceeding value. He did not think it was at all likely that sewage, as an available manurial agent, would remain long in the defective position in which it stood in relation to the practical work of farming.

Mr. William White, F.S.A., said that the chief interest in the paper to him was the attention it called to the amalgamation of the architect with the engineer. This was a question raised many years ago and continued down to the present time,—the question of the division and concentration of labour. The question was whether an architect ought to be essentially an architect, or whether he should also carry on his works with reference to those great and wonderful structural engineering works, of which there were so many at the present day. The point of interest raised by Mr. Tarbotton was rather with reference to the association of the essentially sanitary arrangements of a dwelling with the architect and not so much so the association with the engineer in the structural work, for he thought, on that point, there could be very little question. There was quite enough in architecture to take a man's whole attention, as there was in engineering for an engineer. That an architect ought to be versed in the proper sanitary arrangements for buildings he erected was incontrovertible. If an architect had not learned the sanitary principles which ought to be carried out in a house, there was no question whatever that he ought to call in for his own assistance the sanitary engineer, who had devoted his life and energies to that especial branch of the profession.

A vote of thanks was then unanimously passed to

Mr. Tarbotton, who, in reply, said he wished it to be distinctly understood that he did not mean that engineering and architecture could be absolutely fused, but on sanitary questions there might be more fusion than there was at the present time. Mr. White referred to that point very properly and very strongly, and he quite agreed in his views. In the course of his experience of a third of a century he had found that up to the present time architects did not understand anything about drainage.\*

#### HOUSE DRAINAGE.

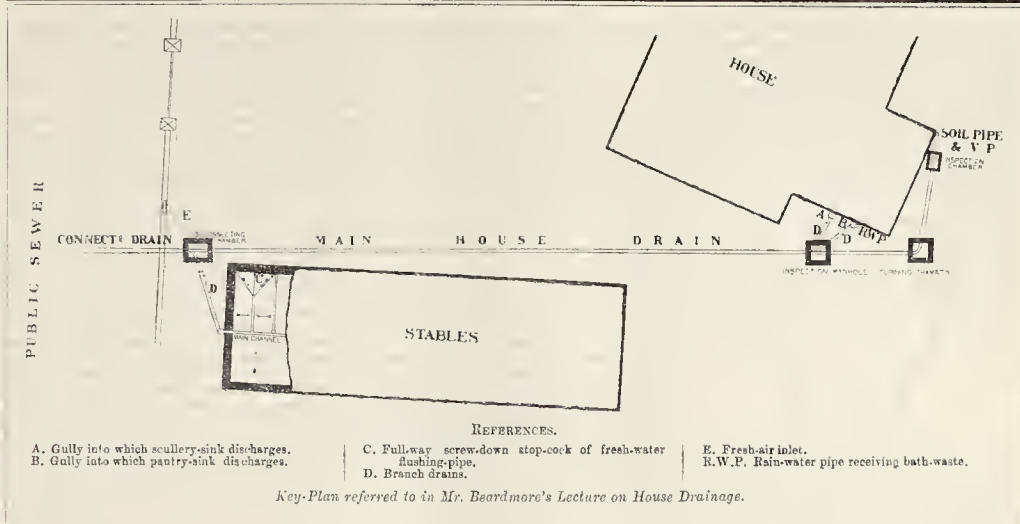
CIVIL AND MECHANICAL ENGINEERS' SOCIETY.

At the meeting of this Society on the 2nd inst., the President, Mr. E. H. G. Brewster, A.M.I.C.E., in the chair,

Mr. W. Lee Beardmore, A.M.I.C.E., gave a lecture on house drainage. Dealing first with a country-house, such a one as might be situated in the position shown by the accompanying key-plan,† he pointed out that it was unnecessary in such a case to carry any part of the house-drain beneath the house. The main house-drain in such a case might be carried along as shown in the plan, it being quite cut off from the public sewer by a disconnecting manhole, which should be placed at from 60 ft. to 70 ft. from the house whenever possible. The sewage of the house in the case shown by the key-plan would be carried from the channels in the disconnecting manhole or chamber by means of a short length of drain (which he preferred to call the "connecting drain"\*) into the sewer, which in this case is taken to be at the left-hand of the diagram, though it is not shown thereon. Of course the upper end of the connecting drain, just after it leaves the disconnecting chamber, must be trapped with a trap of the form shown in fig. 1, the upper socket receiving an inspection-pipe, passing upwards to the disconnecting manhole, above the outlet into the trap. This inspection pipe is provided with a cap, so that in case of any stoppage in the connecting drain (i.e., between the disconnecting manhole and the sewer), the cap,—which is, like the trap itself, of stone-ware—could be easily removed and the drain inspected or cleared by rods, &c. The cap should,

\* Mr. Tarbotton is certainly putting this statement in far too general and sweeping terms. Had he said that "a good many architects did not," we fear we must have left the statement unchallenged. But to make the statement roundly imply that Mr. Tarbotton's experience has not been fortunate.—Ed.

† It should be mentioned that the key-plan is intended more as a lecture diagram, illustrating the principal points touched upon, than as a representation of a complete plan of drainage. As Mr. Beardmore pointed out, there are appliances not shown, which would have to be discharged through a branch drain into an inspection chamber.



however, be sealed with neat cement, in order to prevent the passage of foul gases into the disconnecting manhole or chamber. The trap shown in fig. 1 was pointed out as a good form of



Fig. 1.

trap, inasmuch as, while it gives an ample amount of seal, its contour is such as to lend itself to the easy passage of the sewage. The trap shown in fig. 2, on the contrary, was



Fig. 2.

instanced as a bad form of trap, owing to its uneasy bends and angularity offering resistance to the flow. For the like reasons, figs. 3 and 4 were pointed out as good and had forms of gully-traps respectively. Fig. 3 shows a gully-trap which was designed by Mr. Rogers Field and is manufactured by Messrs. Bailey & Co., of Fulham. The connecting drain should be 6 in. in diameter, but the siphon trap itself should only be 4 in. in diameter, and the inspection arm terminating with the cap should also be 4 in. in diameter. The outlet of the connecting drain into the sewer might be provided with a hinged flap, which would open to allow of the passage of sewage, and might exclude rats, though it would not exclude sewer-gas from the drain, which could only be done by the siphon trap in the disconnecting manhole before referred to. The main house-drain itself need rarely be more than 4 in. in diameter. If it and the siphon-trap were much larger they would seldom or never get flushed full-bore by the sewage of an ordinary house,—in short, they would never get flushed as they needed to be if they were to be kept sweet and clean. If the main house-drain were going to be carried outside the house, the lecturer advised the use of glazed stoneware pipes. If however, the house-drain had to be carried under the house, as was generally the case in London, he recommended

the use of iron pipes. He thought that the objections which had been lately urged against the use of iron drain-pipes were not conclusive. Cast iron, it was true, was liable to rust, but the extent to which liability would operate against the use of iron for drain-pipes had been, he thought, very much over-estimated. If coated with Dr. Angus Smith's solution they would be protected from rust for a very long time. Being in 8 ft. or 9 ft. lengths (as compared with stoneware pipes, which were only 2 ft. long), the joints in a given length of iron drain would be something less than one-third the number of those in the same length of stoneware drain. The iron pipes should be socket and spigot pipes, with the joints well caulked with tow

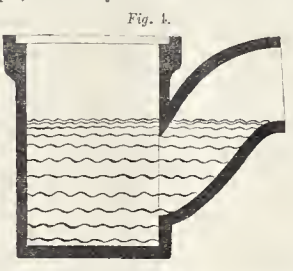


Fig. 4.

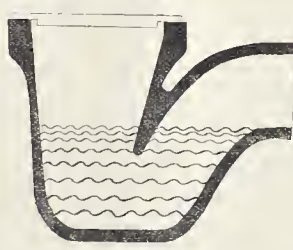


Fig. 3.

and run in with blue lead, which should also be caulked home. Iron pipes thus jointed would successfully resist much greater strains than were ever likely to come upon them when used for drainage purposes, even in case of settlements in the ground. Stoneware pipes, even for work outside the house, should be chosen with a thorough glaze inside and outside, should be free from hurr and flaws, and should be true in outline and shape. The joints should be made with neat cement. The soil-pipe should be of the same diameter throughout as the house-drain, and should, wherever possible, form the head or extreme limit of the house-drain as shown in the key-plan. It should be carried up full bore as a ventilating-pipe, 3 ft.

or 4 ft. above the eaves of the house and above any dormer windows. By having the soil-pipe at the head of the house-drain a thorough current of air from the fresh-air inlet into the disconnecting manhole, along the house-drain, and up the soil-pipe, would be better maintained than if the soil-pipe went up at some intermediate point of the house-drainage system. The soil-pipe should, of course, be external to the building, and should be of heavy iron pipes, with the joints made in the same way as prescribed for the iron house-drain. Lead soil-pipes outside a house were open to the objection that a ladder placed against them by a gardener or horse-painter would dirt them, and so cause them to lose their true cylindrical form,—an evil much to be deprecated in the interests of the self-cleansing capacity of the

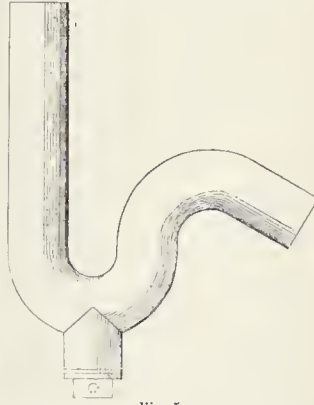


Fig. 5.

pipe. Where the air inlet-pipe to the disconnecting chamber was placed, as it sometimes necessarily would be in towns, in the near vicinity of a house, a tale flap might be placed over the aperture so as to close against the emission of foul air, whether momentarily caused by a rush of water down the soil-pipe and house-drain, or by the down-blow of occasional gusts of wind. The fall of a main house-drain of 4 in. diameter should never be less than 1 in 30; a 6-in. drain should have a fall of not less than 1 in 40; and if it were ever necessary to have a 9-in. house-drain (which he did not believe) the fall should be not less than 1 in 60. Mr. Beardmore then went on to describe other details as to the disconnection of water-closets, baths, lavatories, and sinks. Baths should discharge through a round-sectioned P or O-trap, leading to and discharging into an open rain-water-pipe-head, the pipe being carried down above the water-level in a gully-trap, such as that shown in fig. 3.

Scully and butler's sink wastes should discharge over open gullies of the same kind, and should be trapped, otherwise the waste-pipe would act as a kind of Tobin's tube for the admission of air, mingled with foul gases caused by the greasy deposit always found in such pipes. The trap shown in fig. 5 was a very good one for a butler's sink or for a lavatory; but for a scullery sink, discharging over an open gully, he preferred Jennings's improved hell-trap (a section of which is shown in fig. 6), owing to



Fig. 6.

the readiness with which it could be cleansed. The removal of the disc in this trap, it would be observed, did not destroy the seal. The housemaid's slop-sink was generally a very objectionable thing, and it was always better, in his opinion, to treat it as a w.c. The best form of water-closet he believed to be the valve-closet, but it should not be provided with that readily-siphoned appliance, an overflow-pipe. He advocated the adoption of Mr. Rogers Field's valve-closet, in which provision was made for allowing the overflow, if any, to run over the top of the basin into a lead safe or tray, whence it could be conducted out through the wall by a pipe like the warning-pipe of a cistern, but provided with a brass flap to prevent up-draughts. That pipe should be made to discharge into the open air, so that the overflow might be observed. The drainage of the stables should be made to discharge over a gully-trap, which in its turn should discharge through a branch drain, over the straight, open channel in the disconnecting manhole, whenever possible. Mr. Beardmore advised the use of iron channels such as those made by Messrs. Cottam & Co., especially the "Claremont" pattern. The branch channels could be readily flushed from water-pipes carried from the heads of the stalls to the tops of the channels, while the main channel could be flushed similarly, but by a larger pipe at the end furthest from the gully. Mr. Beardmore also referred to the evils resulting from the redundant size of house-drains insisted upon by some local authorities, and, in conclusion, urged architects to plan their buildings in full view of and with all consideration for the best and most workable disposition of the drainage and sanitary arrangements generally, instead of planning their buildings first and then considering the sanitary arrangements, sticking a water-closet in one corner, a lavatory in another, and a urinal in another, wherever a nook otherwise difficult of utilisation could be found. Such a method of planning could never be productive of satisfactory results. Another golden rule in house sanitation was to have as few sanitary fittings and appliances as possible. The water-closets should be placed, whenever they could be, at the angle of a building, so as to be situated against two external walls, and each closet should, in fact, form a small room, with ample light and ventilation. A well-ventilated lobby or ante-room (which might also serve as a lavatory) should whenever possible be interposed between the closet and the house.

[So much interest was taken in the subject of the paper that a special meeting for its discussion was held on Wednesday evening last.]

**Sunday Art Exhibition.**—The exhibition of the Institute of Painters in Oil Colours, at the Piccadilly Galleries, will be open to the members of the Sunday Society next Sunday, and on Sunday, February 20th, the public will be admitted by tickets. These tickets will be ready for issue on Monday next, and they will be sent free to those who make written application, and send a stamped and addressed envelope for reply, to the Honorary Secretary, 8, Park-place-villas, W.

## LECTURES ON ARCHITECTURE AT THE ROYAL ACADEMY.

### METHODS OF DECORATION AS APPLIED TO GREEK BUILDINGS.

ON Monday evening last Mr. J. H. Middleton, M.A., Slade Professor of Fine Art in the University of Cambridge, lectured to the students of the Royal Academy on "Methods of Decoration as applied to Greek Architecture." Having given a brief though graphic outline of Greek history, in the course of which he showed how strongly Oriental and especially Phœnician influences had tinged the early art of Greece, he went on to speak of and to describe the Palace of Tiryns, from the remains of which we had learned a very great deal as to the early use of different branches of art as applied to the decoration of buildings. As far as could be judged from the evidence of the building itself and its forms of ornament, the palace belonged to the earliest period of Hellenic development, —to the time when a Greek chief had succeeded to the wealth and magnificence which had been founded by one of the Oriental invaders. Though there was distinct evidence to show that the powerful rulers who inhabited Mycenæ and Tiryns belonged to an earlier age than that described in the Homeric poems, yet the buildings, the decorations, the arms, and the gold jewelry found there all assisted us to understand the meaning of much in both the Iliad and the Odyssey which before was obscure and indistinct. Before proceeding to describe the various modes of decoration used in the palace, the lecturer observed that in early times Greek art was almost purely decorative. Painting, sculpture, and metal-work were not employed for the production of objects such as enamel pictures and statues, which were simply intended to be beautiful works of art; but all the various arts were devoted to the enrichment of walls, columns, or roofs, or else, on a smaller scale, to the production of magnificent armor and personal jewelry. Such limitation of the scope of early art did not, however, act upon it in a degrading or in any sense in an injurious manner; on the contrary, the strong recognition by the early Greeks and their Oriental predecessors of the restrictions imposed on their art by the truest canons of decorative treatment, led to a simplicity of treatment and a certain reserve of power and knowledge which resulted in magnificent decorative effects. Passing on to speak of the examples of architectural decoration which were supplied by the remains of the Tirynthian palace, Professor Middleton referred first of all to the floors, which were partly of concrete and partly of mosaic, the open courts of the palace being carefully paved with a thick bed of concrete, which in places where there was exceptional traffic had its surface studded with a sort of mosaic formed of water-worn pebbles set closely together, this being clearly the first beginning of the art of mosaic-work. The other method of floor decoration at Tiryns was no less interesting. Inside the rooms and passages the concrete had been floated with cement to a fine surface, on which, while yet soft, simple designs of squares and wavy lines were scratched, and the whole was then coloured blue and red,—the lines or bands one colour, and the main ground another. From the fact that the colouring matter had sunk some perceptible distance into the body of the cement the pigment must have been applied while the cement was quite fresh,—a real example of true fresco in its simplest form. As to the decorative treatment of walls and other surfaces by means of metal linings, traces existed which showed that some of the walls were at least in part lined with thin plates of bronze, beaten into reliefs and thickly gilt. These bronze linings were nailed on to wooden boarding, with which the wall surface was first of all covered. Doors were covered with bronze plates in a similar manner, the method of treatment being probably not unlike that to be seen in the bronze gates of Salmeser II., from Balawat, now in the British Museum. What the form of the bronze linings on the wooden columns might have been was shown by a red marble shaft and capital which belonged to the doorway of the so-called Tomb of Agamemnon at Mycenæ. That beautiful piece of sculpture (which, by the way, was illustrated in all the hooks worn way up and called a "base") was richly decorated with

delicate surface reliefs of chevron and lozenge bands, clearly copied from a metal original, as rows of nail-heads were carved in the marble. Thus the apparently mythical splendour of the Palace of Alcimons described in the Odyssey (vii., 84), the brazen walls, the doors of gold, and lintels of silver, were not the mere offspring of the poet's fancy. Another sumptuous form of decoration in the Homeric palace of Alcimons had its prototype at Tiryns, namely, the *θηρική σκηνή*. A fragment was found in the great hall of a richly-carved alabaster frieze, covered with delicate ornaments and rosettes and spirals cut in relief, and thickly studded with jewel-like pieces of deep blue glass or paste, carefully cut and fitted. Lastly, the Tirynthian palace was richly decorated with mural paintings. With the exception of a stone plinth about 2 ft. 6 in. high, the walls of the house were built of sun-dried clay bricks. The whole surface was covered with fine hard stucco, which formed a very perfect protection against the weather, and both inside and outside the stucco was decorated with paintings. The wall-paintings of the Palace of Tiryns were of special interest, as being the only examples of the kind that had yet been found. Sufficient fragments had been preserved to show that a great variety of designs were used, belonging to two quite distinct classes of art. Though very simple in treatment, and not minutely finished, the paintings showed a very keen sense of the true principles of decorative art, and also by their freedom of line, and strong decisive touch, bore witness to a very remarkable technical skill and thorough training of hand and eye. The pigments were applied before the stucco was dry; in other words, true fresco was used, not distemper or encaustic painting, both of which were chiefly used by the later Greeks. Not only had the colours sunk into the stucco to an appreciable depth, but in some places the bristles of the brush had left their impression in the stucco. The pigments used were such as would have stood the contact with fresh lime. The native style of art was not limited to mere patterns; figures of animals and men were also introduced, and some very curious examples of these occurred on the painted pottery. There was a special charm about this early art, which was in some respects of even greater interest than that of later and more highly-developed periods. While there was less demand for mechanical perfection, there was more individual freedom allowed to each workman, and thus his work must have been more interesting to him. In the early pottery, for instance, what was most striking about it was its endless variety of form, evidently changing with the mood and individuality of each potter, and full of the most easy grace and multifarious flowing lines. It showed extreme fertility of invention, and the utmost freedom of touch in the manipulation of the revolving mass of plastic clay. The whole style was in great contrast to that of the very beautiful Greek vases of the fifth century, in which the individuality of the potter was carefully suppressed. In these later vases one fixed model had to be followed, from which very little deviation was allowed, and so the result was that there was something rather rigid in their highly-finished beauty, their polished surface, and their extreme perfection of workmanship. Again, the sculptured ornaments on the Greek buildings of the best period also suffered very seriously from the demand that the Greeks made for perfection in design and execution. Towards the end of the fifth century, after long ages of development, the Greeks had arrived at what they considered was the perfectly appropriate ornament for certain parts of a building. One fixed pattern was to enrich the main members of the cornice, others were exactly the right ones for the capitals, and so on, so that even at the most highly-developed period of Greek art there was an undeniable dullness in much of their ornament; for however beautiful a thing was, its beauty could not stand constant and precise repetition. Freshness and spontaneity were absolutely essential elements in the production of works of the highest æsthetic value. On the whole, the earliest Greek art belonged to one of the greatest periods of decorative skill that the world had ever seen, produced by a combination of wealth in the precious metals, and unsparing labour, with the true sense of the fit methods to be employed and the limits to be observed in the use of sculpture, painting, and metal work.



THE ASSOCIATION OF PUBLIC  
SANITARY INSPECTORS.

## ANNUAL DINNER.

The fourth annual dinner of this Association was held at the Guildhall Tavern on Saturday evening last, the President, Mr. Edwin Chadwick, C.B., in the chair, supported by a large number of well-known sanitarians.

The Chairman, in proposing the health of the Queen, the Prince of Wales, and the rest of the Royal Family, said it was matter for congratulation that in the fifty eventful years of the Queen's reign so much had been attempted and so much achieved in the special subject of the health of nations. It might be claimed that in these fifty years the science of sanitation had been founded, and that the Queen was herself one of the first to recognise its principles in the advancement of the health, the strength, the duration of life, and the happiness of her subjects. More than a quarter of a century ago he stated that if all her Majesty's subjects were to bestow the care that by the Queen's directions was bestowed on her own cottages, every third year would be a jubilee, in which there would be no sickness and death.

Dr. John C. Peters, of New York, proposed "The Army, Navy, and Reserve Forces," which was coupled with the names of Sir Andrew Clarke, R.E., Capt. Douglas Galton, R.E., and Major Lamorock Flower.

Sir Andrew Clarke, in replying, bore testimony to the great results that had been achieved for the Army as well as for the civilian population by the labours of Mr. Chadwick, instancing the case of Fort William, on the Hooghly, formerly one of the deadliest of military stations, but now, by the observance of sanitary laws, one of the healthiest.

Captain Douglas Galton and Major Flower also replied, the former gentleman remarking that he looked upon the sanitary inspectors as the very backbone of sanitary administration.

Sir Robert Rawlinson, in proposing "The Association of Public Sanitary Inspectors," said that their President might be said to have laid the foundation of modern sanitary science. He (Sir Robert) had been brought to London and educated in sanitary work under Mr. Chadwick's supervision. And there were other men who had done a great deal for the promotion of sanitary science, notably Lord Fortescue, Captain Douglas Galton, and Mr. George Godwin, the late editor of the *Builder*. No one had done more to help on the work of sanitary reform, especially in house accommodation, than Mr. Godwin, whose labours in the cause had been persistent, well-directed, and emphatically successful. In the course of further remarks Sir Robert Rawlinson insisted upon the necessity of making sanitary inspectors and other health officers to a great extent independent of those who, as things at present stood, were able to bring undue and improper influences to bear against the efficient performance of important public duties. With the toast was coupled the name of Mr. Edwin Chadwick, C.B.

Mr. Chadwick, in replying, said that sanitary science was now so far advanced in certainty that if it were duly represented for the people by a superior and competent State organisation, say by a Minister of Health, that authority might within limits direct, and the sanitary engineer might undertake to effect, large definite reductions of death-rates, and (setting aside the consideration of human pain and misery) might do so as a contractor at a charge for works simply for the saving of money by the reduction of the insurance charges for preventable sickness and mortality. Thus, the present reduced annual death-rate for the metropolis might be stated at 19 in 1,000. He concluded that the sanitary engineer might undertake its reduction to 5 in 1,000, and that he might undertake to do so at a cost greatly below the existing insurance charges for sickness, loss of work, and death. These conclusions he based on that which had been done for the common lodging-houses,—old buildings once the seats of pestilence, now cleared of them by very rudimentary sanitary measures,—also on what had been done in blocks of buildings in the metropolis,—also in old urban districts, such as Salisbury, where the death-rate was as high as 40 in a thousand, and, since sanitation, had been reduced to 16 in a thousand,—in Dover, once 28 in a thousand, now about 14; Rugby, once 24 in a thousand, now under 12; Croydon, once 23, now 10 to 15; Matlock, once 18, now 9. These figures were

subject to fluctuations above or below. But the working examples of reductions of death-rates by more than a third were sufficiently numerous to warrant the undertaking of the reduction of the death-rate of metropolis by at least one-third.

Dr. B. W. Richardson, in proposing "The Houses of Parliament," coupled with the names of Earl Fortescue and Sir Guyer Hunter, referred in eloquent words to the labours of Earl Fortescue as one of the pioneers of modern sanitary reform.

Lord Fortescue and Sir Guyer Hunter replied,—the former speaker mentioning some interesting reminiscences of sanitary administration forty years ago, and Sir Guyer Hunter referring to the improved and improving sanitary condition of India.

Mr. W. E. H. Lecky, the historian, in an eloquent speech, proposed "The Executive." He said that whatever might be said of the eighteenth century, it could not be said to be distinguished for the prevalence of sanitary knowledge. Sanitary science, as we now understood it, was a thing of later growth, although one great sanitary reformer had appeared before the eighteenth century, and his name was The Great Fire of London, who undoubtedly did good in destroying plague-spots, whatever harm he might have done in addition. The end of the eighteenth century witnessed the work of another great sanitary reformer, John Howard, whose labours amidst the horrors of gaol fever were so remarkable. But it was not until the nineteenth century had dawned that it was seen how much could be done by legislation and voluntary effort to improve the health and to ameliorate the social and moral condition of the people; and when the history of the nineteenth century came to be written, among the many notable figures which the historian would have to trace, one of the most notable would be that of the distinguished founder of modern sanitation, Mr. Edwin Chadwick.

With the toast was coupled the name of Mr. G. B. Jerram, Chairman of the Council, and Mr. S. C. Legg, the Honorary Secretary, who briefly replied, Mr. Jerram mentioning circumstances which gave additional point to Sir Robert Rawlinson's remarks as to the necessity of protecting health officers from unfair treatment because they honestly and fearlessly discharged their duties.

Among the other toasts were "Colonial and Local Government," proposed by Dr. Mouat, of the Local Government Board, who gave an interesting account of what (stimulated by the writings and reports of Mr. Chadwick) he had done to improve the sanitary condition of Fort William more than thirty years ago. The toast was replied to by Sir Saul Samuel and Dr. T. O. Duddield.

## SOCIETY OF ENGINEERS.

The first ordinary meeting for the present year of the members of the Society of Engineers was held on Monday evening, February 7, at the Town-hall, Westminster. The chair was first occupied by the retiring President, Mr. Perry F. Nurse, who presented the premiums of books awarded for papers read during the past year. These were—the Bessemer Premium, to Mr. Percy Tarbutt, for his paper on "Liquid Fuel"; the President's Premium, to Mr. G. B. Jerram, for his paper on "River Pollution caused by Sewage Disposal"; and a Society's Premium to Mr. E. S. Bellasis, for his paper on "The Roorkee Hydraulic Experiments."

The death of Sir Joseph Whitworth, an hon. member of the Society, was announced, and a resolution passed offering to Lady Whitworth the condolence of the Society.

The retiring President then introduced the President for 1887, Professor Henry Robinson, who proceeded to deliver his inaugural address. He dwelt at some length on the essential conditions that had to be observed in preparing and training a young man for the engineering profession. Many youths are sent almost direct from school into workshops; whilst, on the other hand, many pursue their theoretical studies apart from opportunities of observing the practical application of their knowledge. In the former case, the youth may become a skilful mechanic, but will lack breadth of knowledge. In the latter, the youth acquires a higher proficiency in pure science than may be required for actual engineering work, and is wanting in the heaven of practical

knowledge. The brain and the muscles, or the mind and the hands, should work together. He urged the necessity for State aid towards higher technical education which a Royal Commission in 1872 had recommended for the endowment of colleges like King's College and University College, London, and others in great industrial centres. Various other matters were touched upon in the address, which also included a strong expression of opinion as to the necessity for such a modification of existing legislation as would bring the letting or selling of houses under more stringent control as regards health. It was pointed out that it was an offence, by Act of Parliament, to sell food which was unfit for consumption, and which was a danger to health. In like manner it should be made an offence to sell or let a house when in an insanitary condition, it being equally dangerous to health.

At the conclusion of the address, a cordial vote of thanks to Professor Robinson was proposed and unanimously passed.

## ARCHITECTURAL SOCIETIES.

*Leicester Society of Architects.*—The fourteenth annual meeting of this society was held on the 25th ult., when the following officers were appointed:—President, Mr. J. B. Everard; Honorary Secretary, Mr. W. Jackson; Council, Messrs. J. Goddard, R. J. Goodacre, J. Tait, and S. Harrison. On the 2nd inst. the society held a *conversazione* at the County Assembly-rooms, Leicester, which was attended by about 500 guests, including the Mayor of Leicester and members of the Town Council, the presidents and secretaries of several provincial societies of architects. There was a good display of artistic objects lent by Messrs. Wardle, of Leek; Messrs. Trollope & Sons, Mr. Staynes, of Leicester; the Worcester Porcelain Works, Messrs. Minton, Messrs. Copelands, and Messrs. Wedgwoods. The Venice and Murano Glass Company sent two cases containing candelabra, vases, glasses, and other articles. On the wall of the reception-room was a collection of water-colour drawings, the work of Sir Edwin Landseer, George Morland, Sir John Gilbert, Birket Foster, and other well-known artists. Two side rooms were converted, one into an Early English room, and the other into an Oriental room. The English room contained tapestry from Mr. Heaton, of London, furniture, pictures, and other objects. The Oriental room was fitted up by Messrs. Elgood Brothers with drapery, grotesque lamps, Japanese art work, and Persian carpets lent by Messrs. Pare & Arthur and Messrs. Hampton & Sons. On the 3rd inst. the President, Mr. Everard, entertained at luncheon about fifty guests, including visitors, exhibitors, and members of the Society.

*Liverpool Architectural Society.*—The sixth ordinary meeting of the Liverpool Architectural Society, was held at the Society's rooms on Monday, the 7th inst., the President (Mr. S. E. Grayson, F.R.I.B.A.) in the chair. Mr. C. Aldridge called attention to a circular letter, signed by Mr. J. Oldrid Scott and Mr. John P. Seddon, which has been sent round to all the Fellows of the Royal Institute of British Architects, inviting them to sign a memorial to the Liverpool Cathedral Committee. Mr. Aldridge stated that it was easy, reading between the lines of this memorial, to see that it was an attempt to set aside Mr. Christian's very able report, and to reopen the whole question, and pointed out to the meeting that to do this would be a most improper course, as it would entirely weaken confidence in the report of a professional assessor; it was also tantamount to saying that the people of Liverpool, with the assistance of Mr. Christian, were not competent to form a correct opinion as to the suitability of the design for the proposed cathedral. Mr. Aldridge did not know how this memorial would be received by the Liverpool Cathedral Committee, but he had a very strong idea that it would be ordered "to lie on the table." Mr. G. E. Grayson, the President, and Mr. W. Farslow, emphatically endorsed the opinions expressed by Mr. Aldridge, which were evidently approved of by the meeting. Mr. J. H. Cook was congratulated upon having been awarded the Silver Medal of the R.I.B.A. and 10l. 10s. for his measured drawings of Stokesay Castle. Mr. G. H. Morton, jun., read a suggestive paper on "Colour," chiefly in regard to decoration, at the close of which he remarked that harmony of

colour arose from the equal presence of the three primary colours: "the scientific fact that natural solar light caused three principal colour sensations, all of which must be equally excited or the eye got wearied, must not be neglected." In the report sent to us the "primary colours" are not named; we presume, Mr. Morton, that there are differences of opinion on the subject.

*Manchester Architectural Association.*—On Tuesday evening last an interesting paper was read before the members of this Association by Mr. H. E. Stelfox, on the origin and development of wrought iron flooring in France. The paper was illustrated by a number of diagrams showing various kinds of flooring in use in that country. The President of the Association, Mr. L. Booth, F.R.I.B.A., occupied the chair, and at the close of the meeting a hearty vote of thanks was accorded to Mr. Stelfox.

#### DRAWINGS FOR THE ROYAL ACADEMY.

As on former occasions, we shall be glad to photograph beforehand any drawings of importance that are intended for the Architectural Room at the Royal Academy, for ultimate publication in our pages, and to deliver the drawings at the Royal Academy on the day appointed for reception.

In connexion with this subject we may draw attention to the manner in which we are now enabled to reproduce architectural water-colour drawings by the Phototype process, of which an example is given in the perspective view of a design for an Art Museum in the present number. The process is equally available for reproductions from photographs of the actual building, and an example of this method of illustrating contemporary architecture will be found in the plate in our issue of January 22 of this year, showing the "Boston Art Club" and "a Sea-shore Cottage." These are from photographs taken from the buildings, and the reproductions, it will be seen, are as sharp and clear as the photographs themselves.

The Phototype method, under present arrangements, is not available for any other architectural journal.

### Illustrations.

#### DESIGN FOR AN ART MUSEUM FOR GENEVA.

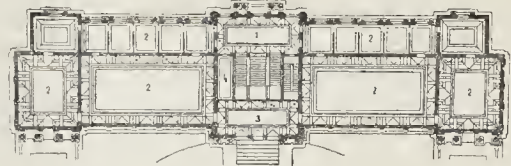
**T**HIS design, which obtained the second premium in a limited competition, is by Herr Alexander Koch, a German architect, formerly of Zurich and now resident in England. We append the plans of the ground-floor and first-floor, or rather (from the way the plan is drawn) of mezzanine and first floor, as the roof of the colonnade seems to be shown on what is described on the plans sent to us as "erdgeschoss." It should be observed that from the rise of the level of the proposed site, from front to back, the first floor has an entrance from the ground level at the back.

The design is a good example of a type of modern architecture much more admired in Germany than in England, and which is, no doubt, open to the charge of being cold and formal in feeling, but it is a dignified and stately design of its kind. It is reproduced by phototype from the author's monochrome drawing.

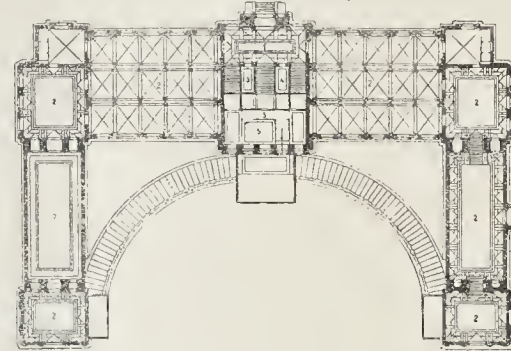
MESSRS. SAMPSON LOW, MARSTON, SEARLE, & RIVINGTON'S NEW PREMISES, FETTER LANE, FLEET STREET.

We this week give an illustration of a new block of offices and warehouses in course of erection in Fetter-lane, between Fleet-street and the Record Office, for Messrs. Sampson Low, Marston, Searle, & Rivington, the well-known publishers. The premises have a frontage of 80 ft. and a depth of 70 ft. The elevation, which is of Portland stone, and Wilcox's ivory white bricks, will make a considerable improvement in Fetter-lane, as the building occupies a site which has been vacant for some time.

The works are being carried out by Messrs.



UPPER FLOOR.  
1. Vestibule. 2. Galleries. 3. Gallery (committee room &c.).



GROUND FLOOR.  
1. Vestibule. 2. Galleries. 3. Doorkeeper. 4. Porter. 5. Caretaker's rooms.

Plan of Design for School of Art.—A. Koch, Architect.

Patman & Fotheringham, contractors, of Theobald's-road, from the designs and under the superintendence of the architect, Mr. W. Seckham Witherington.

#### DESIGN FOR A PROPOSED PEOPLE'S PALACE,

BY THE LATE E. W. GODWIN AND JOHN P. SEDDON.

The accompanying drawing of a building that was proposed to be built some time since on the Savoy site on the Victoria Embankment in London, now occupied by the Medical Examination Hall, was prepared by the late Mr. E. W. Godwin and Mr. John P. Seddon, as joint architects.

The elevation of the river-side façade, which we now give, was the actual handiwork of Mr. Godwin, and, as such, is an interesting example of this style of drawing, of which he was a master. Its breadth, clearness, and brilliancy speak for themselves, and we can recommend our student readers to study it carefully for those most essential qualities of draughtsmanship. No plan of the building is extant.

The prospectus of the scheme which was issued at the time gives the following particulars with regard to the proposed structure, as "a handsome building to be called the Savoy Palace," upon the site of rather more than half an acre, on the Victoria Embankment, facing the river Thames on the west side of Waterloo Bridge, and belonging to the Duchy of Lancaster. The basement, ground, and first floors were to be devoted to a central hall, gallery, &c., for periodical exhibitions of modern art, manufactures, pictures, &c., and the upper portion of the building for residential chambers and club-rooms, the lowest of which residences would have been on the second floor of the building, level with and approached by a high-level bridge across Savoy-street, through the Duchy House, in Lancaster-place, Strand, for which the necessary permission had been obtained.

#### WARMINSTER CHURCH.

This is an interesting church, retaining, in spite of the incongruous work of the last century, and the destruction of many ancient details, ample evidence of the beauty and fine proportions of the original building.

Early in the last century the whole of the nave was taken down and reconstructed in a bastard Classical style, galleries being erected at the west end, and in the aisles, the walls of which were raised to make room for them. It does not appear that any alteration beyond this was made in the exterior of the church, except that some enormous buttresses were added to strengthen the aisle walls, to receive their additional height and the weight of the galleries. It had long been intended to reseal the building, and make it in other respects better fitted than it can now be said to be for the services of the church. Plans were made ten years ago by Mr. Street for rebuilding and enlarging the nave and aisles, and re-arranging and restoring the eastern part, but they were never carried out, and what is now being done, as well as what is proposed to complete the work, is on different lines, and of entirely different character.

The work now proceeding is the restoration and re-arrangement of the eastern portion.

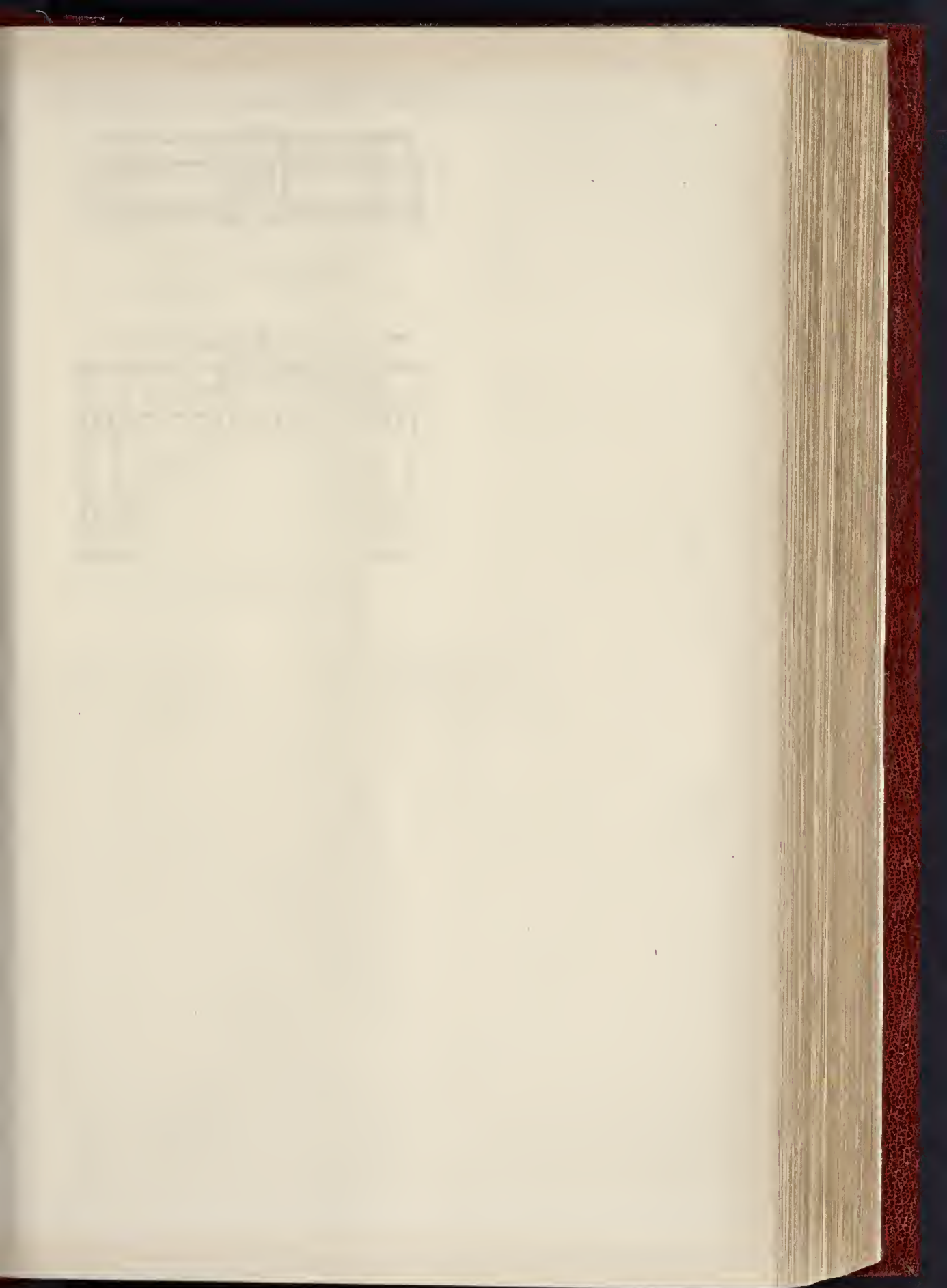
As to the nave and aisles, Mr. Blomfield reported that as they now stand they are substantial, and in good repair, and with the galleries accommodate a large number of people.

On the other hand, the style of architecture is not only bad of its kind, but is utterly out of harmony with anything in the old parts of the church, while the proportion adopted though in itself lofty and imposing, overpowers the rest of the building, and dwarfs the tower.

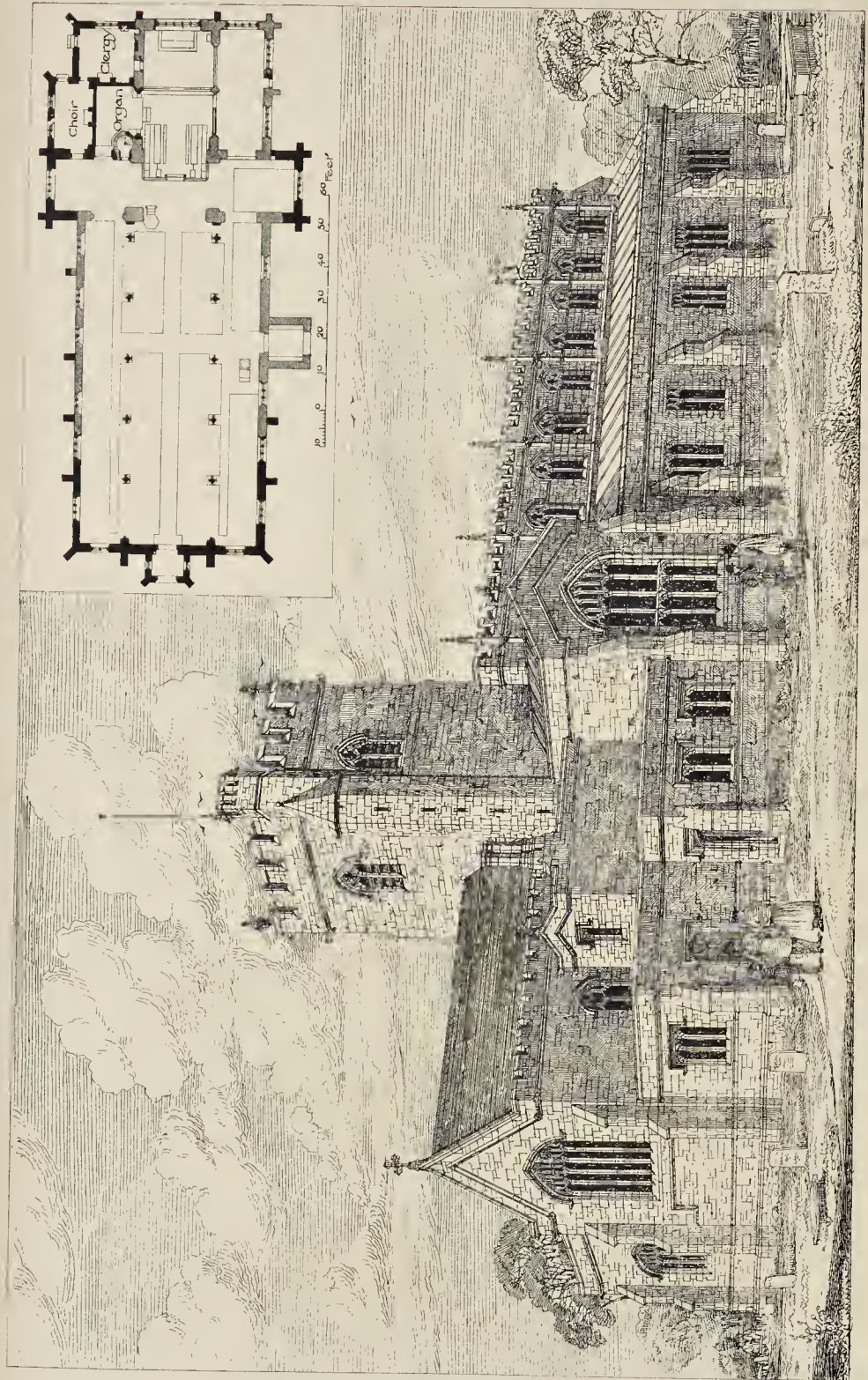
He recommended, therefore, that they should either be left precisely as they now stand, without any alteration whatever, or that the nave should be entirely pulled down, leaving only the old aisle walls, and that the nave should be reconstructed on a scale, and in a style indicated by remains which still exist; the necessity of providing seats to make up for those lost in the galleries, being met by adding two bays to the length of the church.

It was decided to adopt the latter of these two alternatives, and Mr. Blomfield's designs were approved.

It is hoped that the reconstruction of the nave may be undertaken as soon as the present work is complete. Mr. W. Strong, of Warminster, is the contractor, and Mr. J. Simpson is clerk of the works.

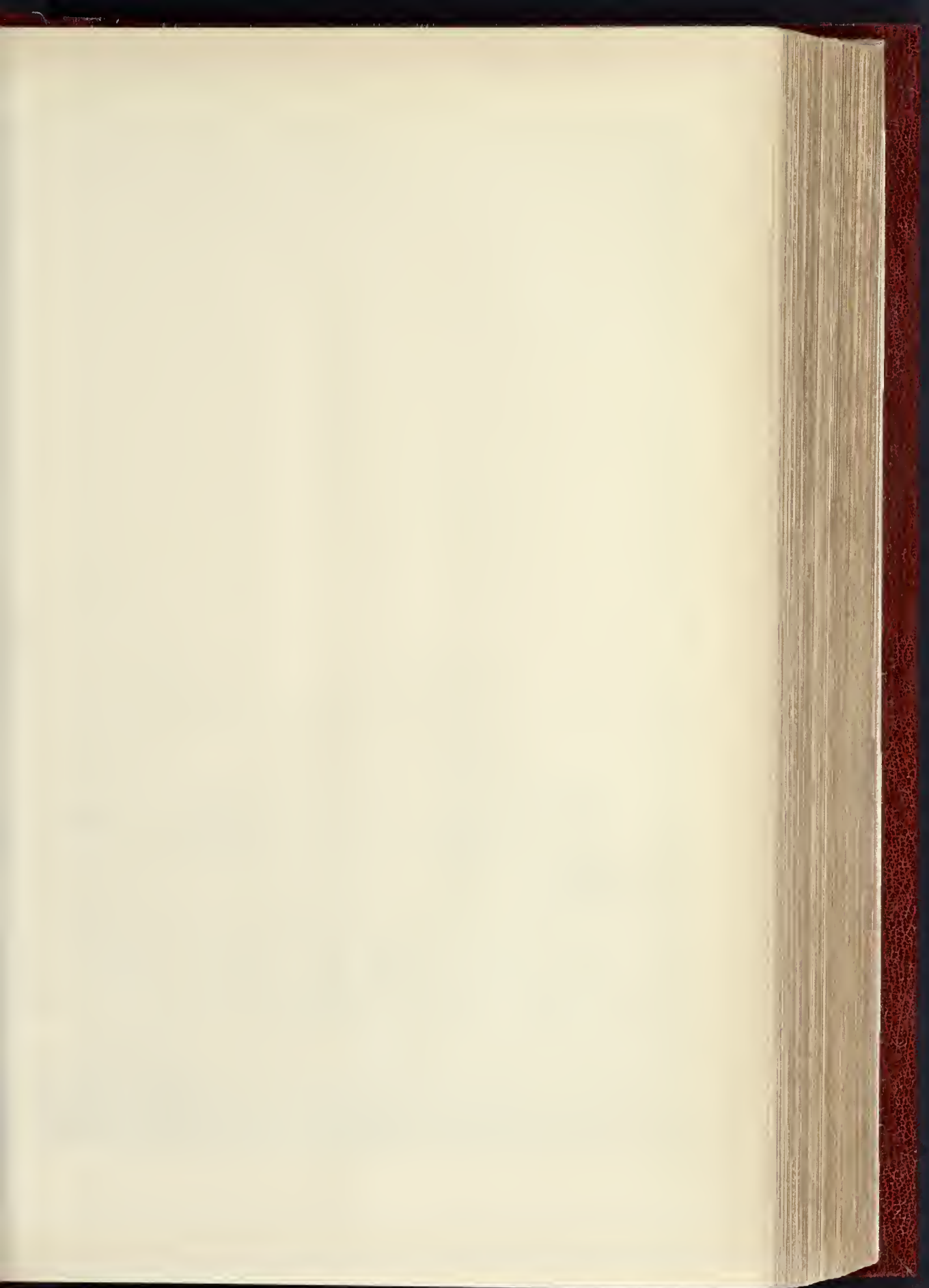


THE BUILDER, FEBRUARY 12, 1887.



CHURCH, WARMINSTER, AS RESTORED.—MR. A. W. BLONFIELD, M.A., F.R.I.B.A., ARCHITECT

THE GARDENS OF ST. JOHN.





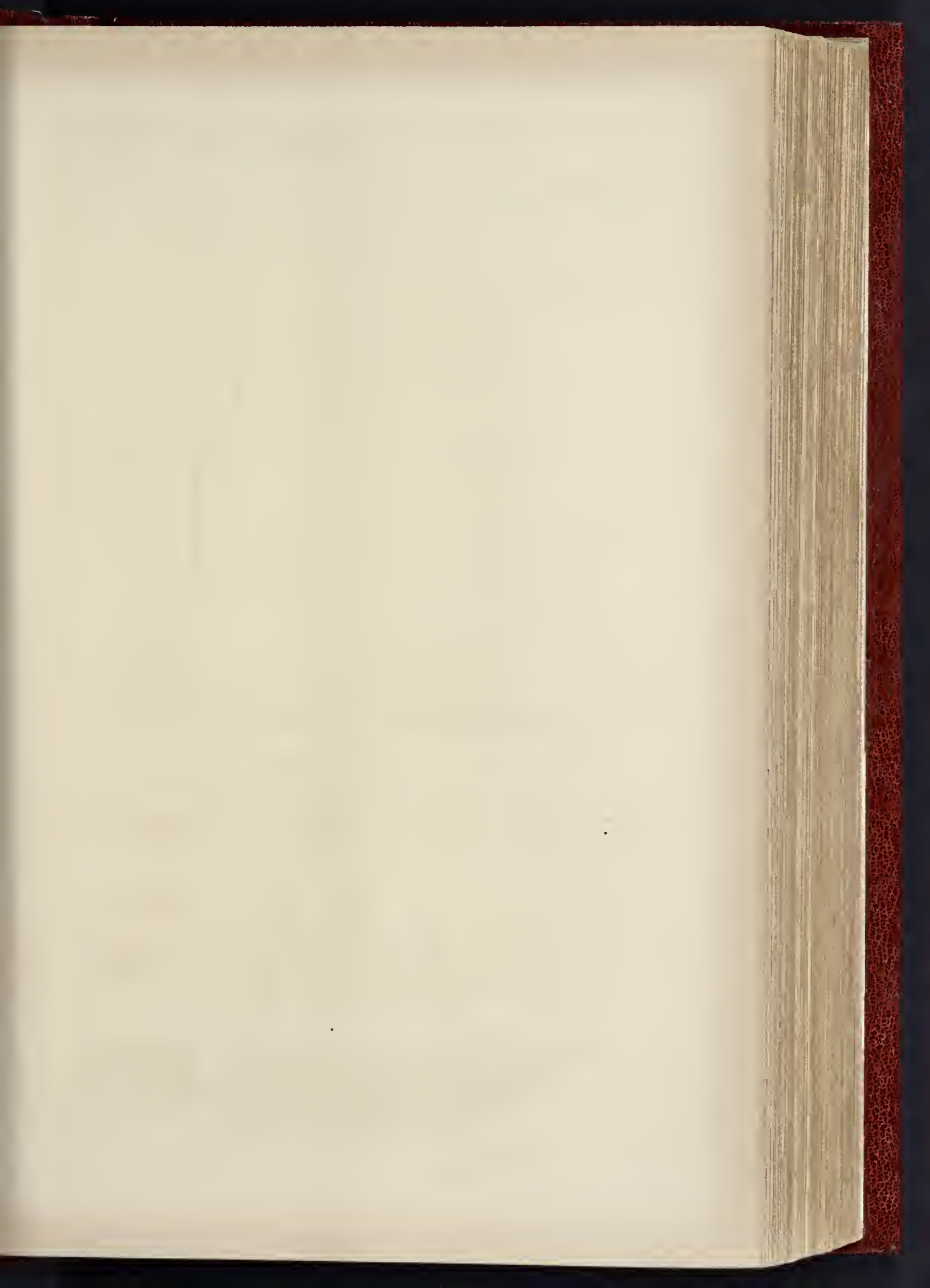
COMPETITION DESIGN FOR ART MUSEUM



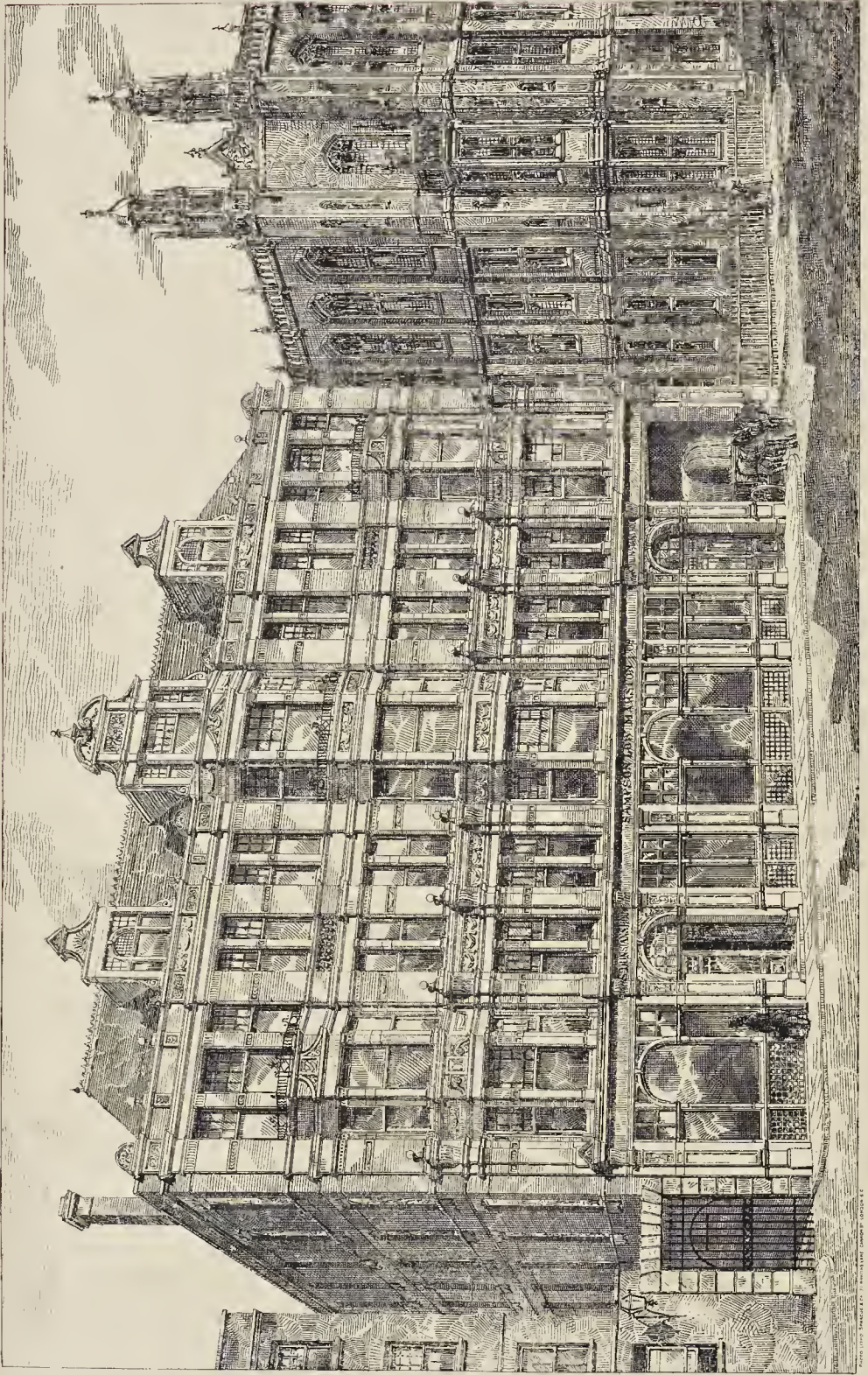
THE PHOTODUPE CO., 303, STRAND, LONDON



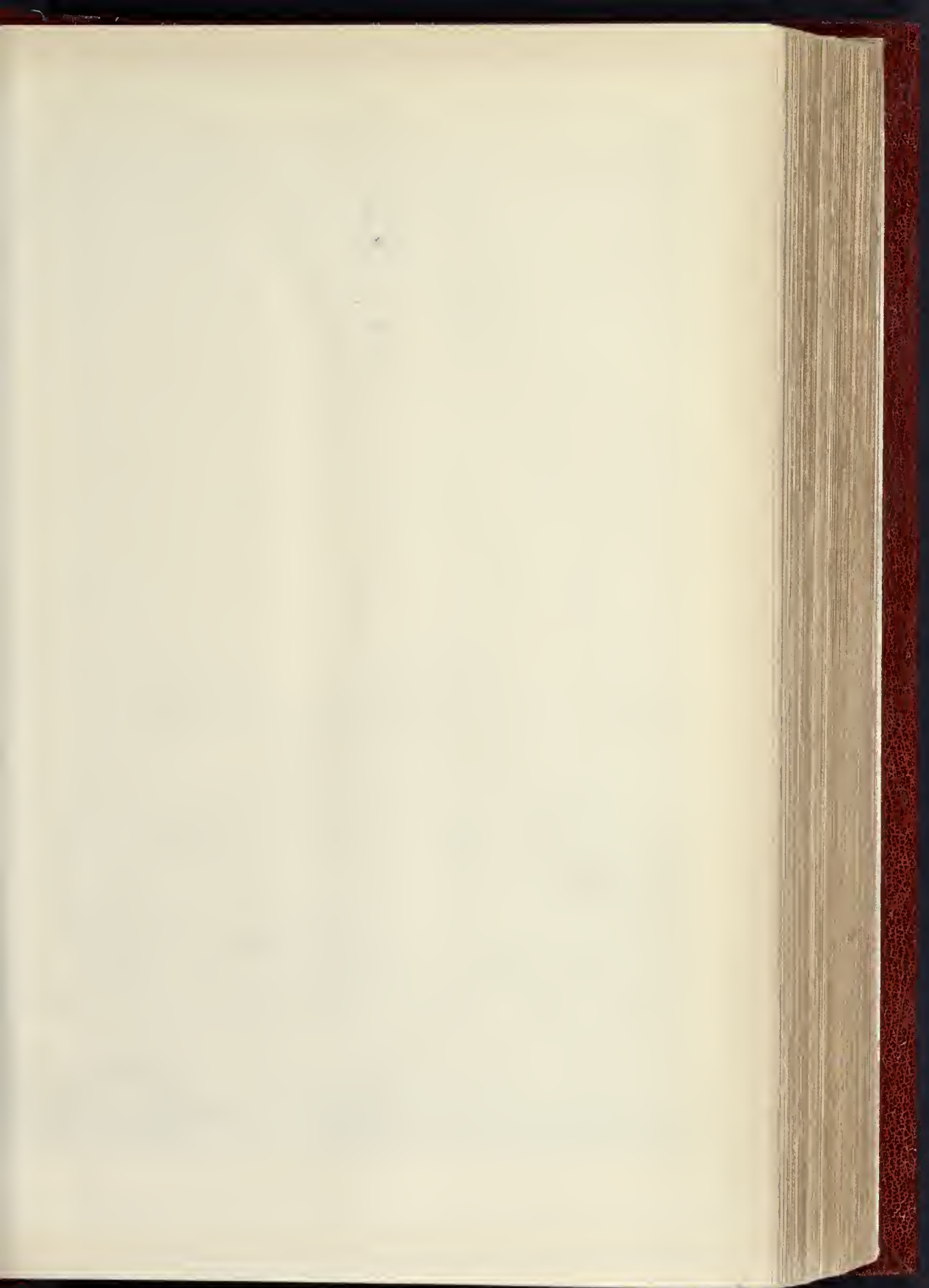




THE BUILDER, FEBRUARY 12, 1887

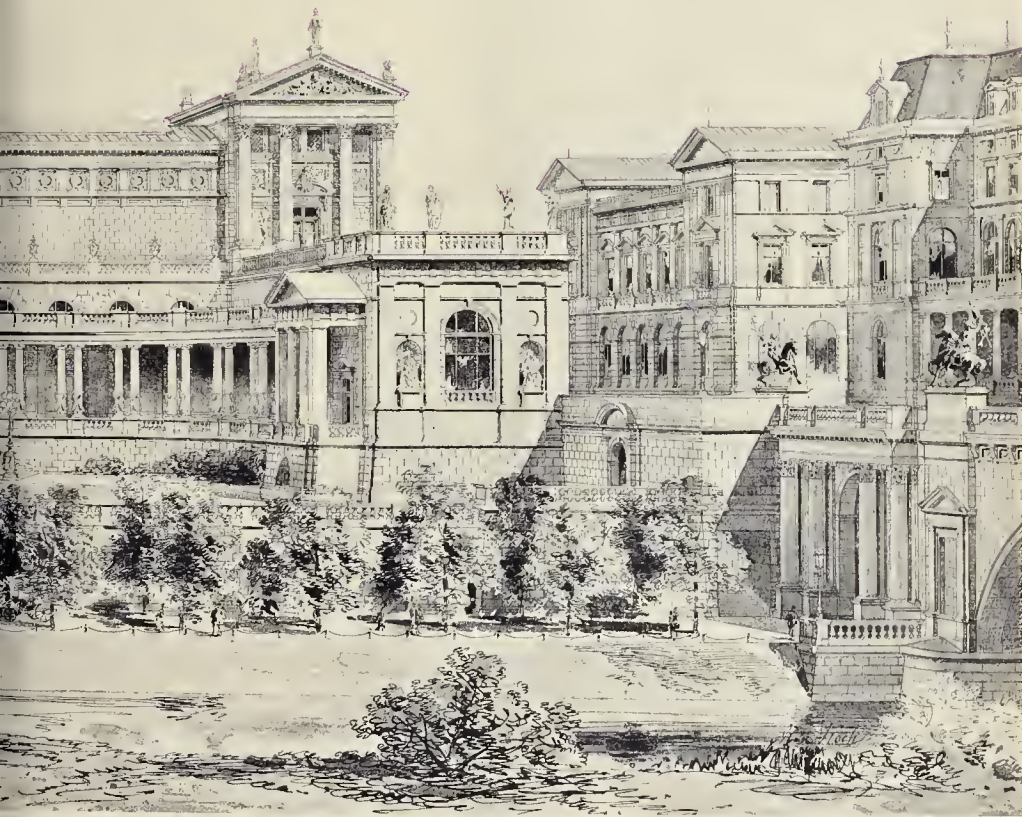


MESSRS. SAMPSON, LOW, MARSTON SEARLE & RIVINGTON'S NEW PREMISES, FETTER LANE, E.C.





COMPETITION DESIGN FOR ART MUSEUM



THE PHOTOYEE CO., 39, STRAND, LONDON.

GENEVA. HERR ALEXANDER KOCH, ARCHITECT.



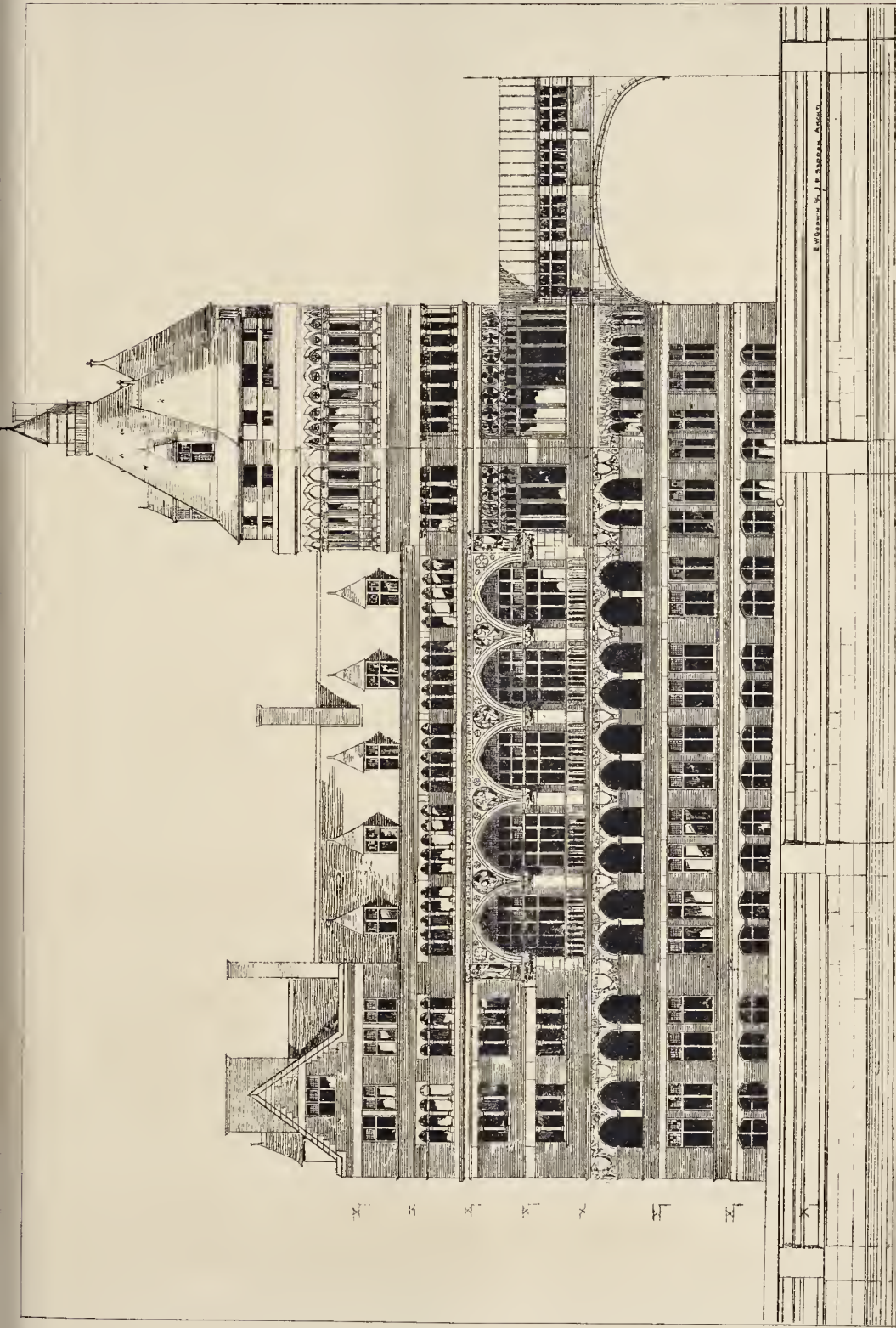


PHOTO LITHO. SPRAGUE & CO. 22, MARTINE LANE, GANNON ST. LONDON, E.C.

DESIGN FOR A PROPOSED PEOPLE'S PALACE. BY THE LATE E. W. GODWIN, AND MR. J. P. SEDDON, F.S.A.





ARRATON  
CHURCH



GODSTALL.



THE VILLAGE OF CARISBROOKE

CARISBROOKE  
TOWER



CARISBROOKE  
CHURCH

PHOTO LITHO. SPRAGUE & CO. 22, MARTIN LANE, LONDON, E.C.



SKETCHES IN THE ISLE OF WIGHT.

To the architectural student in town the Isle of Wight offers a holiday resort the quietness and beauty of which is refreshing after the bustle and worry of London work. It is full, too, of historic interest; traces of the Romans remain in the villas at Carishrooke and at Morton, and there are good examples of different periods scattered about. The sketch of Carishrooke village is taken from the slopes leading to the ruins of the celebrated old castle,—with which Celts, Saxons, Romans, and Normans may all have had something to do. It is a pity that the place is not better preserved; for instance, that portion of the building which had in all likelihood been used as a great hall by the Lord of the Island (perhaps Baldwin de Redvers, 1135) is cut in two horizontally, the lower portion being occupied as a store-room for the militia. The outer walls and gateway were built in the reign of Elizabeth, the letters "E. R. 1598" are cut on the outer gateway. The moat has long been dry, and the portcullis gone, but the original wooden gates remain, although much patched up.

Carishrooke Church, said to be founded 1064, has been partially restored; it is beautifully situated, surrounded by a fine old churchyard, adjoining the "Priory Farm House," the site of the priory attached to the old church. There are a few monuments and a pulpit, dated 1628. The tower contains eight bells. There is some fine bold carving on the pinnacles, and the view from the tower is magnificent. There are some curious stones in the churchyard: a slab over the grave of a farrier has the following lines:—

"My sledge and hammer lie reclined,  
My bellows, too, have lost their wind;  
My fire's extinct, my forge decay'd,  
My vice all in the dust is laid;  
My coal is spent, my iron gone,  
My last nail's driven, my work is done."

A long time ago some one caused to be planted over his grave, in this place, a tree instead of a tombstone; its spreading branches form an excellent shade, and is certainly a much more beautiful object than many of the monuments we meet with.

Godshill Church is situated on the top of a hill overlooking the beautiful village of the same name. The view from the churchyard is well worth the trouble of walking to see it. The church is of Norman origin, and is cruciform on plan: note on the gable of the south transept the old Sanctus Bell. There are some fine monuments in this church, and a picture is pointed out as the original "Daniel in the Lions' Den," by Rubens. It was purchased by Sir Richard Worsley about 100 years ago for 1,500*l.*, and presented to the church. There is a legend current to the effect that the site of this church was originally selected at the bottom of the hill, but as all the walls and materials built and used in the day-time were promptly moved in the night by supernatural beings to the top of the hill, the builders, to save themselves any more bother, were at last glad to commence operations where indicated.

Arreton Church. The sketch shows the porch noticed by the Rev. Legh Richmond, in his "Dairyman's Daughter." He writes:—"Looking upwards as I drew near the porch, I observed a dial on the wall. The sun's declining rays directed the shadow to the evening hour. As I passed underneath this simple but solemn monitor, I was reminded of the lapse of time, the uncertainty of life, and the sure approach of eternity." The tower has four bells, about 200 years old. The chancel was restored in 1863.

J. ELSLEY INGLIS.

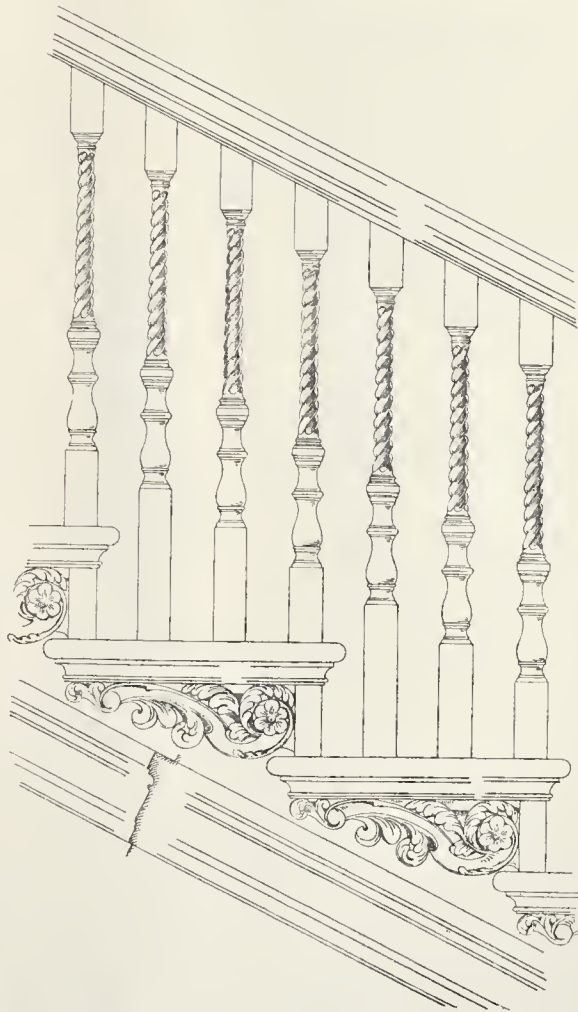
FAIRFAX HOUSE, PUTNEY.

We give a sketch and some details of this interesting old house, long a conspicuous object in the High-street of Putney, and which we greatly regret is to be demolished shortly.

**Ingram House.**—Mr. Blashill writes to say that the stone used in this building, illustrated by us a fortnight ago, should have been described as "Red Corsehill," not "Dumfriess," which does not particularise the stone, though Corsehill is in Dumfriesshire.



Fairfax House.



Fairfax House.—Details of Staircase.

ARCHITECTURAL ASSOCIATION.  
DISCUSSION ON "HOUSE SANITATION."

The eighth meeting of this Association for the present session was held on the 4th inst. at 9, Conduit-street, Mr. J. A. Gotch (President) in the chair.

The following new members were elected, viz., Messrs. H. Somerfield, W. Taylor, and M. F. Cavanagh.

The President.—Gentlemen, I think we shall all feel that it is a matter for congratulation that one of our oldest members, Mr. Thomas Blashill, has been elected Superintending Architect to the Metropolitan Board of Works (applause).

It was announced from the chair that the Coates Prize had been awarded to Mr. Grainger, of Nottingham.

The meeting then proceeded to the discussion of the lecture on House Sanitation,\* given at the previous meeting by Professor Corfield, who was unable to attend on the present occasion.

Mr. John Slater, B.A., said that the subject was such a large one, and contained in itself so many points deserving of attention, that when he was asked to open the discussion, he rather rashly concluded he would find a number of matters that had been omitted by Professor Corfield. On reading the report of his lecture he found, on the contrary, that the subject had been exhaustively dealt with, and he was then rather sorry that he had consented to open the discussion. Perhaps the newest discovery made of late years, with regard to traps, was as to the way in which they got misapplied. He believed Mr. Hellyer was almost the first to make experiments showing how this occurred, and to detail it at considerable length in the last edition of his book on plumbing. Professor Corfield had not attempted to explain how the unwhomping took place. It did so in two ways, either by absolute momentum through the rush of water itself, carrying the whole of the contents of the trap right away down the pipe; the other way being when the trap was connected by a branch with another down-pipe. If a considerable quantity of water filled the main soil pipe, it created a partial vacuum in the branch pipe, during the continuance of which the pressure of the atmosphere on the top point of the trap became greater than the pressure on the other side, forcing some of the water in the trap down the branch into the main duct. This was the reason why it was so important to ventilate traps and branch-pipes as well as soil-pipes. With regard to water-closets, his own experience was not so strongly against what were termed the "wash-out" closets, as that of Professor Corfield; but everything depended, with a wash-out closet, upon there being a thoroughly good supply of water. He quite agreed that a good valve-closet was the best form of closet that could be employed anywhere, but it was a very much more expensive form than the wash-out closet, and he would prefer to have a good wash-out closet with a sufficient head of water even to the best form of "improved hopper." There was no doubt that the regulations of some of the water companies of London and elsewhere, as to the size of the feeding cisterns to water-closets, were very ridiculous, two gallons being quite insufficient to give a good flush. If flush-out closets were used, care should be taken that the water went in directly opposite the out-go, and not obliquely. At one time it seemed to be the fashion for builders of houses to advertise the position of the water-closets by wretched little windows; while if there was a place where light and air was wanted, it was the water-closet. The windows should always be large, and where plenty of room existed, it was well to have a small cross-ventilated lobby between the water-closet and other parts of the house. He always had the water-closet seat made without a flap, with the seat itself hinged, so that if anything went wrong with the apparatus, the seat could be lifted at once. In small houses, too, where a housemaid's slop-sink was not provided, it was well to have the hinged seat raised before the slops were thrown down. With respect to the sanitary condition of houses, in many cases where smells were observable in an upper room, the fault lay not with the plumber, but rather with the plasterer. The partition between the water-closet and a bedroom would often be found to be of lath and plaster, sometimes not even carried beneath

the skirting. As a rule, the water-closet was colder than the other rooms of the dwelling, and it was, therefore, necessary to have the plaster carried down to the sill of the partition, so as to prevent bad smells from finding their way into the rooms. He hoped the time had gone by for any of them to allow such abominations as the D-trap to be used. It was often difficult to apply the proper remedies for putting old houses into a sanitary condition, but one thing at least should be attempted. If a water-closet was found in a situation which rendered it difficult to be made sanitary, some other place should be found for it which would always be better than bringing air-ducts into all sorts of places. Everybody knew that it was very much better that the drain-pipes should not go under the basement of a house, but in London terrace-houses it was next to impossible to avoid this. He would not go into the vexed question of earthenware versus iron pipes, but he believed by a little re-adjustment of the plan of a terrace the necessity for carrying pipes under the basements might be obviated. He was alluding to what were called joint-drains for several houses. If the drainage was put down in such a manner that the stoppage of one drain might close a number, it would not do; but by having inspection-chambers at the junction of each house-drain, with what might be called a supplementary drain running along the backs, with an inspection-chamber at the junction, it would be an easy matter to clear them. It was necessary to look to the testing of the drains, for no one who had not had experience of the extraordinary things builders and their workmen were in the habit of doing, would believe what monstrosities could be perpetrated by the plumber, the bricklayer, and all sorts of people; and they must not even expect to have things done correctly by the man who styled himself a "Sanitary Engineer." He had not a word to say against many of the sanitarians, but the mere fact of a lot of plumbers dubbing themselves "Sanitary Engineers" would not mend matters much. Good drainage was not the one thing to make a house sanitary, for stuffy rooms would make a dwelling unhealthy. The great desideratum was to provide an amount of ventilation which would not cause draughts, and that was a difficult thing to do. Tobin's tubes and all sorts of contrivances would not always do it, and the best way was really to introduce fresh air through the stove, especially in the winter-time. A house, too, could never be sanitary unless care was taken to have an impermeable stratum of concrete, or something of the sort, in the basement, otherwise the atmosphere of the house being warmer than the outer air would draw up the foul air from the soil beneath. With regard to the whole subject of sanitation it might be said that if people cared to spend the money they could have perfectly sanitary houses. The great difficulty was with the small houses of London and other towns, and until the Legislature, therefore, took up the question and made it a punishable offence to build a lot of houses that were mere fever-traps very little that architects could do would be of any avail.

Mr. W. Scott Moncrieff remarked that Professor Corfield was such an able authority upon this subject, that he would have been somewhat diffident in acting the part of a critic, had not reference been made to one or two matters in which he had special experience, and as to which he was somewhat inclined to differ with the Professor. No exception could be taken to his general remarks on the subject of sanitation. On the subject of water-closets, however, the Professor had approached a subject capable of more discussion, because the immediate disposal of fecal matter was one on which a great deal of ingenuity had been expended. As to the vexed question of water-closets, he was much inclined to agree with Professor Corfield and Mr. Slater that, after all, the somewhat complicated but really complete apparatus known as the valve-closet was the best that could be used for all situations. If there was any objection as to its liability to get out of order, that could be got over by making it all the stronger. One of the defects of the valve-closet,—and it had several, which would not be tolerated in the practice of the ordinary mechanical engineer,—was the absence of a gland and stuffing-box, so that the apparatus had practically been found fault with, not because there was any inherent objection to it, but because the connexion of the valve spindle

was defective. Turning to the question of iron versus stoneware pipes for drainage, he could not endorse Professor Corfield's condemnation of iron pipes. On the contrary, he believed that cast-iron would ultimately be found to be the only material available for meeting the tests which in future the public and sanitarians would demand in a modern system of house-drainage. There was a general feeling in favour of earthenware pipes because the surface was clear, because the material *per se* was durable in itself, and it was not subject to be acted upon by oxidation. That might be the case, but the important question was,—Which of the two materials, cast iron or earthenware, was the better, all things being taken into consideration? The glaze of earthenware was sufficient of itself to hide defects in the pipes, and it not infrequently happened that a pipe made by the best makers gave way under a slight collision or pressure, revealing the fact that the pipe was really not homogeneous, but practically dependent on the glaze for its existence at all. In the laying of cast-iron drains his experience was that sewage had the effect of preventing any oxidation whatever, a slightly greasy coating, similar to that found in stoneware pipes remaining on the inner surface of the pipe, so that after a time the same sort of action ensued in both kinds of pipes. This action was quite positive as regards oxidation, and he had been unable to find in an ordinary house-drain any oxidation from the inside outwards. As regards oxidation from the outside inwards, the engineer should be guided by the experience of the water companies; in laying their pipes in a very wet clay soil, and especially if any oxide of iron was present there would be a somewhat rapid decay from the outside of the pipe inwards. That would approach the point of destructive corrosion, and should be avoided by having the pipe laid in cement concrete or by some other means, as there were several ways of protecting a pipe besides Dr. Angus Smith's composition. But when they came to the question of testing drains the cast-iron pipe had really got it all its own way. If a pressure of 10 lb. on the square inch was generally applied to the man-hole covers as well as to the drains themselves, as it very well could be, what an important effect it would have on the health of the community! It would mean, in fact, that all defective drainage would be done away with at a single blow. Now that the water test had come in he believed that in a short time something of the sort would be generally demanded, and if it were applied to the drains themselves he failed to see why it should not also be applied to the manholes and the manhole covers. He looked to the wholesale introduction of some system in which the test demanded would be enormously greater than those in use at present in order to overcome the weak points in our sanitary system.

Mr. S. Stevens Hellyer said that notwithstanding all that had been done to bring home to the London household the importance of putting his drains in order, only a few houses here and there had been properly sanitized, and the amount of sewage which could be found today in pan-closets, traps, soil-pipes, drains, and cesspools in the houses of the metropolis would be sufficient to fill a 9-in. pipe drain from London to Cologne, that home of scents. Eighteen loads of sewage had been taken out of only one house last week by his workmen, where it had been accumulating for half a century, and he thought they would agree with him, now that all kinds of domestic matters were being aired in public, the metropolis ought not to be averted with the excreta of centuries. It would be possible to so reconstruct the plumbing, drainage, and sewerage of London that not a vestige of sewage matter would be found within its area twenty-four hours after it had been excreted. A house to be properly sanitized ought to rid itself of anything and everything passed into its water-closets, sinks, &c., within the space of ten minutes, while every foot of its drains, soil and waste pipes should have its air changed at least every hour. Mr. Hellyer here showed an experiment demonstrating the non-advisability of employing traps of too large a diameter. Good sanitation, he contended, depended upon water, and that ran through the whole scale of plumbing and drainage. He also exhibited a piece of 3-in. soil-pipe, cut out of a stack into which three closets discharged, and which closets had been used six days in the week for six years, by a large number of clerks

\* See *Builder*, p. 1395, ante.

and workmen, averaging about eighty, and which was yet perfectly clean and uncorroded on its inner face. But, however, good the plumbing-work and fittings, if the supply of water was limited, unwholesome water-closets would be the result. It was quite possible to do the plumbing and drainage work of a house in such a way as not to find in the whole system, after a use of five years, sufficient unpleasant matter to cover a half-crown piece. He agreed with what Mr. Scott Moncrieff had said about the valve-closet, in which there was not only a large area of water, as in the wash-out closet, but also a great depth of water. As to cowl, he was quite content with open pipes, under certain conditions, but he liked the wire top to be made of a balloon shape. At the same time, when the air from a down-draught in such pipes would be likely to enter the house through the doors or windows, he would prefer to employ a cowl to reduce the blow-down as much as possible. With regard to the question of iron *versus* stoneware pipes, the great point, in his opinion, was the reliability of the men who were employed to put in the drains. If he could depend on the bricklayer, he would be quite content with an earthenware drain. And here he would say that he thought that a bricklayer who did drainwork ought to be registered as well as the plumber. As to the alleged liability of iron drain-pipes to oxidation he had lately examined one which had been properly coated with Dr. Angus Smith's solution. On opening this drain and inserting a scrubbing-brush a little slime was washed out, but otherwise it appeared to be as good as when laid down five years ago. With a grease-trap for the scullery sink and three gallons of water to flush a good form of water-closet, and with other good sanitary appliances, properly-laid drains would keep free from stoppage, and would be as wholesome ten or fifteen years afterwards as they were after the first three months' usage.

Mr. W. Lee Beardmore, C.E., next made some observations, but his views on the subject will be found in the report, which we give on another page, of his lecture last week before the members of the Civil and Mechanical Engineers' Society.

Mr. E. C. Robins proposed a vote of thanks to the specialists who had kindly lent drawings and specimens to illustrate the subject. He had not had the pleasure of hearing Prof. Corfield's lecture, but had read with much interest the report of it which had appeared in the *Builder*, and which had given him a clear idea of what had been said. The question of siphonage had been dealt with exhaustively by Dr. Reuk, of Munich, in a series of experiments, the results of which he (the speaker) had given in a paper read before the Sanitary Institute. He had not used iron pipes for drainage because the ordinary workmen were not accustomed to that kind of work, but he never laid pipe drains through houses without seeing that they were buried in cement concrete. He never permitted a drain to be closed up without its being tested, and, as young men, they could not do better than look after these matters personally, as the word of the builder or of his workmen, or even of the clerk of works, was not sufficient, curious examples of which he gave.

Mr. John Smeaton remarked that he could not quite agree with the note of the Editor of the *Builder* appended to Prof. Corfield's lecture. As a sanitarian, he (the speaker) considered the wash-out closet one of the worst that had been invented. The bottoms of such closets got foul in course of time, and the apparatus became coated with deposit.\* The best kind of closet, to his mind, was a good valve or hopper closet, but in order to prevent the possibility of leakage of the water in the basin, the joint of the latter should be up almost as high as the top of the out-go of the trap.

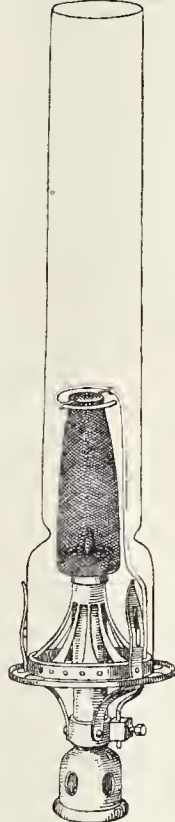
Mr. Leonard Stokes seconded the vote of thanks moved by Mr. Robins, which was passed, and the meeting separated.

**Surveyors' District Map.**—It has come to our knowledge that there are one or two slight "errors of omission" in the map we recently issued. Those of our subscribers who intend to preserve it should send the sheets to the Publisher, who will have them corrected, as has already been done with those sent to him for mounting.

\* We can only repeat that this is contrary to our experience, provided that there is a sufficient flush of water, properly applied.—E.S.

THE WELSCHACH INCANDESCENT GAS LIGHT.

We give an illustration of this light, which produces, by the agency of gas, a steady white light of great brilliancy in proportion to the amount of gas burned. The system, the invention of Dr. Carl Auer von Welschach, of Vienna, consists in placing within the flame of a special form of atmospheric or Bunsen burner a mantle or hood of cotton net or webbing which has been previously steeped in a solution containing oxides of the elements Zirconium, Lanthanum, and some other bodies. The moment that a prepared mantle is ignited it burns away with the smoky flame characteristic of burning cotton, but it leaves behind it a residual skeleton composed of the incombustible oxides contained in the impregnating solution, and this skeleton, while preserving its woven or reticulated character, becomes, under the influence of the Bunsen flame, powerfully incandescent, and emits a purely white and intensely brilliant light, so closely resembling that of



incandescence electric lamps as to be easily mistaken for it. It is, however, rather whiter than the incandescence electric light. The mantles so employed last from 800 to 2,000 hours, according to the situations in which they are placed, and they can be renewed at a small cost. The patentees claim that while a standard Argand gas-burner as certified by the Board of Trade, and consuming 5 ft. of gas per hour, gives an illumination equal to sixteen standard candles, or 32 candles per cubic foot of gas per hour, the Welschach burner produces a purer light (with less heat and no smoke) of twenty candles, with 2½ ft. of gas per hour, showing an efficiency of eight candles per cubic foot of gas consumed. The Welschach lamps can be screwed on to all the ordinary gas fittings, and require no special apparatus for varying the pressure or the quality of the gas, and, as the gas consumed is employed solely to heat the light-giving mantle, it need possess no illuminating property in itself, and therefore gas of poor illuminating quality may with advantage be employed under

the Welschach system, and with a corresponding saving of cost. We give the figures as to relative cost on the authority of the Company. The light itself we have examined carefully, and consider it a most efficient and agreeable form of artificial light.

CASE UNDER THE METROPOLIS LOCAL MANAGEMENT ACT.

At the Woolwich Police Court, before Mr. Marsham, George Viney, of 13, Keenwood-street, Woolwich, builder, was summoned by the Metropolitan Board of Works for that he did, at Graydon-street, in the parish of Plumstead, unlawfully form and lay out a certain road, passage, or way for building, as a street of a less width than 40 ft., contrary to 18 and 19 Vic., cap. 120; and 25 and 26 Vic., c. 102, and by-law.

Mr. Thomas Burton, solicitor, appeared for the Board; and the defendant appeared in person.

Mr. Burton, in opening the case, stated that the defendant had erected several houses in the above street, and by so doing he had reduced the width to 25 ft. 9 in. He had been repeatedly cautioned by the district surveyor that he was not complying with the law, but he had persisted in going on, and the buildings were now finished and occupied.

Mr. Millwood, surveyor, and Mr. Conder, district surveyor, having been called in support of the above facts, Mr. Marsham said he should fine the defendant 40s. and costs.

LIGHT AND AIR CASE.

CARTER v. SPICER.

In the Queen's Bench Division, before the Lord Chief Justice and a special jury, Dr. Geo. Roe Carter, the lessee and occupier of No. 119, Anerley-road, Norwood, sued John Spicer, the owner of the fee simple of premises adjoining, to obtain an injunction restraining the defendant from proceeding with building operations, which the plaintiff contended obstructed certain ancient lights in his house; also for an order compelling the defendant to remove the shop already erected to such an extent as was necessary to secure to the plaintiff the enjoyment of his ancient lights; and for damages in respect thereof.

The defendant denied that the lights in question were ancient, and contended that his new erection had in no way interfered with the access of light to the plaintiff's premises. The walls of the two shops in question were originally 14 ft. high, but proceedings were taken by the Metropolitan Board of Works, under 25 and 26 Vic., cap. 102, sec. 75, and they were reduced to within a height of 6 ft. from the ground.

Mr. Finlay, Q.C., and Mr. Colt appeared for the plaintiff; and Sir Henry James, Q.C., Mr. Murphy, Q.C., and Mr. Upjohn represented the defendant.

The Plaintiff stated he was the lessee of the house in question for a term of twenty-one years, seven years of which had to run, and complained that the light in his drawing and dining rooms has been obstructed, which seriously interfered with the enjoyment of those rooms. The defendant's case was that there had been no sensible diminution of light in the room. It appeared that the premises with which the defendant was dealing were originally private houses, but were now converted into shops, one of which had been opened for some time as an ironmonger's. An interim injunction had been obtained in the Chancery Division, pending the trial of this action, which was proceeded with in this division in order that it might be taken before a jury.

The plaintiff's case having been concluded, Mr. Murphy addressed the Court on behalf of the defendant, and at the end of his speech the jury stopped the case, stating that the plaintiff had not made out his case.

His Lordship gave judgment for the defendant, with costs, and certified for a special jury, and the expenses of a view.

**Rosemount School, Aberdeen.**—This large new public school, erected by the Aberdeen School Board for mixed pupils, on a site at the corner of Esslemont-avenue and Rosemount-place, is to be opened for scholars on Monday next, February 14. The buildings, which are from designs by Mr. James Souttar, A.R.I.B.A., accommodate 860 children, and have cost 7,500l. The external walls are of white Aberdeenshire granite, except the rustic portions at the base, which are of dark blue granite. The main features of the erection (which is to be followed as a model for future new schools) are its square formation, the various class-rooms, &c., surrounding a central hall and staircase; the mechanical process of ventilation; and the piazzas obtained as covered recreation places on the south side of the buildings by the declivity of the site. The open playgrounds are in some parts concreted and in others gravelled, so as to allow of football being played.

## LIVERPOOL CATHEDRAL MEMORIAL.

SIR.—At the suggestion of the Committee on Competitions of the Royal Institute of British Architects, the proposed memorial, which has received about 300 signatures, will be modified, and will be in the following form:—

"To the Liverpool Cathedral Committee.

"We, the undersigned, as architects, considering the national importance of this great undertaking, upon which much depends affecting the future of church architecture throughout the kingdom, venture to request that you will allow the designs to be exhibited in London."

Should any architect who has already signed the memorial object to this modification, or should any others desire to have their names added to it, they are requested to communicate with us.

31, Spring gardens, S. W. J. OLDRID SCOTT.  
1, Queen Anne's gate, S. W. J. P. SEDDON.  
February 10th, 1887.

SIR.—I should like to be allowed to say a few words upon the letter from Messrs. Scott & Seddon, referred to so properly in your last.

Some time back I declined to sign the circular from the "Competitions Special Committee," pledging me to the principle of an architectural assessor; and I did so on this ground, namely, that, though fully sympathising with the idea, I felt that in the absence of any provision to ensure, as far as possible, that the assessor should be a man of broad views, the remedy might easily be worse than the disease; and I said that, personally, I would rather trust myself to a committee than to a man of one style,—a sort of architectural Cyclops, if I might so designate him without offence,—who could see no good existing in one direction.

If the letter above referred to does not fully justify my objection, I am at a loss to know what would.

No. 2, Arundel-square.

GEORGE McDONELL.

## FIRE STATION, TOTENHAM LANE, HORNSEY.

SIR.—As some of my friends have written regretting that the plans of this Fire Station were not illustrated last week with the elevation, I should like to explain that the ground-floor is an open space wholly devoted to the engines and fire-extinguishing gear, the first and second stories being used for residential purposes.

The only feature of interest on the plan is the automatic system of opening the large circular-headed folding-doors, to which the arrangement designed by Mr. J. Sexton Simonds, the second officer of the Metropolitan Fire Brigade, was applied, and is found to answer admirably.

T. DE COURCY MEADE.

\* \* \* We are asked to state that the glazed bricks used for the masonry buildings were made by Messrs. Edward Brooke & Sons, of Fieldhouse Works, Huddersfield.

## "MASONS' WAGES."

SIR.—As a mason who has worked in London many years, both as a foreman and at the banker, I was somewhat startled when I read the letter from a brother chip which you inserted in last week's issue of your journal.

I have not a word to say about the orthography or composition of the letter as a literary production, but I am surprised at your correspondent's want of information respecting the amount of wages paid to masons and other workmen on Government works in the Metropolis. It does not matter who the contractor for the work may be, it is their general rule to employ those only who are willing to take considerably less than the current rate of wages. At the Houses of Parliament there are or were a few masons who get the full rate of 3s. per hour, but the men required for this work have to be highly skilled workmen; hence an exception is made there to the general rule.

W. T. KEMP.

SIR.—Permit me, through your paper, to request the members of the London Lodges Committee (your correspondent, A. Robins, being secretary) to seek to bring about a better feeling between the employer and the employed, rather than try to create trouble with Government officials and Messrs. Perry & Co.

It is a well-known fact that many of the employers of masons have not, for some time past, paid a fixed rate of wages, but have paid their men according to merit; therefore the attack on Messrs. Perry & Co. at the present time is unjust.

If the members of the above-named committee (backed up, no doubt, by the members of their Society) have the interests of their fellow-masons at heart, they would be much better employed in trying to induce the master-builders of London to cease having stone worked at the quarries. I know of cases where builders have taken contracts, and then sub-letting the masonry to a sub-contracting mason, and the latter has again let it to be worked at the quarries. This is manifestly unfair to the masons of London.

If questions of this kind were fairly laid before the employers, I am satisfied it would bring better results than creating strife about wages.

G. C. W.

## The Student's Column.

## FIELD WORK AND INSTRUMENTS.—VII.

## Surveying Instruments.

## VII.—THE CLINOMETER (continued).

THE form of clinometer most generally used is that known as the clinometer rule, which consists of two flat arms hinged together at the centre in a manner about to be described, and fixed so as to open and fold like an ordinary foot-rule, the arms being made broad enough to contain certain tables, which are referred to in our diagram as tables A, B, and C. One of these tables is placed upon the front face and the other two upon the back of the rule. They are intended for use in the application of the instrument to vertical and horizontal measurements. Upon the edges of the rule, inches are also marked subdivided into eighths and tenths.

When the instrument is open it is seen that the head of the rule consists of two metal sliding pieces jointed, so as to turn accurately on the centre D. Each of these sliding pieces has a scale engraved upon it, both scales being, as shown in our illustration, on the same side of the rule, and placed so that when the instrument is closed, the arrow marked A upon the inner scale points to zero upon the outer scale, and the arrow marked B upon the outer scale points to zero upon the inner scale. One of these scales expresses the angular amount of opening between the arms in terms of the degrees of a quadrant, while the other scale registers the inclination as a rise or fall of a certain number of inches per yard run of horizontal distance. Spirit levels are also fixed in the edges of each arm, enabling the observer to place either arm horizontal when using the instrument in a vertical direction. To the inner side of one arm upon the same edge as one of the spirit levels is attached an ordinary magnetic compass, contained in a box, which is constructed to turn to a horizontal plane when observations are being made vertically, and to fold back into recesses marked E and F when the instrument is closed. The needle is set free to revolve by a small stop-lever fitted into the side of the compass-box, and should always be lifted off its centre when not in use. To each end of the other arm of the rule are attached eight-vanes, consisting of metal plate, hinged so as to fold down flush upon its edge when they are not in use, as indicated by the curved dotted lines in the diagram. Each eight-vane has a small circular hole drilled at G, and a larger circular opening at H. The openings at H each contain a glass disc, upon which lines crossed at right angles accurately mark the centre, and guide the eye both vertically and in a direction parallel to the edge of the rule.

When raised, they serve as sights to view objects situated either above or below the level of the eye, in the manner explained by the direction of the arrows upon the diagram, marked as lines of sights when looking up or looking down. These lines of sight are parallel to one another and to the face of the rule, but are not co-incident, as it will be observed upon reference to the end view marked K that the hole at G is not in the centre of the plate. This is because the two eight-vanes are not of the same width: that at the end of the rule being as wide as the edge of the rule, while that at the head of the rule is reduced by the thickness of the outside sliding plate. In each eight-vane the small hole G serves as an eye-piece, and the diaphragm H gives the direction of sight when viewed from the opposite eight-vane: hence the positions of G and H are alternate, by being above H in the one, and below H in the other vane. With the use of the instrument vertically we are enabled approximately to measure heights by the application of table A, while horizontal distances for certain angles of elevation or depression up to 45 degrees can be calculated by the application of Table C. With the use of the instrument horizontally, lateral distances can be approximately ascertained by the application of table B, and with the aid of the compass set parallel to the face of the rule the relative bearing of two defined distant points may be taken. The tables marked A, B, and C depend upon the

fact that when either the base or perpendicular of any right-angled triangle is known, and one of the remaining angles of that triangle can be measured, then the unknown length of either the perpendicular or base can be mathematically obtained. When using the instrument vertically the spirit bubble upon the inner edge of the lower arm is first set by the hand, and then maintained in as level a position as possible. The eight-vanes are raised and the upper arm lifted, until the cross line at H, when viewed at G in the opposite eight-vane, is either at the top of the object to be observed, or until it bisects any point upon that object which can be sufficiently localised to make a calculation reliable.

Then the arrow-head upon each one of the metal sliding pieces marked A and B respectively, will point to the angle and inclination to be read off the other sliding piece. As an example, suppose from a tower 120 ft. high that you can see an object through the sights when one scale reads 26°, and the other scale 18 in. per yard, with the instrument set as shown in the diagram; the upper arm then bears an inclination to the lower arm of the rule equal to a rise of 1 in 2, so that in this case the base would be about double the perpendicular height, and the object is found to be approximately 240 ft. distant. An inclination of 1 in 2 is more accurately expressed by an angle of 26° 34', but the instrument only registers degrees. Referring to table C, an amount of 2'05 is given as the amount of run horizontal per unit of vertical measurement for an angle of elevation or depression equal to 26°.

Applying this ratio to the case under consideration, we find 2'05 × 120 = 246 ft. to be the distance of the tower from the object observed. Next, so as to compare the use of table A with table C, let us suppose the angle observed to be 30° and the tower to be at a horizontal distance of 100 units of length from the given object, we find upon applying the figures given in table A that the height of the tower would be 57.7 units of length; then if the height of the tower be known to be 57.7 units of length, and the distance of the tower from the object viewed be required, we find upon applying the figures given in Table C opposite 30° that the horizontal distance would equal 57.7 × 1.73 = 99.82, or practically 100 units of lengths, as was assumed when applying Table A. If the angle observed be 45° then the height of the tower and the distance of the object from the tower are seen upon reference to Tables A and C to be equal to one another. By the use of Table B lateral or transverse distances can be arrived at when the instrument is held with its face horizontal. When so placed the sights are arranged to be in a line with one extreme, say the left hand of the object, and the arm containing the sights is kept turned towards this point while the other arm is moved out horizontally under its edge in a line with the right hand of the object, the head of the rule being placed as near as possible by the eye opposite the centre of the distance to be calculated, after the shortest or perpendicular distance between this point and the surveyor has been measured. The result gives the transverse thickness of an object parallel to the line LN and perpendicular to the direction of DM produced. If the angle LDN be 45° and the arms DL and DN measure each 6 inches, DM will, upon plotting these lengths and directions to a large scale, be found to measure 5.54 inches and LM 2.29 inches. If DM be produced so as to measure 100 units of length, then a line parallel to LN, subtending an angle of 45° at the head of the rule, gives 100 multiplied by 2.29, multiplied by 2, (because LN = 2LM), and, divided by 5.54, as the number of

units of length required, i.e.,  $100 \times \frac{2.29 \times 2}{5.54} =$

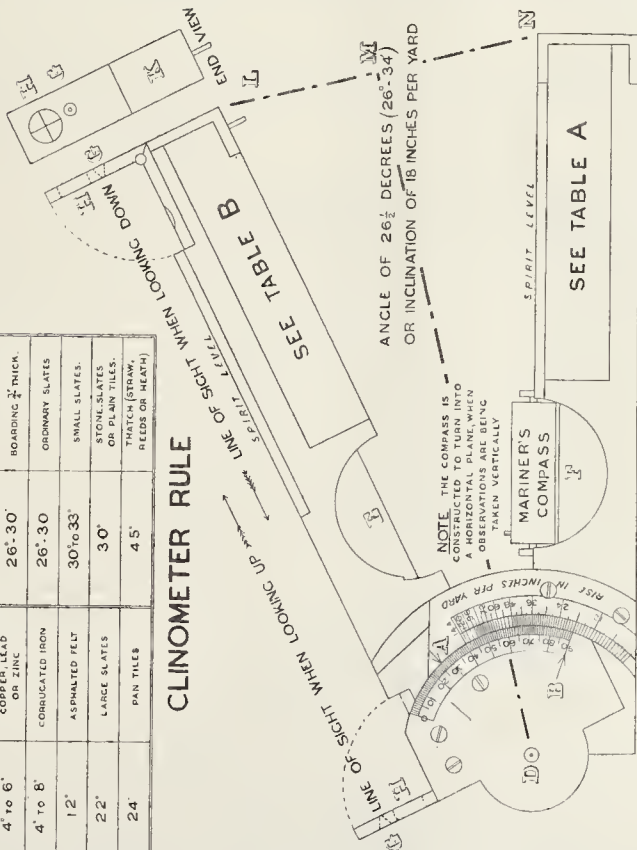
$\frac{45800}{5.54} = 82.8$ , as stated in Table B. From this

we can determine the transverse or lateral dimension at any greater horizontal distance. An object 100 ft. from an observer, subtending an angle of 45°, would be 4 × 82.8 = 331.2 ft. in width.

Independent of the tables the rough inclination of mountain slopes and the dip of strata in a shaft may be determined by the clinometer. The instrument can also be used for setting out the pitch of roofs or to check their inclinations according to the table given in the left hand at the top of our diagram. Having laid the under edge of the lower arm upon the slope to be measured, the upper arm is raised vertically

| PITCH OF ROOFS                                      |                                                     |
|-----------------------------------------------------|-----------------------------------------------------|
| MINIMUM INCLINATION OF SLOPE OF ROOF TO THE HORIZON | MINIMUM INCLINATION OF SLOPE OF ROOF TO THE HORIZON |
| 4° to 6'                                            | 26° 30'                                             |
| 4' to 8'                                            | 26° 30'                                             |
| 12'                                                 | 30° to 33'                                          |
| 22'                                                 | 30°                                                 |
| 24'                                                 | 45°                                                 |

CLINOMETER RULE



**NOTE** THE CENTRE OF THE INSTRUMENT CONSISTS OF TWO METAL SLIDING PIECES THE DEGREES IN A QUADRANT BEING MARKED ON ONE AND THE CORRESPONDING RISE OR FALL OF INCHES PER YARD ON THE OTHER WHEN THE INSTRUMENT IS CLOSED THE ARROW MARKED **A** ON ONE SCALE STANDS AT ZERO ON THE OTHER SCALE

**NOTE** THE FIGURES MARKED UPON A CLINOMETER RULE SUPPLIED BY SOME MAKERS SHOULD BE CHECKED WITH THE TABLES **A** AND **B** HERE GIVEN AS THEY ARE NOT ALWAYS STATED CORRECTLY

**LIMITING ANGLE 90°**

TABLE A  
HORIZ. DIST = 100

| ANGLE OF DIP | THICKNS |
|--------------|---------|
| 1            | 1.7     |
| 2            | 3.5     |
| 3            | 5.2     |
| 4            | 7.0     |
| 5            | 8.7     |
| 6            | 10.5    |
| 7            | 12.3    |
| 8            | 14.0    |
| 9            | 15.8    |
| 10           | 17.6    |
| 11           | 19.4    |
| 12           | 21.2    |
| 13           | 23.1    |
| 14           | 24.9    |
| 15           | 26.8    |
| 16           | 28.7    |
| 17           | 30.6    |
| 18           | 32.5    |
| 19           | 34.4    |
| 20           | 36.4    |
| 25           | 46.7    |
| 30           | 57.7    |
| 35           | 70.0    |
| 40           | 83.9    |
| 45           | 100.0   |
| 50           | 119.2   |
| 55           | 142.8   |
| 60           | 173.2   |
| 65           | 214.4   |
| 70           | 274.7   |
| 75           | 373.2   |
| 80           | 567.1   |
| 85           | 1143.0  |

TABLE A

TABLE B

| DECS | ONE IN |
|------|--------|
| 1    | 57.29  |
| 2    | 28.64  |
| 3    | 19.08  |
| 4    | 14.30  |
| 5    | 11.43  |
| 6    | 9.51   |
| 7    | 8.14   |
| 8    | 7.11   |
| 9    | 6.31   |
| 10   | 5.67   |
| 12   | 4.70   |
| 14   | 4.01   |
| 16   | 3.49   |
| 18   | 3.08   |
| 20   | 2.75   |
| 22   | 2.47   |
| 24   | 2.25   |
| 26   | 2.05   |
| 28   | 1.88   |
| 30   | 1.73   |
| 32   | 1.60   |
| 34   | 1.48   |
| 36   | 1.38   |
| 38   | 1.28   |
| 45   | 1.00   |

TABLE B

**NOTE** SCALES OF INCHES DIVIDED IN EIGHTHS AND TENTHS, ARE ALSO MARKED UPON THE EDGES OF THE CLINOMETER RULE.

**TABLE A** GIVES THE DEPARTURE FROM THE HORIZONTAL, EQUAL TO THE AMOUNT OF RISE OR FALL PER 100 OF RUN HORIZONTAL FOR CERTAIN ANGLES UP TO 85° WHEN THE INSTRUMENT IS USED VERTICALLY AS IN THE FIGURE.

**TABLE B** GIVES THE TRANSVERSE THICKNESS OF AN OBJECT, MEASURED PERPENDICULAR TO THE LINE JOINING THE EYE WITH THE CENTRE OF THE OBJECT, WHEN THE NEAREST DISTANCE OF THE OBJECT IS 100. — BY PLACING THE FACE OF THE INSTRUMENT HORIZONTAL, & THE FACE OF THE COMPASS PARALLEL TO IT, THE RELATIVE BEARINGS AS WELL AS THE DISTANCE BETWEEN TWO OBJECTS CAN BE OBTAINED.

**TABLE C** SHOWS CERTAIN ANGLES OF ELEVATION OR DEPRESSION, WHICH GIVE UNITY OF VERTICAL MEASUREMENT PER AMOUNT OF RUN HORIZONTAL.

until the bubble of the spirit level on its top edge appears in the centre of its run. The angle or inclination of the slope required is then found to be registered upon the scales at the head of the instrument.

### Books.

*Safe Railway Working: A Treatise on Railway Accidents, their Cause and Prevention.* By CLEMENT E. STRETTON. London: Crosby Lockwood & Co. 1887.

THOSE of the large public of railway travellers who wish to enlighten their generally deplorable ignorance in regard to the working of the railway system on which they travel, and the means which are taken to guard against accident, have now a favourable opportunity of doing so by the publication of this small and inexpensive book, by a competent professional man, and written and illustrated in such a manner as to be intelligible to non-professional readers. The making of railway roads, the system of signalling, the various forms of brakes, the new inventions for automatic coupling, &c., are gone into and illustrated by numerous diagrams, and with as little of technical phraseology as possible. Those who wish to acquire a little general and reliable knowledge on a subject which ought to be of some practical interest to most of us, cannot do better than purchase Mr. Stretton's book. It is a matter of constant surprise to us that the public generally can allow themselves to remain so ignorant of everything in connexion with the working of our great travelling system as they commonly are. If they took a little trouble to understand what was being done on a railway, they would not only find it a subject of considerable interest, but they would be saved some of the nervousness which many ignorant travellers allow themselves to give way to at any derangement of the traffic, without having the slightest knowledge as to whether there is ground for any apprehension beyond that of a delay.

Those who inquired into the system would probably find their respect for railway companies a good deal increased. They would have their eyes opened to the nature of the complicated precautionary machinery which is in daily and hourly operation to provide for their safety. It must be added, *per contra*, that Mr. Stretton's book takes note of some anomalies in the signal system which ought to be done away with as soon as possible. We are surprised to find, according to Mr. Stretton's statement, that the system of signalling by lights is still not uniform on all the railways; that a white light on the Great Northern is "danger," while on other lines it is "all right"; that a green light, originally employed as "caution," is in some quarters employed merely to indicate the back of a signal-lamp; that on some railways a purple light is "all-right," and on others it is a "danger" light. There must be a very limited employment of the purple light; we never remember to have seen one. The most serious item in this indictment is that a great railway like the Great Northern should read its lights the opposite way to that almost universal on other railways, on all of which, as far as we know, a white light is "all-right." Considering the number and increasing frequency of junctions of communication between different railway systems, and the running of the trains of one company over the lines of another, it seems a most imperative matter that the same colour signals should be universally adopted, instead of giving the driver the additional chance of mistakes by his having to read a light for one meaning on one line of railway and for another meaning on another line. A Bill ought to be brought forward without delay for compelling the adoption of one system over the whole country. If this were done, it would be a question whether the red light had not better give way to some other light, say purple, for "danger." It is curious that red and green should have been originally selected on our railways for "danger" and "caution," these being the two colours in regard to which there is more colour-blindness than in regard to any other two. At present, as Mr. Stretton observes, "caution" signals are practically abrogated, as on the block system the line is either "clear" or "not clear," and there is no middle course. Green, therefore, may be got rid of, and purple and white for "danger" and

"all right" respectively, would probably be the best and most distinctive colours for universal adoption.

We hope this subject will receive the early attention of Parliament, and along with it should be passed a measure for making a uniform code of bell signals compulsory also. At present, the code of signals by the number of strokes on a bell is different on different railways, so that a signalman at a junction-box may have to use one code of signals in one direction and another in the opposite direction. It seems really monstrous that such an additional difficulty and source of mistake in signalling should be allowed to continue anywhere. It is not so much the fault of the separate companies, each of which may consider it has a good reason in favour of its own code for simplicity and clearness; it is the want of a general regulation from a central authority; a want which ought to be supplied without delay.

The chapter on "railway servants and the law" is a rather painful one to read, showing as it does in how many cases a railway servant who is doing his work to the best of his ability is made a scapegoat for an accident which arose from the defect of the system or of some higher powers. Engine-drivers especially seem to have been liable to this unfair treatment. Of course, the responsibilities of engine-driving are so great that any proved carelessness should be visited severely; but, in fact, it is the rarest thing to find a driver really responsible for an accident, and in the main we believe that no set of men do their work better and more carefully than locomotive engine-drivers.

*A Practical Treatise on Land and Engineering Surveying, Levelling, Estimating, Quantities, &c.* By H. S. MERRITT. Fourth edition, revised and corrected with Appendix by GEORGE W. USILL, A.M. Inst. C.E., M.S.A., &c. London: E. & F. N. Spon.

If land surveying could be taught by books, which we doubt, this book can teach it; for it takes up every point and deals competently with all. But a month's work in the field is worth all the books that ever were written, and will teach more of the practical details in an infinitely more pleasant way.

A useful chapter on contouring,—not always found in such works,—is given; and the illustrations deal with every kind of problem likely to be encountered by the surveyor in practice. The author does not believe that the Ordnance Maps will drive the civil professional surveyor from the field, and recommends special surveys for lines of railway, &c., in preference to the published maps, as not only being more trustworthy, but more economical.

It is somewhat naively stated that the English yard was "settled" at the length of Henry I.'s arm, which reminds one somewhat of Diedrich Knickerbocker's measure of weight. It has, in fact, been often settled, and finally fixed and legalised by the 5th Geo. IV., c. 74, which declares that "the pendulum vibrating seconds of mean time in the latitude of London in a vacuum at the level of the sea is 39.1393 inches of the standard, and that the yard shall be in the proportion of 36 to 39.1393.

The history of the standard measures of Great Britain, their destruction by fire in 1834, their restitution in 1876, is full of interest, and a résumé of it would not have been out of place in a scientific work, dealing about all things with the science of measurement.

*The Gas Engine.* By DUGALD CLERK. London: Longmans, Green, & Co. 1886.

THE author of this work is the inventor of one of the best known types of gas-engine, and has been engaged in the manufacture of these motors for some years. He is, therefore, necessarily in a position to speak with authority on the practical aspect of the question he has made the subject of his work. Mr. Clerk has, however, gone further than this, for he has applied himself to the more abstruse aspects of the case, and has carried his researches so far as to enable him to claim no mean position amongst the students of physical science. If we add to these qualifications for the task he has undertaken a facility for expressing himself in clear and forcible language, it will be evident that the work under notice can hardly fail to reach a high standard.

There is one pitfall that must have beset Mr. Clerk's path in his career of authorship. As the inventor of a special type of gas-

engine, it might have been expected that he would have devoted undue space to the merits of his own system, and to the demerits of those of his rivals. This snare he has well avoided, and there is no evidence in the book, either when the author's own or his rivals' schemes are under discussion, that he has a child of his own appealing to him with that fervour which only in an inventor's breast finds an echo.

Mr. Clerk opens with a historical chapter, dating from the very earliest days of gas-engine invention, which, it will surprise many to learn, extend back for over 200 years. In that era, however, the gas was of a very different kind to that now used, being generated by the explosion of gunpowder,—a means by which Hnyghens proposed to obtain motive power in 1680. The effort was, of course, unsuccessful, as were the experiments of Papin, who shortly after followed in the same track. A truer form of gas-engine was introduced by Robert Steele, who patented his device in 1734. The bottom of the motor was heated by fire, and some spirits of turpentine being injected, the gas thus obtained was used for explosion in the motive cylinder. The next gas-engine (Browne's, of 1823), worked by vacuum, the flame being condensed by an injection of water. This motor was placed in a boat, which was run on the Thames. Other engines followed, but the origin of the modern gas-engine has been so well thrashed out in the law courts within the last few years, that it is, perhaps, unnecessary to say more on this subject.

In the second chapter on "The Gas Engine Method" the author points out the advantage this motor has over the steam-engine, inasmuch as the fuel (gas) heats the working fluid (atmospheric air) in the motive cylinder in place of the operation being performed in a separate vessel. We are not quite clear whether the author means to infer that the products of the exploding gas play no part beyond heating the air. If so, it is hardly in accordance with the generally-accepted opinion. The very obvious advantages of gas-engines over hot-air engines are next dealt upon. The temperature usual in a gas-engine cylinder, the author tells us, is 1,600° C.; whilst the temperature of molten cast-iron flowing from a cupola is about 1,200° C. Of course, the metal of the engine cylinder is preserved from injury by the water jacket, but the price paid for this immunity from fusion of the iron is about one-half of the whole heat of combustion. The slight conductivity of air for heat prevents what would otherwise be a far more serious loss.

The chapter on "Gas Engines Classified" gives a brief abstract of the leading elements of various types; after which the book proceeds to treat of the "Thermodynamics of the Gas Engine." The labours of Professor R. Schöttler and Dr. A. Witz are referred to, and the general principles which govern the action of gas-engines, in common with other heat-engines, are briefly and plainly set forth. Efficiency formulæ are worked out, and illustrated by means of diagrams, practical examples being given. "The Causes of Loss in the Gas Engine" supply a suggestive chapter, after which "Combustion and Explosion" form the subject of a useful section of the work. The descriptions which follow of gas-engines of different types with details of various parts constitute the main body of the book. It is an impartial and lucid composition, aided by diagrams of all the chief forms of gas-engine, including some of the earlier types. The Otto engine occupies, as by right it should, the chief attention of the author, who gives full credit to the ingenuity and talent of his fellow worker and rival. He is not chary, however, in giving the results of his own labours; whilst the Robson, the Stockport, and Atkinson's engine are illustrated and described. A dissertation on the theoretical action of the gases in the modern gas-engine, and a chapter entitled "The Future of the Gas Engine," together with a brief appendix, completes the work. The book may confidently be recommended to any one wishing to obtain a knowledge of the theoretical and practical aspect of what is often described as "the coming motor." It is not often one meets with a work that contains so much good material in the same compass.

*Studies in Russia.* By AUGUSTUS J. C. HARE. London: Smith, Elder, & Co.

THE criticism which most readers would pass on this book is made by the author himself in his preface, where he quotes the Russian



proverb,—"A foreigner must spend two years in our country before he can judge of it." As Mr. Hare spent but one summer there, and his knowledge of the language,—acquired in long, dreary journeys by Russian railways,—was but superficial, the "studies" are not of great value. It is true that a trained traveller like Mr. Hare sees a vast deal more than an ordinary tourist. He observes as well as sees, and practice has taught him how to present his observations to the reader in an acceptable fashion. The scissors, moreover, have supplemented the pen; and, from Richard Chancellor and George Turberville,—forgotten authors of the sixteenth century,—down to Kohl, de Custine, Haxthausen, and Wallace, with whose names we are more familiar,—there have been gathered passages which bear upon pretty well every Russian matter. The author was, unfortunately, unable to sketch many places or public buildings,—the use of the pencil at once making him an object of suspicion to the obtuse officials, who were rarely able to read the permits with which Mr. Hare had provided himself. Altogether, therefore, the book cannot claim a place beside some of its predecessors, though the failure must not be ascribed to any lack of industry on the part of the author, but simply to the circumstances which surrounded him.

From an architect's point of view, Russia is a barren land. The towns are almost as deficient in beauty as the country around them. In the capital the wide streets suggest desolation rather than grandeur. The shops are mean, and the palaces, "built of hard brick covered with worse stucco," look paltry and puerile. "Human hands built Rome," says the poet Mikewicz, "divine hands created Venice, but he who sees St. Petersburg may say,—This town is the work of the devil." Probably the epithet which Mr. Hare applies to the archway at the end of the *Grand Mostoi*,—the epithet "aimless,"—is that which best characterises Russian architecture, unless we recognise size alone as the aim to be secured. The *Cathedral of St. Isaac* has, indeed, some few pretensions to grandeur. "Its pillars are glorious granite monoliths from Finland, hurried there for centuries amidst the swamps, and the golden screen, decorated with huge columns of malachite, is a very striking feature." The building rests, like most of the city, upon very insecure foundations, and the piles upon which it rests already show signs of decay, though the present structure was completed only in 1858. Novogorod and Moscow are much more interesting than St. Petersburg. Both the two former have their Kremlin, or citadel, of high antiquity, and their many-mingled monasteries, which look picturesque against the sky. But from Novogorod the grandeur is departed, and in Moscow is side by side with squalid misery. There is a quaint picturesque about the Cathedral of St. Sophia, Novogorod, which Mr. Hare's sketch reproduces, but the bulbous gilt domes which ornament its roof are rather meaningless. Not so the crosses which there and everywhere else rise supreme. It will be noticed that they have crescents at their base, and for this reason:—"The Tartars, who were masters of Russia for 200 years, had changed the churches into mosques and fixed the crescent upon them. When the Grand Duke Ivan Vassilivitch drove out the Tartars and restored the churches, he left the crescents, but planted the cross upon them in sign of victory, and Russia has since continued the practice."

We must add that Mr. Hare has provided his book with a good index, so that it is really useful for purposes of reference.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

2,967, Improvements in Levels. J. J. Hicks and C. T. Light.  
According to this invention, a chamber of a disc shape, either circular or square, is half filled with coloured fluid or spirit, and the circle around it graduated, so that the level of the fluid will indicate at both ends against the scale, or the chamber may be nearly filled, and the bubble of air which will be formed at the periphery of the disc will travel round in the same proportion to the change of level.  
3,006, Water-taps. H. Watson.  
This invention consists in altering the construction so that the tap can be readily attended to when leakage occurs. The tap is made in two parts placed horizontally, the joining being made water-tight by a gland, stuffing-box, or other suitable means. The valve spindle and working parts are also placed horizontally to prevent the sediment or

grit from resting on the valve, and for greater convenience in getting at the working parts in case of the same being out of order.

3,217, Sewage and Cement. J. B. Hannay.  
The object of this invention is to treat sewage so as to render the water innocuous, and at the same time to form a cement similar to Portland. The precipitate of the sewage is dried and burned in a reverberatory furnace. Lime and clay are mixed in at an early stage in the operation, and when thoroughly burned, the material, it is claimed, forms a valuable cement.

11,524, Fences, Stalls, Tables, &c. T. S. Winter.

This invention relates to a convertible contrivance for use in fields, &c. It is made in wood, somewhat similar to an ordinary rail fence, but provided with hinges, which allow of one part lying out horizontally and being supported by legs opening wider. This form may be used in drying hay and other agricultural work with great advantage.

15,948, Alarums for Doors. N. J. Bushy.  
This invention consists in an arrangement of striking mechanism actuated by pulling a knob in the ordinary manner, but designed to give an extra sound and with certainty, and also to obviate loosening or slackening of wires and cranks.

15,684, Improved Vices. C. J. Hermann.  
This invention relates particularly to bench vices and it is claimed for the improvements that the jaws can be drawn further apart and the object sustained in the vice is securely held at all positions of the jaws. The vice itself is fixed upon a turntable, and it is movable to many positions, in each of which it may be rigidly fixed.

15,257, Stained Glass. O. Lossing.  
According to this invention, cut and coloured pieces of glass are placed according to the pattern desired, and while heated to a proper temperature joined and covered by cement of colourless and transparent cement. Sometimes two sides of transparent glass are used to enclose the picture. No "leads" are required, and though the coloured glass may be small and thin the picture may be made very strong.

NEW APPLICATIONS FOR PATENTS.

Jan. 28.—1,348, J. Cornell, Latches for Locks, &c.—1,362, J. Macintyre and Others, Kitchen Ranges.—1,364, W. Farrell, Gauge for obtaining Lines, Angles, &c., in working Mouldings on Stone.—1,414, W. Barnes and Others, Paint Brushes, &c.

Jan. 29.—1,448, J. Bidder, Chimney Cowl or Ventilator.—1,457, E. Tonks, Sash Fasteners.

Jan. 31.—1,471, J. Moore, Nails.—1,480, C. Stroud, Guttering for Roofs, &c.—1,488, G. White, Fixing Lines to Window-sashes without removing the Sash from Frame.—1,493, J. and J. Wilson, Cowl for Smoky Chimneys.—1,508, G. Hookham and W. Tonks, Lines for Window-sashes, &c.

Feb. 1.—1,532, T. Woodriddle and T. Jones, Forming Floors.—1,577, J. Guest, Ladders and Steps.—1,598, H. Lake, Preventing Damage by overflow of the Leakage of water to the Contents of Warehouses or other Buildings.

Feb. 2.—1,636, M. Stansfield, Counterbalancing Sliding Windows or Sashes.—1,663, G. and T. Claughton, Wooden Pins and Dowels.—1,688, D. Sorfeet, Automatic Draught Preventer for Doors.

Feb. 3.—1,708, H. Roberts and T. Osborne, Automatic Siphon Flushing Cisterns.—1,730, J. Gibson and W. Glasgow, Closing the Space underneath Doors when Shut.—1,738, W. Reynolds, Substitute for Stained Glass.—1,740, J. Gets, Forming Water-tight Joints for Doors and Windows.—1,754, E. Purdon and H. Walters, Door Closer.—1,758, J. Harrington, Sash Fasteners.

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RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JANUARY 27.  
By BAYNE, PALME, & JEFFER,  
Bromley, Palace Grove—St. Edmund's Road, 978 years, ground-rent 7l. .... 2925

FEBRUARY 1.  
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FEBRUARY 3.  
By J. & W. JOHNSON & CO.  
Kingsland-road—No. 22, freehold ..... 725

MEETINGS.

SATURDAY, FEBRUARY 12.  
*Architectural Association*.—Visit to Church at Wimbledon, 3 p.m. (Postponed from Feb. 5. See advertisement.)  
*Surveyors and Auctioneers' Clerks' Provident Association*.—Annual Meeting, Auction Mart, 3 p.m.  
*Edinburgh Architectural Association*.—Visit to Magdalen Chapel and the High-street closes.

MONDAY, FEBRUARY 14.  
*Royal Institute of British Architects*.—Professor T. Hayter Lewis, F.R.A., on "Notes made during Tour in Greece, 1881 and 1884" 8 p.m.  
*Royal Academy of Arts (Lectures in Architecture)*.—Professor J. H. Middleton on "Methods of Decoration as applied to Medieval English Architecture." 8 p.m.  
*Society of Arts (Lectures)*.—Mr. W. Y. Dent, F.C.S., on "Building Materials." I, 8 p.m.  
*London Institution*.—Mr. W. B. Richmond, on "The Future for Art." 5 p.m.  
*Society of Antiquaries of Scotland (Edinburgh)*.—8 p.m.

TUESDAY, FEBRUARY 15.  
*Institution of Civil Engineers*.—(1) Further discussion on Mr. W. J. Dibdin's and Mr. W. Santo Grimm's papers on "Sewage Sludge and its Disposal." (2) Mr. W. Willcocks on "Irrigation in Lower Egypt." 8 p.m.  
*Society of Arts (Foreign and Colonial Section)*.—Mr. Allan Ransome on "Some of our Colonial Woods." 8 p.m.  
*Birmingham Architectural Association*.—Mr. Whitworth Wallie on "Pompeii." 7.30 p.m.  
*Statistical Society*.—Ordinary Meeting. 7.45 p.m.

WEDNESDAY, FEBRUARY 16.  
*Society of Arts*.—Mr. Henry H. Cunyghane on "Uses, Objects, and Methods of Technical Education in Elementary Schools." 8 p.m.  
*British Archaeological Association*.—(1) Rev. L. H. Lloyd on "The Parochial Registers of Wing, Bucks." (2) Mr. J. T. Irvine on "The Communion Plate, Peterborough Cathedral." 8 p.m.  
*Civil and Mechanical Engineers' Society*.—Mr. David Gravel on "Reservoir Dams." 7 p.m.  
*Royal Meteorological Society*.—Ordinary Meeting. 7 p.m.  
*Builders' Foremen and Clerks of Works' Institution*.—Ordinary Meeting. 8.30 p.m.

THURSDAY, FEBRUARY 17.  
*Society for the Encouragement of the Fine Arts*.—Mr. G. A. Rogers on "The History of Wood-carving." 8 p.m.  
*London Institution*.—Professor Silvanus Thompson on "Electric Bells." II, 6 p.m.  
*Parke's Museum of Hygiene*.—Mr. Chas. E. Cassal on "Food Adulteration and Analysis." 5 p.m.  
*Edinburgh Architectural Association*.—Ballie Russell on "The Work of the Architect in Relation to Health and Longevity." 8 p.m.

FRIDAY, FEBRUARY 18.  
*Architectural Association*.—Mr. Walter Crane on "The Architecture of Art." 7.3 p.m.  
*Institution of Civil Engineers (Students' Meeting)*.—Mr. G. A. Becks on "Diving; the Apparatus used, and the Work carried out under Water." 7.3 p.m.

SATURDAY, FEBRUARY 19.  
*Builders' Foremen and Clerks of Works' Institution*.—Annual Dinner (Holborn Restaurant). 6.30 p.m.

The Surplus Lands of the Metropolitan Board of Works.—At the meeting of the Board on the 4th inst., Mr. T. G. Fardell moved: "That it is desirable that all the Board's surplus lands should, in the first instance, be offered for sale by public auction." He believed that better prices would be got in the majority of cases if the lands were put up to auction instead of being sold by tender. Mr. W. A. Lindsay seconded. After some discussion, the question was referred to the Works Committee for consideration.

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 C. S. Roberts ..... 649 0 0  
 H. Williams ..... 539 0 0  
 G. Gates, Frintsbury (accepted) ... 483 0 0

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 Willis, Hailworth ..... 2,644 0 0  
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 Brook & Ash, Crediton ..... 2,586 0 0  
 Turner & Skinner, Honiton ..... 2,558 11 10  
 Gibson, Exeter ..... 2,485 0 0  
 Phillips, Exeter ..... 2,434 0 0  
 Satter Bros., Exeter ..... 2,391 0 0  
 Newton & Idle, Clapham ..... 2,231 0 0  
 Rimes, Mutley, Plymouth ..... 2,060 0 0

**STREATHAM.**—For Methodist Free Church Schools, Streatham. Mr. F. Boreham, architect. Quantities by Mr. O. W. Brooks:—  
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 T. Richards ..... 1,370 0 0  
 L. H. & R. Roberts ..... 1,348 0 0  
 Holloway Bros. .... 1,269 0 0  
 J. Allen & Sons ..... 1,263 10 0  
 J. Holloway ..... 1,263 0 0  
 G. Jervis Smith (accepted) ... 1,240 0 0

**SUDBURY (Middlesex).**—For alterations and improvements to house, and the erection of cottages, pigeries, &c., Sudbury Park Farm, for the Dairy Supply Company (Limited). Mr. E. F. Whelock, architect, Finsbury-parment:—  
 E. Harris & Sons ..... £3,908 0 0  
 W. A. Rhodes ..... 2,960 0 0  
 E. Watts ..... 2,144 0 0  
 W. Downes ..... 1,863 0 0  
 A. Mackie ..... 1,730 0 0

\* Accepted subject to some modifications.

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 Biley ..... 1,459 0 0  
 Lathey Bros. .... 1,370 0 0  
 Johnson ..... 1,350 0 0  
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 Lorden & Son (accepted) ... 1,275 0 0

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# The Builder.

Vol. LII. No. 2295.

SATURDAY, FEBRUARY 19, 1887.

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### Elasticity and the Strength of Materials.



CONSIDERABLE amount of information upon elasticity is scattered through the periodicals of this and other countries, and a few books have been wholly devoted to it, but we have

now before us the first great attempt of recent years to give a comprehensive view of the subject and its relation to the strength of materials.\* Not only does elasticity cover all the principal phenomena of the latter: it would, if fully understood, enable us to form a much clearer conception of the ultimate constitution of matter, and is therefore of the utmost importance to men of science generally. In this volume of nearly 1,000 pages we have Dr. Todhunter's first instalment of the history of the theory, bringing us up to the year 1850, and we are indebted to Professor Pearson for a large amount of additional matter, together with a revision of the whole. In collating the work of writers of various ages and countries there is, of course, a difficulty in deciding upon and adopting a uniform terminology, but we think this has been successfully accomplished, and the present work will, as a standard of reference, go far to confirm its usage. There is so much confusion in ordinary text-books at the present day as to the use of the terms "stress" and "strain" that it is interesting to note the terminology here adopted. The word *strain* is retained, as first suggested by Rankine, for the purely geometrical consideration of distortion; *stress* is reserved for the dynamic aspect of distortion, as first accurately defined by Saint-Venant. Thus the stress across an elementary plane is the resultant of the actions, whether attractive or repulsive, which the molecules situated on one side of the plane exercise upon the molecules upon the other side, when the direction of these actions traverses the plane. "Tension" and "compression" are not used; in place of them the word *traction* is used, being positive or negative, for a *stretch* or *squeeze*, and indicating the external effort as against stress, the molecular resistance. *Shear* is used for the stress aspect of the current use of that term, while *slide* is adopted for the strain aspect. The book abounds with copious extracts in the original language of the

various writers whose opinions and theories are quoted, in order that no misunderstanding may arise where important statements are involved, and these add much to its value as a standard work. With so distinguished an author and so discriminating an editor its mathematical excellence is beyond our praise; as it is the last so it is the best history of a subject which is essentially mathematical in its nature; but we shall confine our notice to the practical side of the subject, as being of more immediate interest to our readers.

Commencing about 250 years ago with Galilei, whose problems of the resistance of beams gave a foundation for the theories of elasticity, although he believed the fibres were themselves inextensible, and passing over Sir Wm. Petty, who attributed sexual characteristics to atoms, we find in the hypothesis of Hooke (1678) the first hint of the modern conception of elasticity. "*Ut tensio sic vis*" was the law he laid down for springs and elastic bodies, and although his theory was tainted with the vague and unsatisfactory notions of his day, the experimental law was of the greatest importance, and gave rise to the Mariotte-Leibnitz theory that extensible fibres resisted as their extension. Mariotte considered that half of the fibres of a bent beam were extended and the others compressed; Varignon thought the neutral surface coincided with the fibres farthest from the extended side; Jas. Bernoulli, who solved the problem of the elastic curve, thought that the force required upon the end of a beam to cause its fracture would be the same wherever the "axis of equilibrium" might be, and he, therefore, considered the position indifferent. Newton (1717) argued that the cohesive and dispersive phenomena of matter were due to attraction and repulsion among the particles, not that attraction was a cause, but only,—the same as was gravity,—"a general law of nature, the truth appearing by phenomena, while the cause was yet undiscovered." A few years after, Musschenbroek made experiments, principally with wood, to ascertain these *vires internæ*, holding that without our needing a metaphysical hypothesis as to their cause, we may determine them in each case by experiment. Billfinger (1729) rejects the theories of Mariotte and Bernoulli, and holds that until the laws of compression are formulated the position of the neutral line must be found by experiment. The majority of early writers took but scant notice of compression, and even at the present day much remains to be done. A great difficulty in the way of progress during the seventeenth and eighteenth centuries was "the union of those theological and metaphysical tendencies of the time which so checked the true or experimental

basis of physical research." J. Riccati (1750) approaches the modern conception of the conservation of energy; he says the *forma viva* spent in producing a deformation remains in the strained body in the form of *forma mortua* or, in modern language, the mechanical work stored up in a state of strain must be equivalent to the energy spent in producing that strain; but the chief value of his writings lies in his method and his desire to explain the elastic property of bodies upon a purely dynamical theory. Euler (1759) applied his mathematical powers to the investigation of the elastic curve and the bending of columns with other important matters. He assumed that the moment of the forces of elasticity at any point is inversely proportional to the radius of curvature, the proof of which we do not get until we reach Poisson. Lagrange (1770) continued the study of columns, and asserted that a truly cylindrical column was more efficient than one of similar weight with an entasis, such as Vitruvius and other architects had recommended; but Hodgkinson afterwards refuted this by means of careful experiments on columns of cast iron. Coulomb (1773) places the neutral line at the middle of the transverse section of a rectangular beam, the sum of the forces of extension being equal to the sum of the forces of compression across any section. He introduced (1784) his theory of torsion, which by means of a suspended filament has afforded such an exceedingly delicate means of measuring small forces. He also formed an important conception of cohesion as applied to "les corps formés de molécules agglutinées," such as a masonry pillar, and others; he held that the difference in the cohesion of the same material in different states depends upon its capacity for receiving set-slide (*glissement*): if its parts cannot slide on each other it is brittle; if they can, it is ductile or malleable. The eighteenth century is brought to a close with an account of Girard's treatise on elasticity, which, besides a historical review, contains an exhaustive account of all that was known upon the subject at that time; speaking of it the author says,—"The whole book forms at once a most characteristic picture of the state of mathematical knowledge on the subject of elasticity at the time, and marks the arrival of an epoch when science was to free itself from the tendency to introduce theologico-metaphysical theory in the place of the physical axiom deduced from the results of organised experience."

In the opening of the nineteenth century the subject seems to have attracted attention in England, and, although from his superior attainments as a mathematician we can understand that Dr. Todhunter could not tolerate the want of such knowledge in any man pro-

\* A History of the Theory of Elasticity and of the Strength of Materials, from Galilei to the present Time. By the late Isaac Todhunter, D.Sc., F.R.S. Edited and completed for the Syndics of the University Press by Karl Pearson, M.A., Professor of Applied Mathematics, University College, London. Vol. I. Galilei to Saint-Venant, 1639-1850. Cambridge: University Press. 1886.

fessing to be a leader in science, we were not prepared for such a sweeping condemnation as the learned doctor passes upon all our "fathers" in the science of building. Young, Robison, Gregory, Barlow, Tredgold, each comes in for a portion of the discredit which is finally summed up in the following paragraph:—"It is difficult to picture the remarkable scientific ignorance of practical men in England in the first quarter of this century. One can only trust that there may be a closer union of practice and theory in our own day." No doubt the practical men would be more reliable if they had more theory to guide them; but are the theorists without blame? Have not mathematicians devoted much labour to questions of little practical value, neglecting many others for the solution of which the world of constructors is waiting? And have not the practical questions they have touched been too often left involved in obscure mathematical language?

Young (1807) originated the modulus of elasticity: it was then a modulus of length, but, as now known, is one of weight. He added but little to the subject under review. "Without making any very definite statements, he would appear to ascribe the properties of cohesion and elasticity to the existence of the ultimate material particles in an ethereal medium, which, in some fashion, produces between them apparent forces." He appears, however, to have been among the first who laid marked stress on the distinction between lateral adhesion and direct cohesion; he was also the first to state the general theorem of resilience. Belli (1814) remarks that two opinions have been held as to molecular force: "Newton and his followers maintained that molecular force was quite distinct from the force of gravity or universal attraction; whilst, more recently, Laplace had suggested that it was only a modification of gravity." He opposes the latter view, relying upon the argument furnished by the fact that a drop of water will remain in equilibrium hanging from a horizontal surface, where the attraction of the drop on its lowest particle must be strong enough to overcome the attraction of the whole earth. Binet (1814) has the credit of first discovering the fundamental principle that spiral springs act chiefly by torsion. Biot (1816) attributes the elastic properties of bodies to their molecular construction and to forces between these molecules. G. Rennie (1817) made several experiments on the strength of materials, particularly cast iron, and gave some facts of practical experience for mathematicians to work upon. P. Barlow (1817) assumed that the sum of the moments of the tensions of the extended fibres about the neutral point of any section must be equal to the sum of the moments of the compressed fibres; Hodgkinson objected to this, and Barlow afterwards (1837) accepted Coulomb's principle. Tredgold (1822) calls down the full wrath of our author on account of his rejection of fluxions as a necessary branch of study, "Such is the scientific capacity of the man whose works remained for years the standard text-books of English engineers!" Hodgkinson (1822) adds some important deductions from his experiments on cast iron, among which we find that "the *moduli* for extension and compression are not exactly equal, hence the neutral line does not exactly pass through the centres of gravity of the sections; the difference, however, is so small that it does so very approximately." He proved experimentally that a cast-iron girder should have unequal flanges in the ratio of the tensile and compressive resistance of the metal, while for wrought iron the ratio being practically equal, the flanges should be equal. The author adds, "We have referred thus at length to Hodgkinson's second paper (1831) because it suggests several points which have not received full treatment at the hands of the mathematician. Notably the difference in character between cast and malleable iron, the range of imperfect elasticity, and the shape of the beam of the greatest absolute strength, are all points which seem capable of mathematical treatment with advantage to both theory and practice. The mathematician can-

not fail to be struck with the *very small* portion of the phenomena presented by a material subjected to continuously-increasing strain, which is covered by the current theory of elasticity." The decade from 1820 to 1830 shows a remarkable progress in the theory of elasticity; during this period the theory was definitely established, and its broad outline completed. "It is entirely to French scientists that we owe this great contribution to a wider knowledge of the physical universe, and however we may regard the relative merits of Navier, Poisson, and Cauchy, there cannot be the least doubt as to their dividing between them the entire merit of the discovery."

Navier (1821) gave for the first time the general equations of equilibrium and motion which must hold at every point of the interior of a body, as well as those which must hold at every point of the surface. He also considered many practical questions, as the limits of safety for various kinds of stress, the equilibrium of masses of earth, arches, continuous beams, &c. During this period we have also the contributions of a lady, Mlle. Sophie Germain, the pupil and friend of the great mathematician Lagrange, who invented the calculus of variations. She was herself no mean mathematician, and succeeded in finally establishing the equation for the normal vibrations of a plate. Laplace (1825), in his celebrated "*Mécanique Céleste*," says, with reference to forces which are sensible only at imperceptible distances—"Dans ma théorie de l'action capillaire, j'ai ramené à de semblables forces les effets de la capillarité. Tous les phénomènes terrestres dépendent de ce genre de forces, comme les phénomènes célestes dépendent de la gravitation universelle. Leur considération me paraît devoir être maintenant le principal objet de la philosophie mathématique." He devotes some space to the investigation of the attraction of one sphere on another, but does not much help the present subject. In the *Memoirs* by Savart (1819-40) we have some very interesting matter relating to elasticity founded upon original experiments. Although he deals principally with elastic vibrations as regards their relationship to the theory of sound, yet valuable hints may be derived therefrom upon the structure of elastic bodies, and a wide field is opened out for the verification of his results by mathematical processes. Lagerhjelm (1827), a Swedish physicist, showed that within the limits of elasticity all kinds of iron,—hard, soft, or brittle,—possessed the same degree of elasticity, *i.e.*, the modulus of elasticity was identical, notwithstanding that the limit of elasticity itself was greater for the harder irons. According to Lagerhjelm, the breaking-weight increases with the limit of elasticity, and is nearly proportional to it; also, "if a beam or wire be subject to tension, which produces a permanent extension, its limit of elasticity is increased, and, in proportion to its diameter, it possesses a greater absolute strength." The same writer shows that a permanent set produces an increase of volume. Poisson (1814-28), as a great master of analysis, is dealt with very fully, particularly section 6 of his "*Mémoire sur l'équilibre et le mouvement des corps élastiques*," which is the first investigation of the problem of the elastic plate from the general equations of elasticity, and which gave rise to much controversy; section 7 is devoted to the application of the formulæ. In his *Memoir* of the general equations of equilibrium, &c. (1829), he refers to *caloric* as supplying a repulsive force, in addition to the attractive force which may be supposed to arise from the action of particles of matter on each other. His writings are of the greatest value in elucidating the general subject of elasticity, and many of the most important problems are due to his initiative. Contemporary with Poisson was another celebrated elastician, Cauchy, whose attention was directed to the subject by being appointed one of the Commissioners to examine the memoir sent to the Paris Academy by Navier. His theory included the six stress-components which have to be considered at any point, the stress ellipsoid, &c., and he originated what is

known as Cauchy's Theorem. At this time no advance was made in the science of elasticity by the transition from the consideration of the forces upon a molecule exerted by its neighbours, to the consideration of the stress upon a small plane at a point. He was invited by the Academy to write a treatise on Molecular Mechanics, but this was never accomplished, his literary work consisting principally of detached memoirs published in the "*Comptes Rendus*." Cauchy observes that a disturbing element is introduced into the equations if we consider a homogeneous body as built up of a system of molecules and each molecule as in itself a system of atoms. The experiments on wires in connexion with the Geneva suspension bridge (1824) cause the remark that "they bring out various physical facts which are too often omitted in the theoretical consideration of traction problems, and for which no comprehensive mathematical theory has yet been propounded." In Rondelet's "*L'Art de Bâtir*" (1830) we have mention of some of the first recorded experiments on adhesion, but they are confined to mortar and plaster, and were made in 1787. He found that when two stones were united by mortar the separation occurred in the middle of the thickness of the joint, and not following the surfaces; whereas with plaster the contrary took place. We are told that this preponderance of adhesion over cohesion in mortar compares with that of glue in Bevan's experiments, but the figures quoted (Art. 374) hardly bear out this statement.

Weber (1830) first drew attention to the importance of considering the influence of temperature on stress, and made some interesting experiments on wires under traction. In 1835 he discovered the remarkable phenomenon now known as elastic after-strain or "Weber effect"; to explain this "he supposes the ultimate particles of the body to have three axes, and the angles made by these axes with the central distances of adjacent particles to be capable of variation; the complete equilibrium for any applied load denotes a certain relative position of these axes for neighbouring particles, but this position can be attained only after a long interval of time." About this period the contraction at point of fracture received some attention, and owing to the increasing number of practical experiments under various conditions, together with the minute attention bestowed upon them, many physical problems were propounded which mathematicians have not yet fully elucidated. Vicat (1830) pointed out the omission of *shear* and *slide* from the ordinary theory then current in practical books; they had, however, been the subject of investigation by various experimenters. He also insists upon the distinction which must be drawn between instantaneous and permanent loads. His experiments on compression confirm the modern theory that rupture by pressure is produced by lateral extension. Those on short beams of non-fibrous material built in at one end, show that when the rupture takes place at a built-in end the surface of fracture is always curved in certain definite ways, which are *très prononcés* for a short beam, but cease to be appreciable when the length becomes considerable. Ampère (1832) appears to have been the first to clearly distinguish between particles, molecules, and atoms: a particle is an infinitely small portion of a body which still retains the nature of the body: the molecule is essentially solid, and cannot be broken by mechanical force, only by chemical force; with regard to atoms, the only statement that can be made with certainty is that they are absolutely indivisible. "Molecules as a whole can vibrate: from this arise the phenomena of sound; their atoms can also vibrate: from this arise the phenomena of heat and light." Belli (1832) argues against the attributing of cohesion to gravitating force, and recounts the three current hypotheses of the nature of matter, *viz.*: Bodies are formed of minute extended particles separated by distances not much greater than their diameters (Newton); Molecular distances are incomparably greater than molecular diameters (Laplace); Bodies do not consist of discontinuous

molecules in a vacuum, hut of discontinuous vacua in a continuous matter (Bernoulli and Euler). Belli himself concludes that in every disposition of matter it would be necessary to suppose bodies to have "una enorme rarità di tessuto e una enorme densità della materia, se vi vuole che la coesione possa dipendere dalla gravitazione." Piola (1833-6) applies the mathematical methods of Lagrange and Poisson, and analyses the theory of elasticity, but he does not appear to advance the subject to any extent. Gerstner (1833) in a series of careful experiments on pianoforte wires, made the important discovery that the elastic strain even after the beginning of set remains proportional to the load, and that when such a wire is reloaded no further set occurs until the previous load has been exceeded. Baudrimont (1835) pointed out that, owing to the "worked state" of wires, their elastic character was very peculiar, and that such material did not present uniformity in its elastic constants. The Transactions of the Inst. C.E. for 1836 contain a paper by Tredgold on tension, where he shows the importance of making the load exactly axial with the bar in all structures. Avogadro (1837) gives a good account of the state of mathematical and physical knowledge at that time, hut contributes no original work. Brix (1837) tested French and German iron in comparison, and carefully noted the results; he found that the strain after the beginning of set consisted of two parts,—a purely elastic part following Hooke's law, and a set for which he could discover no law; he also proved that a given load will only produce a definite amount of set, however long maintained. His tabulated results showed clearly the position of the yield-point, hut he appears not to have noticed its existence. He observed that rolling and wire-drawing produce a change in the elastic conditions of the surfaces. Duhamel (1835) contributes some problems upon thermo-elasticity. Lehanc (1839) notices an important practical point, that long wires have a less breaking load than short ones of the same diameter, because there is greater probability of small flaws occurring. Hodgkinson's experiments on cast-iron (1840) naturally receive some attention, but although they were more exhaustive than any preceding them, and were of great practical value, our author is unable to find any mathematical theory upon them beyond a modification of Euler's theory for columns. It appears to be very desirable that mathematical and technical experts should be associated in carrying out such experiments, in order that the physical results may be noted in such steps as will ensure their mathematical value. Theory must be founded on practice, but practice can only make progress when theory lends her aid. Poncelet (1839), to whom we owe the introduction into practical mechanics of the principle of energy, gave courses of lectures wherein several points relating to elasticity were first treated. They were published in various editions, known generally as the "Mécanique industrielle." Among other things he described the *résistance vive d'élasticité*, or work done in deforming a bar up to its elastic limit, and represented graphically by the use of curves the result of several experiments. He was the first to give "an accurate graphical representation of the traction-stretch relation for bars subjected to terminal tractive load." He also went very fully into the question of resilience, and was instrumental in advancing the general theory.

In 1826 a small band of French military engineers in the Russian service, of whom Lamé and Clapeyron were the chief, was formed into a Commission for investigating the subject of the most suitable iron for suspension bridges, and to their labours are due many interesting facts and theories. The want of isotropy in iron bars, the properties of the state of ease, the conditions of the yield-point, Lamé's stress ellipsoid, and the existence of principal tractions, are among the points established. Considerable space is devoted to an account of Lamé's mathematical work, but this does not appear to be directly based upon physical axioms, and is of purely theoretical interest.

The chief feature of the decade 1830-40 is thus seen to be a richness of physical results which gave a broad basis for a reciprocal development of theory.

In the next decade we find a remarkable activity in all branches of research. "On the technical side it is no longer suspension-bridges, hut practical railway needs, which call forth not only innumerable experiments on iron, but corresponding developments of theory. . . . The technical papers of the period abound with material suggesting profitable lines of mathematical or physical investigation."

Hausmann (1840) notes that after rupture has taken place in a bar of wrought iron at the section of stricture, the stricture ends of the bar were found to be strongly magnetised when tested upon iron filings. Masson (1841) attempted to set up a relation between the elasticity of a substance and its atomic weight, hut the experiments were not very conclusive. Brewster, relating his researches on the polarising effect of strain upon glass and other bodies, suggested that models of arches should be made of glass, and so the stress in different parts of the arch rendered visible by exposure to polarised light, though we are not aware that this proposal was ever carried out. Neuman (1841) starting from Brewster's researches develops a theory for the analysis of strain by means of its double-refracting influence on light: his chief object was to determine the fringes produced by a given strain; but naturally the converse problem is of more importance. He also compares the effect of temperature with that of load in producing a change of density. One great difficulty that English engineers,—and not engineers alone,—have laboured under has been a very imperfect knowledge of the labours of scientific men of other countries, and only within quite recent years has any practical step been taken to remedy this; we refer to the copious extracts from foreign periodicals and hooks now found in every volume of the Transactions of the Inst. C.E. These place engineers in the present day *en rapport* with their co-workers abroad, and are of inestimable value. This difficulty was fully appreciated by Moseley, who, in his "Mechanical Principles of Engineering and Architecture" (1843), reproduced much of what was useful in the writings of Poncelet and others. Stokes (1849) contributed some important papers upon the vibratory motion of elastic solids, and a mathematical analysis of experiments on the effect of moving loads upon railway bridges. Wertheim (1842) experimented upon all the principal metals to determine the stretch-modulus, limit of elasticity, electro-elastic and magneto-elastic properties of bodies. The true elastic limit is considered to be "the stretch at which stress ceases to be proportional to strain," but he measured it as "the stretch at which set commences" and these are not necessarily the same. His contributions to physical elasticity are, however, among the most important of the period. Person (1848) considered that the work done in separating the molecules of a substance mechanically ought to be related to the heat required to separate them by fusion, but we fail to see any analogy between his exhaustive experiments on the vibrational constants of elasticity, and the temperature effect; according to the author, his experiments "conclusively prove that either isotropy possesses two constants, or that wires possess a cylindrical arrangement of elasticity, *i.e.*, are *aeolotropic*."

In 1849 we have the Report of the Commissioners on the Application of Iron to Railway Structures, containing the opinion of nearly all the leading British engineers of that day, and a detailed account of experiments upon the effect of continuous and intermittent loads, of long-continued impacts, of moving loads, &c., carried out upon a large scale and with every regard for accuracy. This Report caused a great activity in the discussion of the general subject of molecular mechanics, and the practical use of wrought and cast iron, and is, of course, well known to all practical men; it is, in fact, the "corner stone" of their structural work in iron, but it may not be out

of place to recapitulate a few of the conclusions arrived at. The dead load on girders should not be more than one-third to one-fifth the breaking load; travelling load, causing vibrations, should not be more than one-third to one-tenth of the breaking load, the majority being in favour of one-sixth. According to the evidence of nearly all the practical men, a girder was supposed to be deflected less by a load moving at a high velocity than by the same load at rest; Hawkshaw, P. Barlow, and R. Stephenson, however, held the contrary view, which we now know to be the correct one. Some interesting evidence was given as to the change of molecular structure in iron by long-continued vibrations, tough and fibrous metal being reduced to a crystalline and brittle state, but, on the whole, this change appears to be brought about from repeated *transverse* impulse, and to be absent in the case of *longitudinal* impulses only. Homersham Cox (1848) ingeniously applied some well-known elementary principles to formulate the elastic equations, and obtained close approximations in a very simple manner. Hodgkinson's experiments covered a very wide field. In addition to his better-known work, he tested bricks and building stones; he found that sandstone failed in crushing by the formation of a wedge fracture as in cast-iron, while limestone formed perpendicular cracks and splinters. The change of shape in the cross section of a solid rectangular wrought-iron bar under transverse stress must have presented itself to many experimenters, but it is first noted and figured in Clark's "Tuhular Bridges," where it resembles "the elastic figure obtained from Saint-Venant's theory of flexure." According to Clark, if a bar he put under initial transverse stress, by heating hot and straightening cold, the deflection is decreased, and the bar gains in absolute strength, although from theoretical considerations it seems very doubtful whether the absolute strength of a body (its limit of cohesion) can be increased in this way, and further experiments are needed.

A most important remark by the author upon the criterion of strength for permanent structures is contained in the following sentence:—"It cannot be too often reiterated that the theoretically best form of a section for a beam to be loaded only below the elastic limit by no means necessarily coincides with the section of beam of greatest strength." All the investigations of physicists and mathematicians into stress-strain relations tend to substantiate this opinion, yet, with the exception of Box, we can call to mind no popular writer of the present day who gives any heed to it in fixing the limit of safe load in structures. Fairbairn, in experimenting upon iron plates for ship-building (1850) found a very slight difference between the absolute strength of plate and bar iron, also between the strength of a plate torn through or across the fibres. As now made, the material shows very decided differences. We need not on that account impeach the accuracy of the experiments, which were doubtless correct for the material employed, but in utilising the results we must be guided by the present circumstances of manufacture. Haughton (1846-54) incidentally adds to the theory of elasticity, but is principally concerned with establishing the laws of the undulatory theory of light. Jellott (1850), employing Lagrange's method, investigated the equations for an elastic solid, the solid being regarded as an aggregate of molecules, and considered the hypotheses of both independent and modified action. Clerk-Maxwell (1850), among other interesting problems, follows up Brewster's suggestion of determining the nature of a strain in an elastic solid by means of the colour-fringes exhibited by polarised light, and furnishes a graphical solution of the problem.

The closing chapter is specially devoted to the researches of Saint-Venant before 1850. This renowned elastician "had a keen appreciation of practical needs combined with a wide theoretical grasp of which it would be hard to discover another example in the history of our subject." Although many valuable discoveries had been made, they were not current

in the practical world, being either misunderstood or ignored, and "to restate theory in its true place, to make the theory of elasticity of practical value, has been the life-work of Saint-Venant." He died only so recently as January, 1886, and the major part of his work will come under review in the second volume of this History. Prior to 1850, however, we owe to him the best definition of stress across an elementary plane, the true criterion of the strength of a body, the correction of the Bernoulli-Eulerian theory of flexure by the consideration of slide, and that of torsion by the discovery of the distortion of the primitively plane section. Note B in the Appendix by Professor Pearson, upon terminology and notation, will repay careful perusal before reading the History; the remainder of the Appendix, with its diagrams, will be better appreciated after tracing the gradual development of the theory, and many suggestive remarks will be found to give food for reflection until the appearance of the next volume. A word of praise is due to the very complete index prepared by Mr. Beare; the entries appear to have been made with judgment, and really form a concise summary under each head.

Although our notice of this work has extended to some length, we have given but a faint idea of the mass of information it contains, and particularly of the detailed mathematical investigations which are inserted and discussed throughout, and we have not even referred to the great controversies respecting multi- and vari-constancy, uni-constant and bi-constant isotropy, &c., as these, although of the very essence of the subject, are of interest only to the specialist in elasticity. Naturally the book will prove somewhat heavy reading to the ordinary practical man; but no scientific library will be complete without it, and any engineer or architect aspiring to deal with the forces of nature in an intelligent manner will do well to possess himself of it.

#### NOTES.

**I**T will be remembered that nearly a year ago the House of Commons rejected a vote of 50,000*l.* for the maintenance of the London parks, on the ground that London ought to maintain its own parks other than those designated "royal parks"; these include Hyde, St. James's, Regent's, and the Green Parks. But in addition to these "royal parks" Her Majesty's Office of Works has hitherto had under its control Victoria, Battersea, and Kennington Parks, and it was urged that the expense of the maintenance of these should be borne by the ratepayers of the metropolis, and should not be a charge on the national exchequer. As we said at the time, there can be no question as to the abstract justice of this proposition, and we now learn that as a consequence of the rejection of last year's vote the Government has introduced a Bill by which it is proposed to transfer the custody and maintenance of the three parks last named to the Metropolitan Board of Works (we presume) their "successors, administrators, or assigns." The opinion we have before expressed that the Metropolitan Board has its hands sufficiently full, and more than sufficiently full, is a growing one, but seeing that the Board has created and has under its control Finsbury Park and Southwark Park, and that it has charge of such open spaces as Hampstead Heath, Blackheath, Clapham Common, Peckham Rye, and Wormwood Scrubs, we think there will at any rate be no harm done by the transfer of the parks in question to the control of the Board as the local authority of the metropolis for the time being. The question came up for discussion at the meeting of the Board on the 11th inst., when an important communication was received from the Government, enclosing a statement of liabilities and assets which are to be taken over by the Board with the parks. A very heavy liability (nearly 200,000*l.*) rests on Battersea Park, but this may possibly be

eventually covered, in great part at least, by the ground-rents of land on the margin of the park, although it appears that some doubt has been thrown on the validity of the title to this property. The Board seems to be proceeding cautiously in the matter, and Sir James McGarel-Hogg has taken steps to oppose the second reading of the Bill pending the further consideration of the matter by the Board.

**T**HE same Bill proposes to transfer to the Board, with all obligations and assets, the control and maintenance of Westminster Bridge, the gardens adjoining the Bethnal Green Museum, and the embankment wall at Grosvenor-road, adjoining the Board's Embankment at Chelsea. With regard to these, as well as with reference to the parks, members and officers of the Board do not hesitate to express the opinion that the particulars of liabilities and assets furnished by the Government are insufficient. The Board is only doing its duty to the ratepayers by being chary of buying a "pig in a poke" or of accepting a gift in the nature of a white elephant. One of the members of the Board, we may note, spoke disparagingly of Westminster Bridge, which he characterised as "a very fragile structure."

**W**ITH regard to the new street from Charing-cross to Tottenham Court-road, which will shortly be completed and opened, two recommendations concerning it have been made by the Works and General Purposes Committee of the Metropolitan Board of Works for consideration at the Board meeting which will be held a few hours after these lines are published. The first recommendation is "That the name 'Charing-cross-road, W.C.' be applied to the new thoroughfare now in course of formation by the Board between Charing-cross and Tottenham Court-road." We cannot say that we think this suggestion any happier than the Board's original proposal to designate the new street from Bloomsbury to Piccadilly-circus "Piccadilly-road," for which the name "Shaftesbury-avenue" was ultimately adopted. Even supposing that the new street came right down to Charing-cross (which it does not), Charing-cross would be at only one end of the new line of thoroughfare. We were the first to suggest that the name of the great philanthropist should be associated with the street from Bloomsbury to Piccadilly, and we had the satisfaction of seeing our suggestion adopted. We now venture to make another suggestion, and that is, that the new street from Tottenham Court-road to Charing-cross should be named "Nelson-avenue, W.C." The connexion of the new street with "Trafalgar-square" will say something for this, but the strongest argument in favour of our suggestion is that the name of one who is generally regarded as the greatest naval commander England has ever seen is not given to any important street in London. "Nelson-avenue" would be popular, and no one could confound it with the three "Nelson-streets" which exist in other and remoter parts of the metropolis.

**T**HE other recommendation of the Committee has reference to the improvement of the line of frontage of the new street, especially in the immediate vicinity of the National Gallery. It will be remembered that at a recent meeting of the Royal Institute of British Architects, it was announced (see *Builder*, p. 215, ante) that, acting on a suggestion of the standing Art Committee, the Council had decided to memorialise the Board with a view to getting a better line than that which the new street now presents at its southern end. The memorial was duly sent to the Board, and referred to the Works Committee for consideration. The Committee now report recommending:—

"That the Royal Institute of British Architects be informed, in reply to their letter relative to the Board's new street from Charing Cross, that a line upon which is practically the same as that suggested by them; and that, as regards their proposal that the National Gallery shall be extended across Hemming's-row, this is a matter for the considera-

tion of Her Majesty's Office of Works, &c., and not of this Board."

We venture to hope that, 'twixt Board of Works and Office of Works, not only will the opportunity of securing architectural effect at the flank-end of the National Gallery be duly secured now, but that it will be taken advantage of at no very distant date.

**I**N all the many changes of public opinion scarcely anything more marked can be found than that which has reference to public spaces in towns. Thirty years ago it never occurred to philanthropic society that the regulation parks were not sufficient for the general wants; indeed, it never occurred to the people themselves what a valuable addition a few more would be to their health and pleasure. As to the commons, they were nobody's business to take care of; and if a greedy Lord of the Manor did sometimes encroach upon the rights of the parishioners, a little grumbling, or occasionally a little pulling down, took place, and nothing more was heard of the thing. But now-a-days open spaces are not only craved for, but are jealously searched for; and should some old suburban mansion, which has not been heard of since the days of Pepsy, emerge from its seclusion, and be announced for sale, it is immediately pounced upon as an open space, and if there be a bit of park land and some good trees, it is sought to secure them for the public. It is only by watching these events that we can at all realise the vast absorption that is going on around us from day to day,—an absorption that will in fifty years' time make an open space of Leith Hill, and a park of the whole range of the South Downs. Last year was very successful in this particular form of legislation, and during this year, so far as we know at present, we are to have two new parks, both in quarters where they will be highly appreciated. Ravenscourt Park, Hammersmith, is familiar to tens of thousands who daily pass it by rail. The house we may dismiss, but the 32 acres are certainly very charming, and so is the avenue that leads to them from the high road. Clissold Park, Stoke Newington, is still better from a scenic point of view, for it has water,—albeit it is but the New River,—and some very lovely timber; and as it is understood that the Ecclesiastical Commissioners have power to sell, and are willing to do so for 95,000*l.*, it would be a sin if the serried rows of terraces and streets, which are even now beating at the door, should be allowed to enforce an entrance. Scarcely a week but brings some complaint through the press that some historical house is for sale, so that there need be no fear that the speculative builder will be able to make a bargain round the corner. On the whole, the community is to be congratulated that so healthy a spirit is abroad.

**A** USEFUL little Bill has been introduced into Parliament, which if passed will be known as the "Quarry Fencing Act, 1887." The title explains the object of this piece of legislation. It is to oblige every owner of a quarry, whether being worked or disused, to keep it safely fenced. The term quarry is to include every pit or opening made for the purpose of getting stone, slate, lime, chalk, clay, gravel, or sand. There are far too many of these places now wholly unprotected, or fenced in so fragile a manner that the so-called protection is almost worse than none, being a mere trap. We are inclined to think that in addition to a substantial fence there should be near every quarry a notice-board conspicuously placed, having the word "quarry" on it in legible letters, so that persons approaching it, either riding or driving, might be warned of its existence before getting very close to it.

**T**HERE is no bond of federation to heat the iron rail, and we are heartily glad to see that West Australia, which has been too long out in the cold, is preparing to ally herself with her fellow colonies in a very practical and substantial manner. It is proposed by an English syndicate to make a line of 700 miles in length, from Perth to Eucla, on the land grant

system, and it is believed that this offer will be accepted by the Government. As Eucla is a considerable distance inland, this line would, of course, not do very much towards bringing the colony a connexion; but it happens that this same place is only some 400 miles from Port Augusta, in South Australia; and the same syndicate has, therefore, made a similar proposal to the South Australian Government. There seems some uncertainty as to the character of the country about Eucla, but a large area between it and Perth, which was said to be waterless and good for nothing, has already been examined, and proved to be just the contrary, so that very little fear is entertained as to the remainder. Should this scheme be carried out in its entirety, a continuous railway will exist throughout the entire southern half of Australia, and it will be possible to run a through train from Perth to Adelaide, Melbourne, Sydney, and Brisbane, a journey which will take from five to six days. Partly in dependence upon this large undertaking, a land syndicate is already issuing proposals to deal with West Australian land on an extensive scale.

TWO or three days hence some old landmarks will have disappeared from Clerkenwell. Spa Fields Chapel, in Exmouth-street, and the Countess of Huntingdon's house adjoining thereto, have just been pulled down.\* Their site is appropriated for the new Church of the Good Shepherd, to be built after Mr. J. D. Sedding's designs, for which an appeal is now before the public. The Metropolitan Board of Works' project for what are known as the Clerkenwell-road to Islington Improvements have involved the diversion from its hitherto uses, perhaps the ultimate extinction, of a relic of the several spring-heads which formerly fed the River of Wells, and gave so rural a character to this once favourite quarter of the town. The inner block of Coldbath-square is in the wreckers' hands. Here, behind Nos. 25 and 26, on the north-eastern side, and boarded over to protect it awhile from the falling debris, lies Nell Gwynne's hath. Having until very recently continued to serve their converted purpose, the frigid chalybeate waters, rising not far from the Fleet's course, were at one time sufficiently famous to give names to various thoroughfares and alleys in the immediate vicinity. Their specific virtues were first announced to the world by Mr. Walter Baynes, of the Middle Temple, who owned the property. His advertisement in the *Post Bag* informed his patrons that the best route thither for carriages lay through the notorious Hockley-in-the-Hole, at foot of Ray, or Rag, street. In or about 1697 he built, on what was then the open ground of Sir John Oldcastle's field, the three-gabled bath-house whereof a view is preserved to us in the little print published by A. Bengo in 1812.

THE demolitions we speak of in the foregoing paragraph will, in all likelihood, be followed by the destruction of the Clerkenwell House of Detention, which, together with its site of about two acres, is now offered for sale. This prison was erected in 1845-47, to replace the "New Prison," which had been rebuilt in 1774-5, near to the Old Bridewell, by William Moseley, architect. The original plan consisted of four arms radiating from a common centre. To these a fifth floor was subsequently added, with two more blocks along the south-eastern and north-eastern sides. The total accommodation is for 1,000 prisoners, male and female, under remand or awaiting trial. One can plainly see from within (as also from Corporation-row) the breach that was made in the back of the outer wall, opposite to the northern exercising-ground, at the attempt to rescue the Fenian prisoners, Burke and Casey, on December 13th, 1867. The signal was given by a woman from a house in Corporation-row, which overlooks the lofty boundary-wall. But some rumour of the attack had reached the governor's ears, and Burke and Casey were not amongst the exercising party at the time. Certain movable fittings have been despatched

to Holloway, Norwich, Liverpool, and elsewhere. The most interesting feature of the prison is the two-storied entrance-lodge by the main gates in St. James's-walk. This, we were told, is part of the original watch-house or lock-up. It contains an upper small apartment, now occupied as a bedroom, wherein Jack Sheppard was once confined before trial. If this be so, it may possibly form the scene of one of his celebrated exploits of prison-breaking.

THE habit of holding exhibitions of the sketches of this or that painter has one especial interest among others, that it sometimes serves to show more satisfying artistic qualities than are to be found in the same painter's more complete and larger works. Now Mr. E. H. Fahey is, in the oil paintings by which he is best known, one of the most mannered of contemporary artists, but in the series of small water-colour sketches from the Norfolk Broads, now on view at the rooms of the Fine Art Society, though this pervading manner is apparent enough, it is certainly not so pronounced or so mechanical in quality as in the finished works of the same artist; and there is more of the variety and individuality which comes of direct transcript from nature. The scenes are well chosen to convey an idea of the characteristic features of that very peculiar landscape (or waterscape). Among incidents which belong specially to the district are the immense boat-load of "Marsh Hay" (No. 9), and "The Winning Boat" (20), coming down one reach of the zig-zag river or canal, while the sails of the other yachts are seen across the land pursuing the opposite direction on another reach of the stream. The whole collection is of great topographical interest, and exhibits much refined and delicate work of its kind, though it cannot be said to belong to the highest order of landscape painting.

ONE must be thankful for small mercies when Government Departments deal with anything of an artistic nature. It would, therefore, be captious to complain of the tasteless colouring and bits of weak and meaningless design to be seen in some of the recently introduced postage stamps. It is a great gain that the insipid lilac which pervaded the last set appears only in two or three of this one. The twopenny stamp is distinctly good, and so is the colouring of some of the others, notably the bright red of the halfpenny, especially on a considerable field of white, but the zigzag margin line of the latter is nothing short of ridiculous. As to the unaltered penny stamp, no amount of getting accustomed to it will prevent our giving an occasional regretful thought to its old brick-red predecessor.

A WOULD-BE witty evening journal makes wondrous merry over its original discoveries,—by the aid of Professor Middleton's lectures,—in the domain of architecture. These discoveries are that the dado is no modern invention, but "was in fashion nearly two thousand years ago," and that the Romans were "jerry builders," to the extent of venerating some of their massive walls with thin slabs of marble. Would our esteemed contemporary be surprised to hear that the origin of the dado may be referred at least to the date of the erection of the ancient palaces of Assyria, and that a good proportion of the Roman "jerry buildings" in question have been "substantial and lasting" enough to stand "nearly two thousand years"? It is true that much of the marble was but a casing, and has disappeared, but that is a fact which few persons who had ever seen such a building would be disposed to doubt, even if there were no Slade Professor to give them the information.

**Iron, Hardware, and Metal Trades' Pension Society.**—The thirty-first annual ball of this charity was held at Willis' Rooms, on the 10th inst., under the presidency of Mr. D. W. M'Innes, of the Carron Company, who was assisted by numerous stewards representing the various branches of the trades throughout the kingdom. The attendance numbered 300 persons.

#### ON THE WORK OF SOME UNKNOWN DESIGNERS.

FROM the known we must plunge our readers hack once more into the region of the unknown. We present them to-day with a series of sketches of designs, all of great excellence and some of the rarest beauty, the names of whose authors are not only wrapped in oblivion, but the object of whose existence can only be the subject of conjecture. With regard to all the works which we have hitherto examined the purpose for which they were created has been sufficiently clear. We have seen how some designs were made expressly for tradesmen's catalogues, and how these artistic catalogues were issued by jewellers, goldsmiths, locksmiths, and gunsmiths alike, in a kind of friendly rivalry, each striving to raise his own wares to the highest pitch of artistic excellence. Then, again, we have seen how a goldsmith would publish a book of ornament pure and simple, with no mercenary object in view, but merely from a desire to improve the standard of work in his own craft by instilling first principles into apprentices; and yet, again, there have been books published by artists who were not craftsmen themselves containing suggestions for those who were. In our next article we shall deal with some of the numerous books of grotesques which were published for the amusement of the world at large of the sixteenth and seventeenth centuries. But the engravings which we have now before us owe their existence to something higher than a mere sordid desire to attract purchasers; they were designed and executed out of the purest love for the art, and are invested with the charm which is inherent to all labours of love. They are simply decorative engravings, and stand on a par with those other engravings of Scriptural, historical, and fancy subjects with which the art life of three or four centuries ago was enriched. All the specimens which we have seen of the ornamental work of this period seem to have been published simply as engravings, and do not appear even to have been incorporated in books, either on friezes or tailpieces. It is just possible that some of them may have been intended as name-plates; for example, the quasi-heraldic device (fig. 3) or the V (fig. 4); but even this is doubtful, and there is nothing left for us but to imagine that they were designed for the love of the art of designing, and for the love of that art alone. The first two illustrations (figs. 1 and 2) which we give are photographic reproductions, and show both the actual size of the original plates and the style and manner in which they were engraved. The remainder of our illustrations are reproductions of sketches in which the style of the engraving is lost, but in which the design itself is preserved with great fidelity.

Apart from the very great beauty of these two engravings, the point to which we specially desire to call attention in connexion with them is the lesson they teach with regard to the shading and embossing of ornament generally. We need not recur to what has already been said as to the necessity, in criticising any design on paper, of first ascertaining whether we are looking at the actual design in the condition in which it is intended to remain, or whether we have only a drawing or representation of the design as it will appear when it comes hereafter to be wrought in wood, stone, or metal, or in the softer fabrics. The designs which we have now before us are clearly not intended to represent the effect of any carved or wrought work, but are simply the ornamentation for the small surfaces on which they are graven; for although the leaves are shaded, yet the flatness of the surface is not destroyed, and the appearance of actual embossing is nowhere given to them. They will serve us, therefore, as excellent examples of the due limits which should be set to shading in decoration.

In dealing with this question it will be necessary, however, to bear in mind some of the first principles of the art. In the first place, let us imagine a surface which has to be relieved of its monotonous uniformity by means of ornaments placed upon it. The simplest possible form in which this can be done is by the use of lines of uniform thickness arranged in some graceful form: a good example of this style will be seen in one of Michel Le Blond's knife-handles (fig. 8 in our issue of January 15 last). A more elaborate, but equally severe, style is based on the use of lines of varying thickness, as in the patterns known by the names of arabesques: of this style the panels by Gentsch

\* See *Builder*, November 29, 1886.

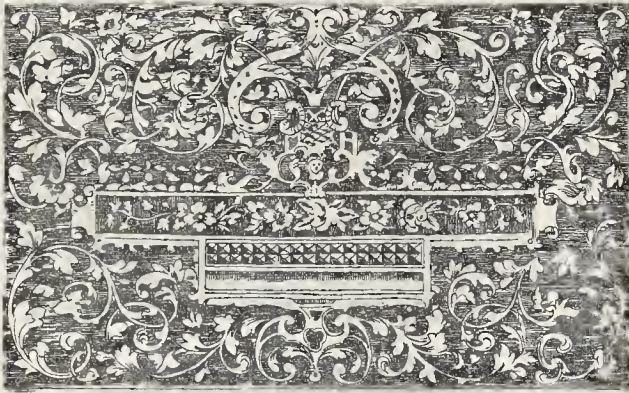


Fig. 1.



Fig. 3.

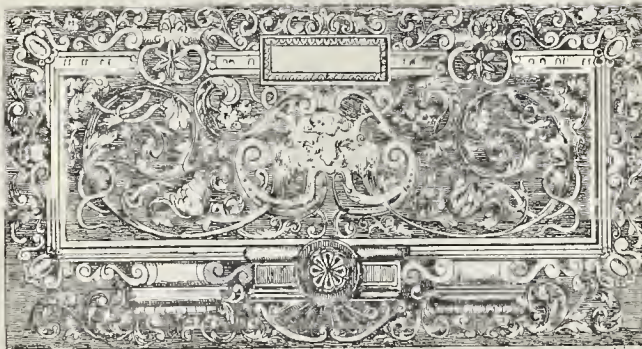


Fig. 2.



Fig. 4.

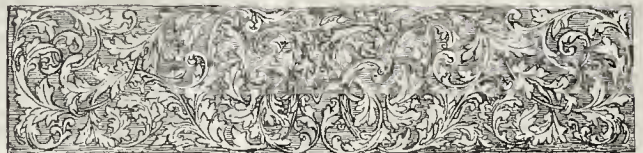


Fig. 5.

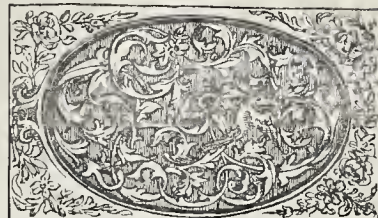






Fig. 6.

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and the tablet by Brentel (figs. 10, 11, and 12 in our issue of January 15 last) are as fine examples as could be found. The third style is less severe than the two preceding ones; its characteristic is the adaptation of the lines of ornament to some form suggested by nature—the process, in fact, which we call conventionalising; in this style the lines used are not only of varying thickness, but take the form of leaves and flowers. Referring still to our issue of January 15, Le Blond's small circular panel (fig. 19) will serve as a good example of this method. But, so far, we have got nothing beyond a flat ornament on a flat surface; and the question which then presents itself is, have we in these three styles, with any modification or amplification of them which can be devised, exhausted the resources of decorative art? Is the whole field of ornament quite covered? Will the next step take us across the line and plunge us at once into the domain of representative art? Experience shows us that there are still resources left untried, that the field is but half explored, that there remains on that side of the line which belongs to decorative art an abundance of space for the invention of another class of ornament of a peculiar fascination and grace, though of a much less severe character than even the third of the classes already mentioned. In this class not only is the form of natural objects conventionalised, but also their structure and appearance. How is this done? Now it is absolutely necessary that one further point should be clearly understood. If any one thinks that, say, a dessert-plate is a good or convenient place on which to have painted a lily or a rose, let him have as many such dessert-plates as he is pleased to pay for, by all means; if another should think, as many a very few years ago seem to have thought, that a wall-paper is a fitting place on which to have painted bunches of flowers tied up in nosegays with beautiful streamers, or the semblance of a trellis up and on which many plants of ivy grow and cling, let him by all manner of means cover his drawing-room walls, and ceiling too for that matter, with the nosegays, and his dining-room with the trellis and the ivy; but if either of our imaginary friends does thus think, let him, in Heaven's name, have his roses and lilies, or his nosegays and ivy, painted with at least a moderate degree of accuracy. We will not be exacting, we will ask only for moderate accuracy, but if he will not meet us to this extent let him not, if we declare him to be one without taste, to be one without a shadow of an idea of the meaning and function of decoration, turn round upon us with the exclamation that we who have severely criticised his dessert-service and his wall-papers are enthusiasts for principles which have no separate existence from our own brain, or (as some who are old enough art-critics to know better have said) that we are mere harmless devotees of line for line's sake.

The answer to the question how the structure and general appearance of a natural object is to be conventionalised, as well as its form, seems to depend on the further inquiry, how its structure and appearance are conveyed to the eye? Obviously by means of lines and shadows: the lines we have already dealt with, the shadows alone remain to be considered; these must also be treated in a conventional manner. The method of doing this must depend on the materials used. For work in colour the old mural painters show us how this can be most effectively done: instead of letting the colours gradually deepen from light to dark, they adopted the plan of using three or four distinct shades of the colour, and laying them on separately one on the top of the other, allowed each shade to terminate abruptly in a hard line. Almost any piece of early illuminating will furnish an example of this method, and one or two capital letters in which the stems are treated in this way are to be found in Owen Jones's "Grammar of Ornament" (plate lxxi.—Illuminated MSS.—notably the letter N there given). This method, easy enough with colour, is, of course, inapplicable to engraving, but the best way of dealing in a conventional manner with shading in black and white ornament is to be seen in the two facsimiles given in figs. 1 and 2: practically only the deepest shadows are indicated, the curvature of the foliage being obtained by a very few curved lines springing from the structural base of the object, and shortening as they extend outwards. In this simple way the actual curvature of the leaf is indicated, but without any approach being

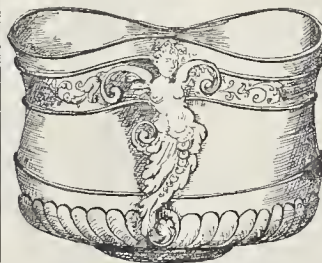
made to an accurate representation of the real lights and shadows which play upon the leaf in nature: the similitude of an actual plant twined over the surface is nowhere aimed at, but the surface itself on which the ornament is placed is preserved, and is as present to the eye as it was before the ornament was put upon it, though its harsh and unpleasing monotony is broken up with graceful forms.

In an earlier article we have said that most of the engravings which we have sketched to-day might be attributed to a school which might fittingly be called "The School of Gentsch." The two plates undoubtedly his which we gave in our issue of January 15th, are the only ones which bear any known monogram. Those which we give to-day vary considerably in style, and are many of them inferior to his plates, but there is a strong family likeness between them all in the manner in which they are executed, and there can be little doubt that the same influences which impelled his hand impelled also those of the designers of most of the others. Such influences are, within certain limits, eminently local and co-eval. His two charming arabesques, which we have already referred to, point to him either as the master whose spirit the others, the now nameless ones, caught; or as the most successful exponent of the spirit in which they also worked. The small plate which bears a capital V (fig. 4) is in much the same style, and may have come from his hand, unless it be by the same designer as fig. 5. The monogram on this plate is usually read A. S., but this is probably a topsy-turvy reading of V. S. or S. V.; if this be so, the V-plate might also be attributed to the same man with safety, and the monogram could then appear to be S. V. If this should not be correct, the V. S. must not be confounded with the monogram of Virgilius Solis, between whose work (to be noticed in a subsequent article) and this plate there is nothing in common. The V does not give the impression of forming part of an alphabet, though it might, as we have said, possibly be the initial for a hook-plate; it certainly looks as though it were the initial of the inventor's name.

The remainder of the sketches will appeal to our readers without any special comment on our part.

The last illustration of to-day's article, the lovely scroll, fig. 6, stands by itself apart from the series of engravings we have just been dealing with, both in style and in method of execution. It is probably of very much earlier date, but its authorship is absolutely unknown. To our mind, it is one of the most beautiful pieces of decorative art that we have ever seen; in fitness and firmness of drawing, in implicit obedience to every canon of the art, it stands alone among its lovely companions in the British Museum collection, the loveliest of them all; nor is there any other plate which gives us the slightest clue to its history or origin. We must leave it as it stands to appeal to our readers, as we think it should, as the most perfect and beautiful expression of all that is good in one of the most beautiful of the arts.

The following sketch is one of the series of cups designed by Carravaggio, which we refer to in our issue of January 22, and of which we promised our readers a reproduction in a subsequent article.



**Lifts.**—Messrs. Archibald Smith & Stevens have been instructed to supply one of their improved hydraulic lifts for Messrs. Lloyds, Barmett, & Bosanquet's new bank in Lombard-street. This lift will run through the entire height of the building.

#### THE METROPOLITAN BOARD OF WORKS AND LONDON THEATRES.

The Bill introduced by the Metropolitan Board of Works for the further regulation of theatres provides that the Board shall every year cause an inspection to be made of all licensed theatres and music-halls, with the exception of such of the latter as contain a superficial area for the accommodation of the public of less than 500 ft., and if the result of such survey is satisfactory the Board shall grant a certificate to the person by whom such theatre or music-hall is kept open.

Certificates under the Act shall be granted not later than the 1st of July in each year, and the Board may, with the approval of the Home Secretary, fix a charge for the same. In the case of the Board refusing to grant a certificate, the person aggrieved may appeal to the Secretary of State.

No alterations may be made in the structure of any theatre or music-hall without the consent of the Board, and penalties are provided for any infringement of the Act.

Any premises kept open as a theatre or music-hall after the Board has refused to grant a certificate, or a certificate has been cancelled, shall be deemed to be unlicensed, and shall be liable to the penalties attaching thereto.

The Board may serve notice upon the manager of any theatre or music-hall requiring him to comply with any regulations the Board may make with regard to appliances for the extinction of fire, the keeping of the gangways and staircases free from seats, persons standing, and all other form of obstruction, and the provision of oil lamps and candles in theatres and music-halls, and the exit corridors therefrom for use in the event of the extinction of gas.

The Bill was brought in by Sir James M'Garel Hogg, Mr. Tatton Egerton, and Mr. R. G. Webster, and the second reading is fixed for the 9th of March.

The Bill was framed before the occurrence of the lamentable disaster in Spitalfields, and it is possible that if it had been framed since that event it might have been of a more stringent character. It will be seen at once that as the Bill now stands it will be inoperative as regards the Hebrew Dramatic Club and similar establishments, notwithstanding the Home Secretary's declaration to the contrary in answer to a question by Mr. Isaacson in the House of Commons on the 10th instant, the operation of the Act being confined to licensed premises. The dual control of the Lord Chamberlain and the Metropolitan Board of Works in the case of theatres, and of the Justices and the Board in the case of music-halls, will be continued. The inconvenience of this condition of affairs has been repeatedly pointed out, and calls for a remedy. The simplest plan of dealing with all places of public entertainment would be to make the inspecting authority the licensing authority also, and this might be done by transferring the licensing power from the Lord Chamberlain and the Justices to the Metropolitan Board of Works or the new Municipality for London.

#### LECTURES ON ARCHITECTURE AT THE ROYAL ACADEMY.

METHODS OF DECORATION AS APPLIED TO ROMAN BUILDINGS.

On the 11th inst. Professor J. H. Middleton, of Cambridge, delivered his second lecture of the present course\* to the students of the Royal Academy, taking as his subject, "Roman Houses and their Decoration." In his prefatory remarks he pointed out that subsequently to the early "feudal" period of Greece, there was no age of anything like equal splendour in the decoration of houses until we came to the early years of the Roman Empire. In the most flourishing period of Greek art, architectural splendour was devoted to sacred purposes. Throughout the Republican period of Ancient Rome the same was the case, and as late as the days of Julius Cæsar anything like magnificence in a private house was viewed with extreme jealousy by the Roman people. But fifty years later all was changed. Augustus encouraged the use of marbles, and the erection of splendid buildings of every kind, and in his reign the house of almost every rich

\* For an abstract of the first lecture, on "Methods of Decoration as applied to Greek Buildings," see last week's *Builder*, p. 248.

century began to be decorated in the most costly and elaborate way. One of the characteristics of the houses in Rome itself, beyond those in other parts of the Roman domain, was the magnificent way in which the walls of the rooms and courts were lined with costly foreign marbles and porphyries, of rich and varied colour, brought from countless quarries in Northern Africa, Arabia, Greece, Asia Minor, and other far-distant portions of the Roman Empire. Great skill was shown by the Roman marble-masons in the way they cut and polished not only slabs and columns, but even delicate mouldings in the very hard red porphyry of Egypt, and the green porphyry of Sparta, which a modern marble-mason would declare to be unworkable. The skill of the Romans in this respect appeared to have been derived from Egypt, where the use of the tubular drill set with jewels, such as rubies or corundum, was known as far back as 4,000 years B.C. Marks of such drills, and of saws set with similar jewels, were still to be seen on the hard granites and porphyries used in Rome. By the use of the saws such refractory materials as those referred to were cut with comparative rapidity into slabs of wonderful thinness and evenness. The Romans were always seeking to make the greatest possible display at a given cost, and veneers of the porphyries were found having only a thickness of  $\frac{1}{8}$  in. There was no known example extant of a Roman room with its decorative marble lining still complete, but the broken fragments which had been found, aided by the impressions of the marble-work on its cement backing, helped us to make out the usual scheme adopted, which, supposing marble to have covered the whole wall, seemed to have had a strong general resemblance to the designs of the wood panellings which were used by Wren, and his pupils and followers in the first half of the last century. There was a dado, with a moulded skirting below it; the skirting was 12 in. or 14 in. high, while the capping of the dado was 3 ft. or 4 ft. above the floor. At the ceiling line there was a deep cornice, the intermediate wall-space being divided into panels. Marbles of various colours were used to strengthen the effect of each line and moulding. Great pains were taken to polish the whole marble surface to the highest possible degree, so that the effect of one of these rooms, with its strong contrasts of vivid colours and reflective brilliancy of surface, must have been more magnificent than artistic. In some cases the marble linings were used in a less simple way, series of columns, free or engaged, being ranged along the walls, the intermediate spaces being broken by semi-circular niches filled with statues. Having described the way in which the marble linings were affixed to the walls by means of iron or bronze hooked clamps, the lecturer passed on to speak of mosaics, which were largely used for Roman houses, not only for floors, but also for the decoration of walls, vaults, and ceilings. Probably no mosaic now to be seen in Rome dated from an earlier time than the middle or end of the first century B.C. The earliest were those in the Regia, in the so-called house of Livia on the Palatine, and the fragments in the *cella* of the Temple of Castor. These were very different in style from the later mosaics of which so many examples still existed. Simple geometrical designs were used, with scarcely any variety of colour, the pattern being grey on a white ground. The tesserae were smaller and much more neatly fitted than in the later mosaics. Indeed, as time went on, both the design and the execution of Roman mosaics became steadily coarser, while richer and more varied materials came to be used, until in the reign of Severus, at the end of the second century, mosaics in Rome had become large, gaudy, and devoid of any artistic quality. As the art of the mosaicist declined, and became feebly pictorial,—marble would no longer supply sufficient varieties of colour, and so tesserae of brilliant glass were introduced, at first mixed with the marble, and then by themselves. These sparkling jewel-like mosaics were mainly used for the decoration of walls and vaults, but sometimes even columns were encrusted with them, producing a startling splendour of effect, such as no other method could surpass. Stucco reliefs were also used by the Romans for the decoration of walls and ceilings. The best of these were by far the most artistic among the methods of decoration used in Rome, the more especially as the finest examples had nothing whatever that was Roman

in their design or treatment, but were really pure Greek work, such as would not have disgraced the school of Praxiteles or Scopas. Some of the best of the stucco reliefs in question were made thus:—Four or five coats of stucco were applied to the brick facing of the wall after it had received its usual studding of metal plugs. The first coat was made of coarse *pozzalana* and lime; the next coating was compounded with finely-sifted *pozzalana*; the third coat was of pounded marble; the fourth was of marble in finer particles; and the finishing coat consisted of pure white marble-dust mingled with lime and a little size or fig-tree sap. This set slowly to a surface as hard as marble, and almost like ivory in colour and texture. But before the final coat had set, a sketch in outline of the design was incised with a pointed tool upon the soft surface; the artist then mixed some of the marble-dust stucco into a plastic mass, and applied it in lumps on to the level surface within the sketched outlines. Then rapidly, before it had time to harden, he moulded the work into shape with his fingers and thumb, assisted by a few modelling tools. Very little after-touching seemed to have been needed. The decision and rapidity with which the work was necessarily executed resulted in imparting to these reliefs a vigour and life such as could perhaps never have been given by the slow chiselling of a hard substance. It would be difficult to find any other examples of art which showed so strongly a combined high training of hand and eye. Rapid as must have been the execution of these reliefs, the modelling of the nude showed a very complete knowledge of human anatomy. When they had set hard, the reliefs were coloured, gilt, and silvered, not coarsely all over, but with much skill, so as to increase their decorative effect without vulgarising the figures by any attempt at realistic colouring. Professor Middleton devoted the remainder of his lecture to the subject of mural painting. He said that in Imperial times wall-painting seemed to have been left to an inferior class of house-decorators, who, though possessed in some cases of very remarkable technical skill, were not original artists of a high class. We found constant repetitions of the same composition, so closely followed as to show that the wall-painter was not in the habit of producing designs of his own. Moreover, we found a certain equality of merits and defects in the paintings of quite humble houses and Imperial palaces, which would not be the case if it had been the custom for the famous artists of the time to produce wall-pictures. In most cases the great manual skill of the painter was shown rather in the way in which he produced rich and striking effects at a small expenditure of labour than in any serious and carefully-studied excellence either of drawing or finish. In the main, the mural paintings of ancient Rome had the merits and the defects of theatrical scene-painting: they were to be regarded as part of the whole scheme of decoration in each room, and not, as a rule, to be examined for their own sake. Information as to the technical methods of painting used by the Romans was to be found in Vitruvius. The processes used were very varied, and included tempera medium, varnish medium, fresco *humo*, and encaustic. These were severally described by the lecturer, who referred in conclusion to the Pompeiian wall-paintings.

#### METHODS OF DECORATION USED IN ENGLAND DURING THE THIRTEENTH CENTURY.

THIS was the subject of Professor Middleton's third lecture, delivered on Monday evening last. He observed that much had been said and written about the Renaissance of art in Mediæval Italy, but he wished to say something about the very interesting but much neglected subject of the Renaissance in England,—a movement which, on the whole, began earlier than in Italy, was quite independent of it, and during its earlier and most flourishing period produced works of art in many branches, sculpture, painting, and metal-work, which on the whole were superior to anything that the Italian artists of the same time were able to produce. To that statement there was one reservation, and that was with regard to the Pisan sculptor Niccola, who in 1260 carved the great Baptistery pulpit. That wonderful genius, born out of his due time, was a quite exceptional person in Italy, and it was not till some years after the end of the thirteenth

century that any of his pupils showed knowledge or skill at all equal to that of their master. Niccola's son Giovanni was far inferior, both in sense of beauty and power of plastic simplicity of design, to our English sculptor William Torelli, the London goldsmith, who modelled and cast the beautiful effigies of Henry III. and Queen Eleanor, which still existed in the Confessor's Chapel at Westminster. That wonderful period of English art, during which the artists of England were unrivalled in the world, began with the early part of Henry III.'s long reign of fifty-six years (1216–1272), and lasted in full glory till the beginning of the following century. After that its development was checked, owing to a series of causes, among which the most obvious were the Black Death, which devastated the country more than once during the fourteenth century, and the disturbances and preoccupations of mind which resulted from the Wars of the Roses. Apart from its interest as the birth-time of the new life of art, the thirteenth century was a very momentous one in England, no less than in Italy, for it marked the transition from the old system of feudalism to the modern one of individual rights and liberties. A striking feature of the period was the growth of the various art and trade guilds, which had very important effects both in art and politics. In matters of art the formation of the guilds led to the creation of a superior class of artists, and by degrees took such branches as painting, sculpture, and metal-work out of the hands of the monks, who had previously to some extent monopolised them. The secularising of the artist was a distinct gain, and helped the world to free itself from the dull hieratic formalism of Byzantine tradition, which had for so long prevented any progress towards the growth of a really living art in any branch of work. Any study of the beauties of the human form had hitherto been forbidden to the monkish artist as a snare of the Evil One and a lapse towards the errors of paganism. The secular artist soon threw off such deadening influences, and though for some centuries he continued to work under the influence and mainly in the service of the Christian faith, yet he could not be prevented from pressing sensual beauty,—the true scope of art,—into the service of his nevertheless purely religious painting and sculpture. In another way the art-guilds were of service to the interests of art; they provided for the careful training and long probation of large classes of art-apprentices, and their governing councils were very strict in keeping their members up to a high standard of excellence, both in workmanship and materials used. The painters' guilds, for example, fined the master-painters if their drawing was judged to be faulty, or if they used inferior materials,—such as impure gold or silver leaf, bad flesh-tints, or second-rate azure, and for any carelessness shown in allowing "knots" to show through paintings on panel. One of the chief causes of this brilliant, though brief, period of England's supremacy in art was the enthusiastic way in which Henry III. devoted an unsparing amount, both of time and money, to the production of works of art of all kinds. In all parts of England new palaces were built, and covered with sumptuous paintings. The chief among the many artistic glories of Henry III.'s reign were the creation of the magnificent royal Palace of Westminster, the rebuilding of the greater part of Westminster Abbey Church, and the making of the wonderful gold shrine for the body of Edward the Confessor, the mere inventory of which, by its list of gold reliefs, gold statues set on and around the shrine, and the great sapphires, rubies, antique gems, and other precious stones which studded every part of it, reminded one of a story out of the "Arabian Nights." Of the gold shrine nothing but its imagination-dazzling catalogue now remained. Westminster Abbey, on the other hand, being so well known to his audience, Professor Middleton said he would select for description some of the mural decorations from the Royal Palace at Westminster, some notion of whose splendour might be gleaned from a few fragments saved from the fire in 1834, aided by the very interesting series of accounts which were now preserved in the Record Office, and also by some careful copies by Stothard (lent by the Society of Antiquaries) of the few paintings that survived till the present century in one of the great halls of the palace. No mere painting, how-

ever beautiful, could have had the rich decorative effect of the walls of the palace; the very exceptional splendour of the work was produced by a combination of painting and relief, which was practised in England at that period in a much more complete and skilful manner than was ever done in Italy. The walls of the chief halls were lined inside with fine ashlar stonework, over which a very carefully-prepared coat of thin plaster was laid: a fine mixture of gypsum and size, with in some cases a proportion of whitelead, which set with a hard smooth surface, very like the beautiful stucco which was used by the Greeks and Romans, and quite unlike the soft, spongy, rubbishy stuff which was now used for the internal plastering of houses. When the thin layer of plaster was dry, the outlines of the picture were lightly sketched in with a fine brush in red or brown, or else with red chalk. The next step was to apply the ornament in relief, such as diaper backgrounds, rich patterns on the dresses of the figures, crowns, sceptres, hrooches, and other ornaments, and especially the main lines of the gables, arches, and other parts of the various buildings which formed the background of many of the pictures. All this ornament in relief was formed by applying a fresh skin or thin layer of the finest stucco in the proper spaces, and by stamping it while soft with very minutely-cut wooden dies or stamps, executed with the delicacy of a cameo or engraved gem. The detail of this ornament was in many places so minute in its richness of design that the full beauty of the pattern could only be made out by a very close inspection. When the stamped reliefs had set hard they were covered usually with thick gold or silver leaf, and then further decoration was added by painting in transparent oil-colours (especially in crimson lake) over the gleaming gold surface of the reliefs. The gold leaf used was very much thicker than modern gold leaf, and was proportionately costly, while the cost of the wall-paintings was materially added to, owing to the necessity of drying the oil-colours with braziers of charcoal, for "driers" were not then known. For this reason, it was only in portions of the pictures that oil-colours were used, the other parts being in tempera. The artists were usually paid a fixed sum for their labour and skill, all materials being found, and very commonly, hoard and lodging in part of the royal palace. The usual pay of an artisan in Henry III.'s reign was what would now be equal to about 3s. 6d. a day, with hoard and lodging, or 5s. per day without. The painter was paid at a higher rate. The usual wage for skilful but not distinguished artists was from 6s. to 7s. a day, and that was what the majority of Henry III.'s painters received. A more distinguished artist, like William of Westminster, a Benedictine monk, was paid about 30s. a day; and the architect of Westminster Abbey, Edward Fitz-Otho, had special favour shown to him, besides being paid a very liberal salary. He had a set of rooms in the Palace, and the king granted him a lead pipe the size of a quill to carry water to his rooms from the Palace conduit, — a remarkable favour at a time when it was very rare for secular houses to have water laid on to them, though the richer monasteries were usually well supplied. In conclusion, the lecturer described the Palace of Westminster (the general arrangement of which, he said, was well shown in a drawing\* by Mr. H. W. Brewer) and its decorations, and said a few words as to the decorations and artistic objects of the sanctuaries of many thirteenth-century churches, which must, in some cases, have looked rather like museums of valuable curiosities.


**Failures in the Building Trade.** — According to *Kemp's Mercantile Gazette* the number of failures in England and Wales gazetted during the week ending Saturday, February 12th, was 111. The number in the corresponding week of last week was 85, showing an increase of 26, being a net increase in 1887, to date, of 58. We regret to notice that, on the same authority, the number of failures in the building trades during the week was 17, as against five and nine in the corresponding weeks of 1886 and 1885 respectively.

\* The drawing exhibited by the lecturer was the original of the illustration entitled "Westminster in the Time of Henry VIII." which appeared in the *Builder* for Nov. 15, 1884.

## Illustrations.

### SKETCHES IN FRANCE.

#### AN OLD HOUSE AT ROUEN.

 IN a small garden just off the Rue Jean d'Arc stands the tower of St. André, and behind this tower, hidden up in a corner, is the front merely of a house which once stood in the Rue Grosse Horloge. Who will venture to say how many modern works have owed some portion of their design to this small building? What a familiar feature is the window in the gable! Be that as it may, there is much that is suggestive in the whole front, and it was a happy thought on the part of its owner thus to preserve it, when circumstances compelled its demolition where it originally stood. It is constructed entirely of wood, and either time has dealt very leniently with it, or it has undergone a most judicious restoration, for the appearance is rather that of a house just built, than of one nearly three centuries old.

#### CHURCH OF NOTRE DAME DE L'ÉPINE, NEAR CHALONS-SUR-MARNE.

The church of Notre Dame de l'Épine, near Chalons-sur-Marne, which has been declared a "monument historique," possesses two open spires of great beauty,—quite a rarity in this part of France. It is said to have been designed by an English architect, and Ferrusson compares it to St. Mary Redcliff. The plan is that of a Latin cross, with nave and choir of nearly equal length, and with boldly projecting transepts,—this latter being certainly an English feature. The church is groined throughout, and the aisle is continued round the apse, which is formed in three cant. The flying buttresses surrounding the choir are sculptured with most comical and amusing grotesques, thoroughly French in their detail, as indeed is the whole building, notwithstanding its English origin. The windows, however, more nearly approach the English Late Decorated in their tracery and general form than any French example, but examination of the mouldings and other details unmistakably proclaim a foreign workmanship; and the curious western porch, surmounted by a great Crucifixion in full relief, is unlike anything to be met with on this side of the Channel. The tower differs slightly in design, the southern being larger and more important than that on the north, which latter has recently been rebuilt. For many years this tower was used as a telegraph station, the spire having been taken down to accommodate it to this novel purpose. Happily, better days have dawned; all signs of posts and signals have vanished, and the church, now in its restored condition, presents a striking contrast to the miserable hamlet in which it stands.

#### DESIGN FOR A SUBURBAN CHURCH.

This design, prepared by Messrs. Thos. Garratt, of London, and J. C. Carter, of Cardiff, in competition for a large church in the suburbs, where economy was an important condition, shows an attempt to gain effect in the simplest possible manner. It was intended to be built of grey stocks, with red brick dressings, and a sparing use of stone in the windows, strings, &c.

The nave and chancel being of the same width, a large arch is thrown across the transepts in continuation of the nave arcade.

A hoarded barrel roof is carried through the nave and chancel at the same height, the former having principals showing, whilst the latter is panelled out with longitudinal and transverse ribs, and a simple wooden vault formed over the crossing.

Externally the nave clearstory is arcaded. The chancel has its clearstory arcaded internally, arranged in connexion with the five-light window at the east end, below which there is space for a large reredos.

The clergy and choir vestries are placed on the north side of the chancel, and an organ-chamber and porch on the south side, the latter to be used as an exit supplementary to the large western porch. The baptistery is at the west end, near the entrance.

The choir seats are arranged so that communicants could return to their seats by the passage behind them.

There is seating accommodation for 831, to

which, on special occasions, chairs could be added to a considerable number.

THOS. GARRATT.

#### NEW OFFICES, LEEDS.

THESE buildings are being erected for the *Yorkshire Post*, a well-known Conservative daily in the north, for the accommodation of the advertising department. The large room on the ground-floor will be fitted up in the most finished style, with furniture from the architect's designs. The walls, and probably the ceilings, will be lined with Burmantoffs' valence in colours. The whole of the front externally is of Ruabon red bricks, with terracotta dressings. The architects are Messrs. Chorley & Connon, Leeds, and the contractors Messrs. Franks & Evans, of the same town, Messrs. Wilcock & Co. having supplied the terracotta. The building shown in the view and plan forms only the street front to extensive premises behind, in which are accommodated the printing, editorial, and other departments, all of which have been carried out from the designs of the same architects.

#### LANTERN TOWER, PERSHORE.

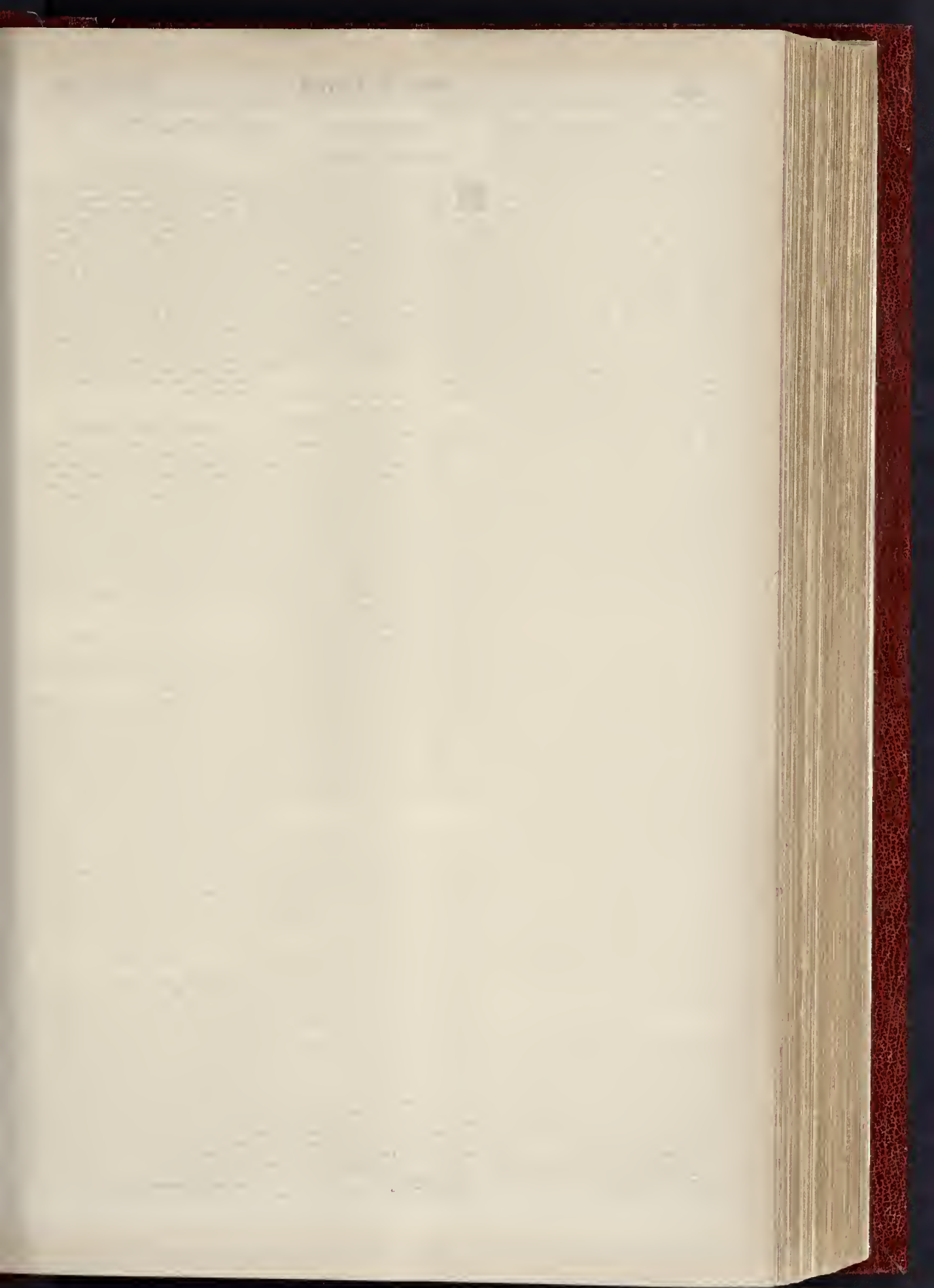
THIS tower is a remarkably fine example of early fourteenth-century work. It consists of two stages, built on the original Norman arches, the lower stage being open to the church, and the upper forming the belfry. The late Sir G. G. Scott inserted a ringing-gallery in the lantern (omitted in the drawing), which is approached from the upper passage. There is a notable absence of ornament, the ball flowers on the two external strings and on the hand of panels of the lantern inside being the only carving in the work. The upper portions of the pinnacles are restorations. This drawing was one of those for which a certificate of honour was awarded in connexion with the Page's studentship this year.

#### BASINGSTOKE BOARD SCHOOLS.

The foundation stones of these schools were laid in November last by the Chairman of the Board (Mr. G. Dunn) and Major May, the Mayor of the Town.

The schools are planned in three departments,—the boys and girls in one building, and the infants in another. They accommodate respectively 900 and 400; total, 1,300. The site is over one acre in extent, and occupies an elevated position, with frontages on three sides to roads. The boys' and girls' schools have each a central hall, with class-rooms opening out of it for sixty children. The infants have all their rooms on one floor, and the sexes are divided equally. The playgrounds are spacious, and with a sunny aspect, with sheds on one side. The schools are built of red local brick, with flint facings above the plumb line. The roofs are tiled. The large school will be heated by hot water, and ventilated on an improved system,—a shaft for this purpose being provided 70 ft. high. The infant school will have open fires. The architect is Mr. Charles Bell, F.R.I.B.A., of Dashwood House, London; the builder, Mr. Goodall, of Basingstoke; and the clerk of works, Mr. G. W. Bery. The contract is 10,351l., and it is expected the works will be completed in the autumn.

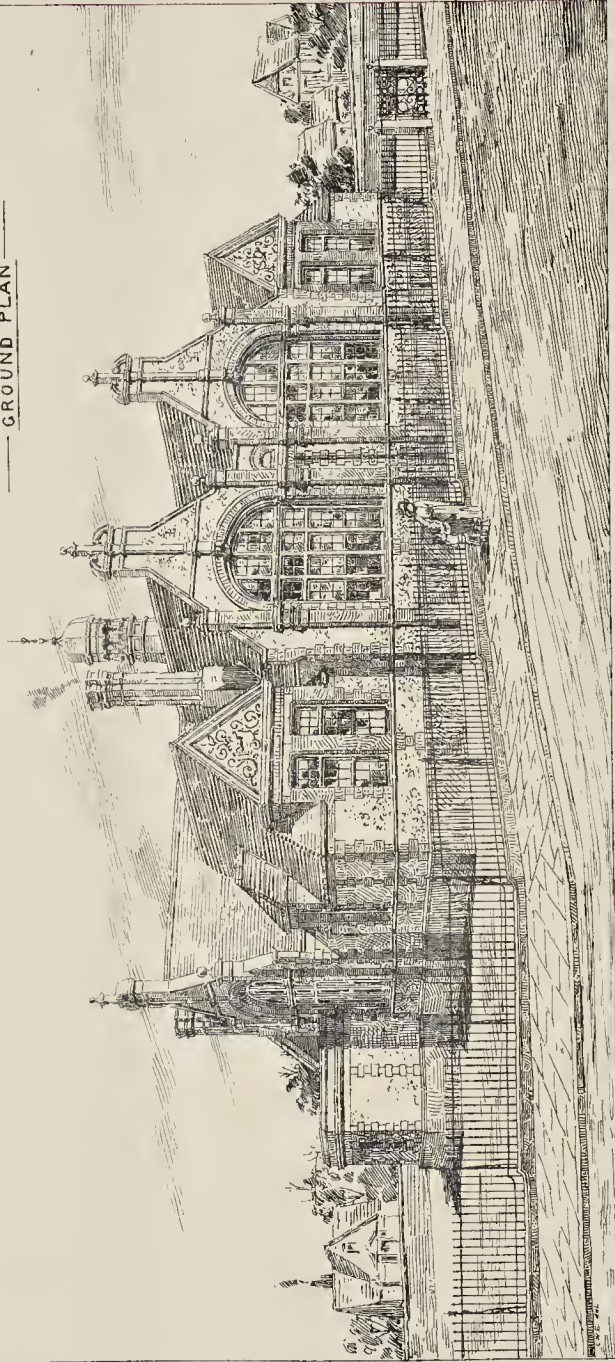
**Surveyors' and Auctioneers' Clerks' Provident Association.**—The third annual meeting of this Association was held on Saturday last at the registered office, the Auction Mart, Tokenhouse-yard, Mr. G. Haines (Messrs. H. Haines & Son) presiding. The report and financial statement (to which reference was made in the *Builder* three weeks ago, p. 205) for the past year were agreed to and adopted, and the officers re-elected for the current year. The chairman said it was a matter for congratulation that the Association was in a successful position, financially, though he regretted the number of members was not considerably larger. He hoped all interested would do their best to extend the usefulness of the Association, which was established for the objects of granting allowances to members in sickness, life assurance, and superannuation. A vote of thanks to the annual subscribers was passed, and also to the chairman for presiding.



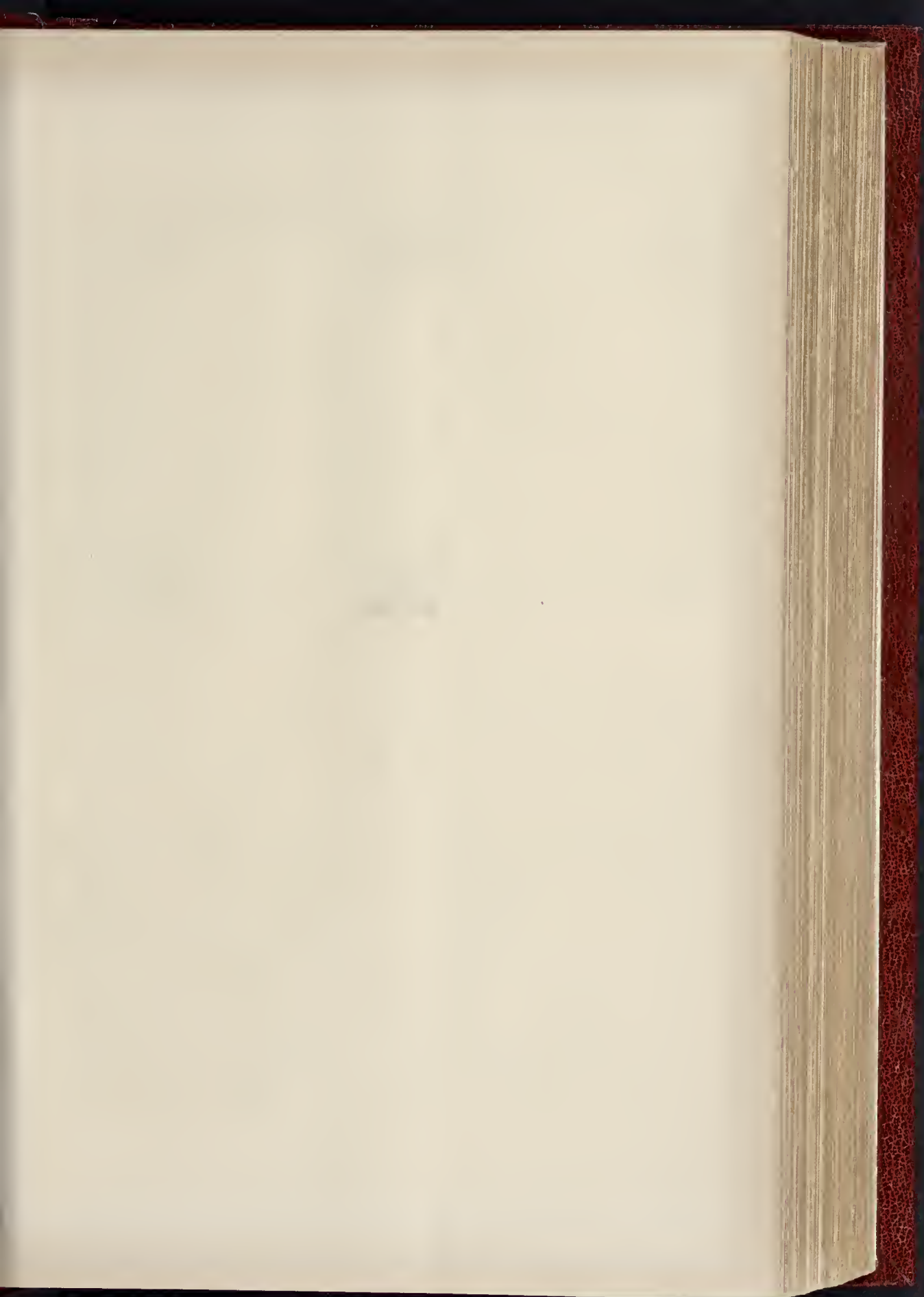
**BASINGSTOKE BOARD-SCHOOLS**  
CHARLES BELL FRANK  
ARCHITECT  
— 1887 —



— GROUND PLAN —

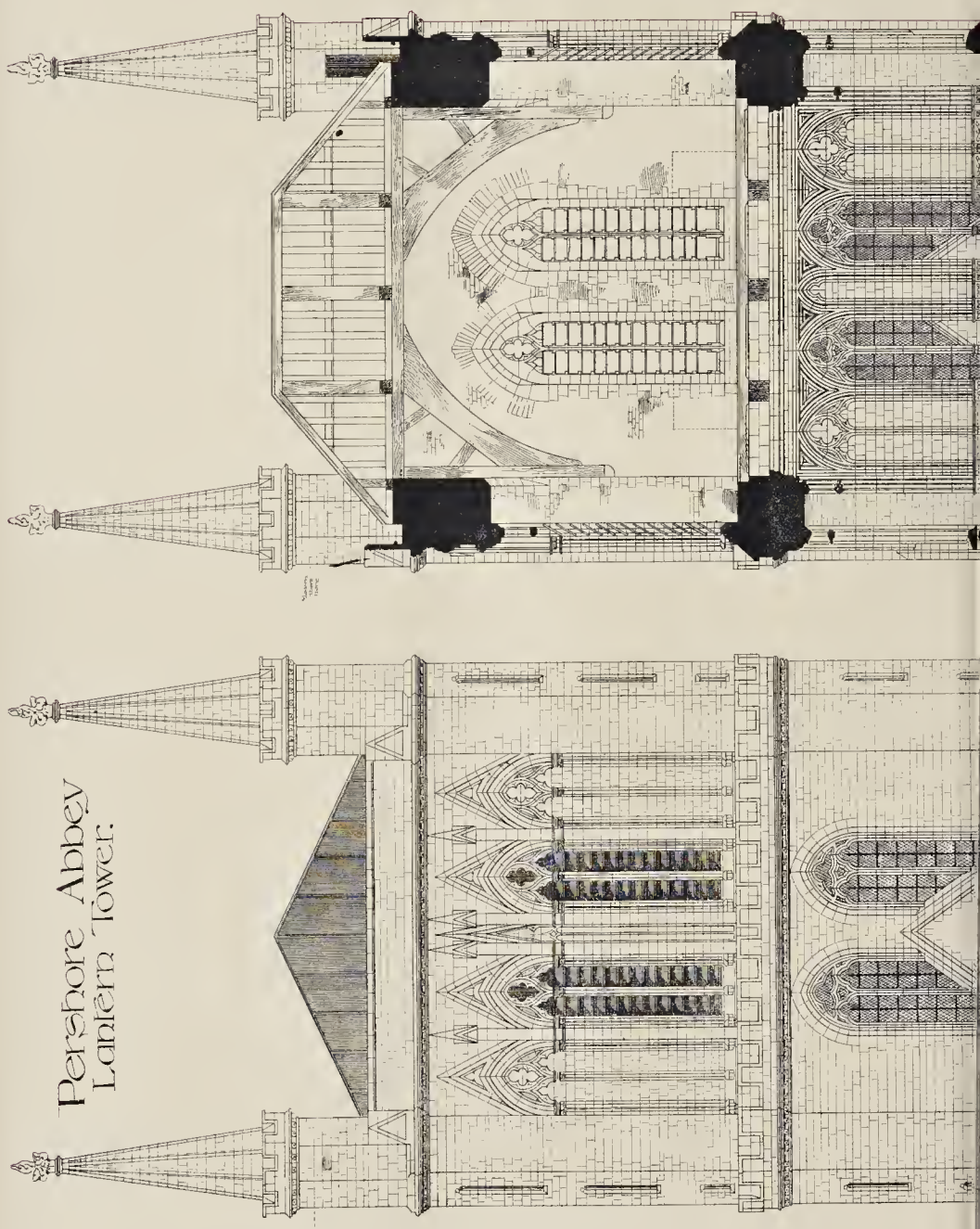


— INFANTS — SCHOOL —



THE BUILDER, FEBRUARY 19, 1867

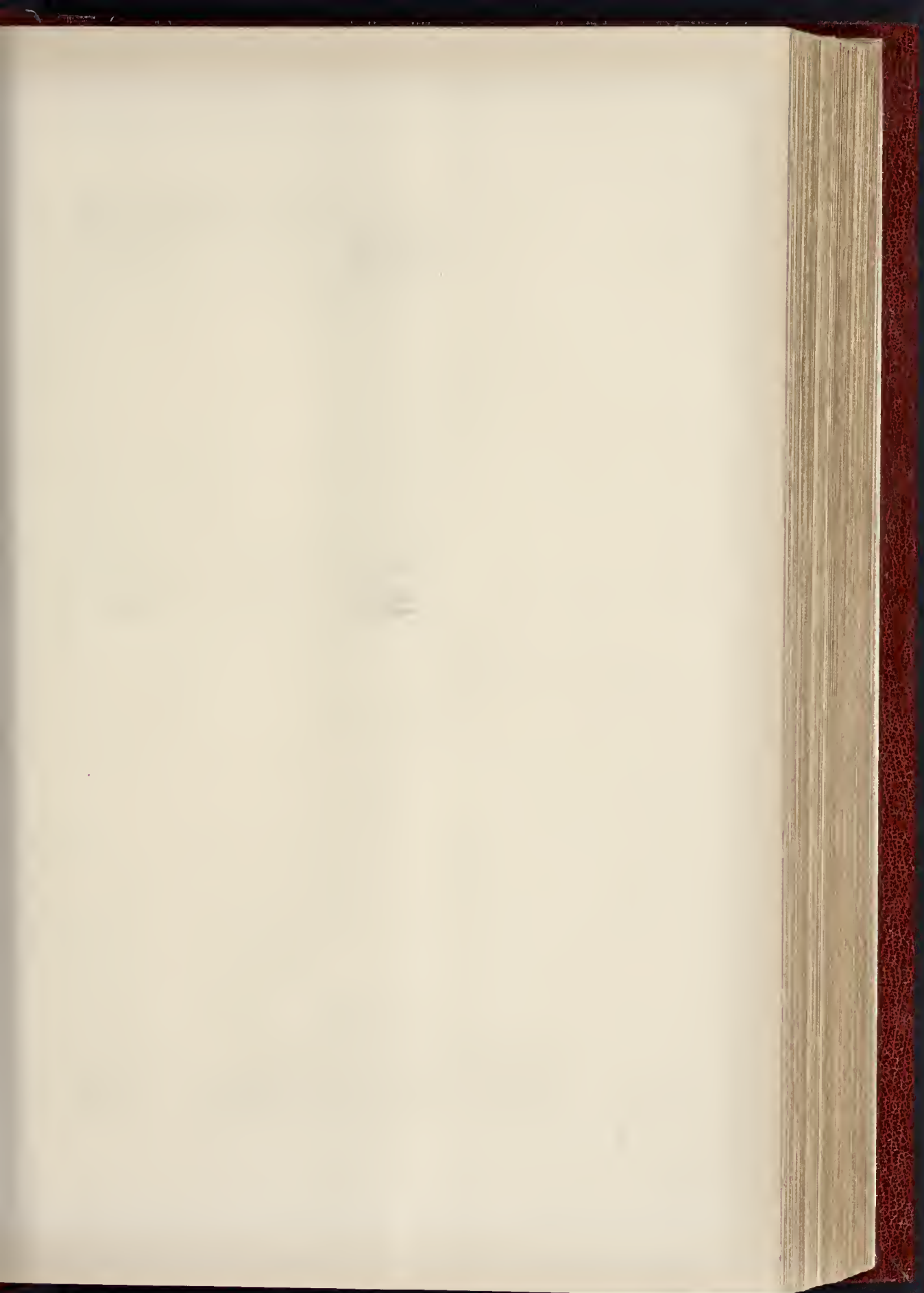
# Pershore Abbey Lantern Tower.



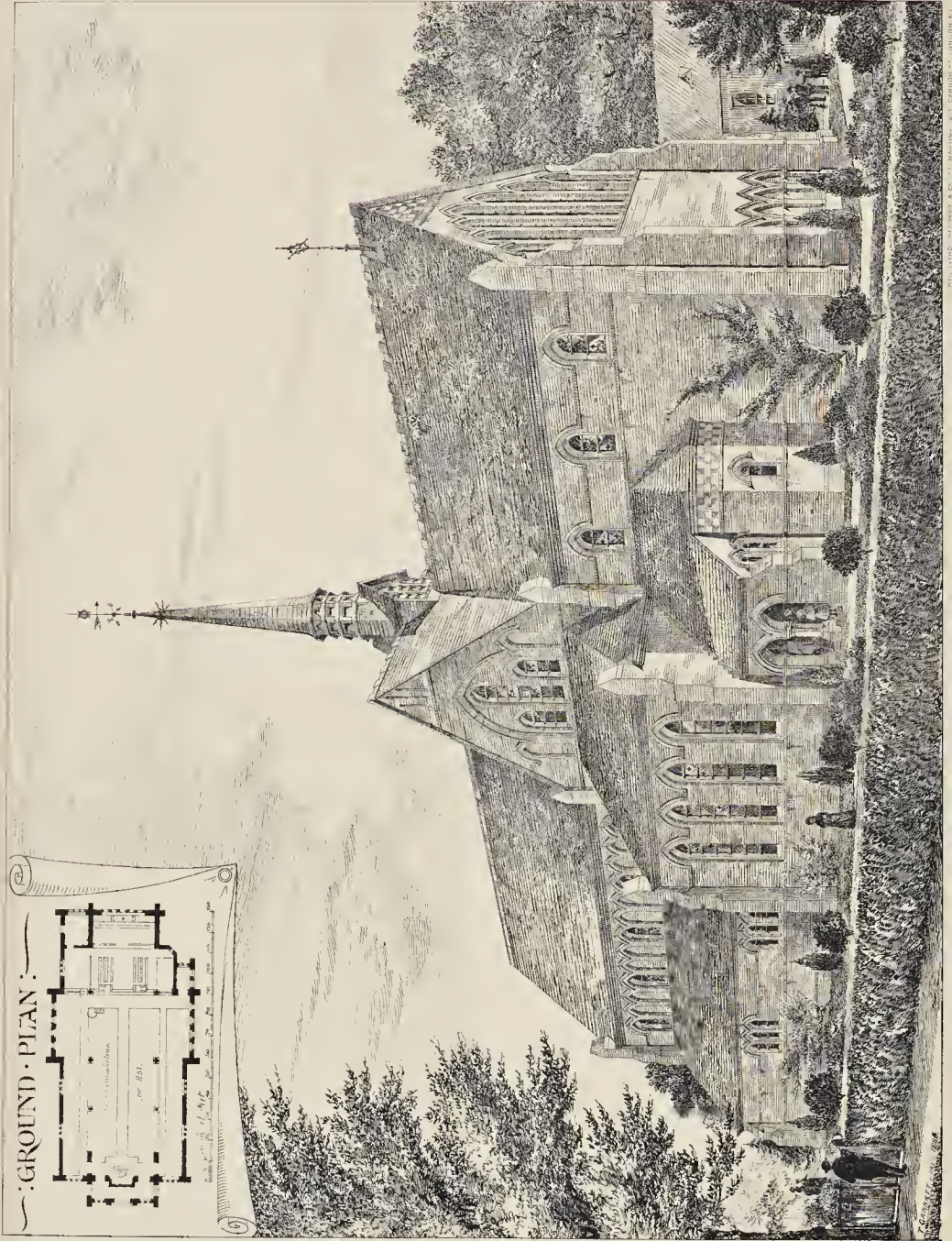






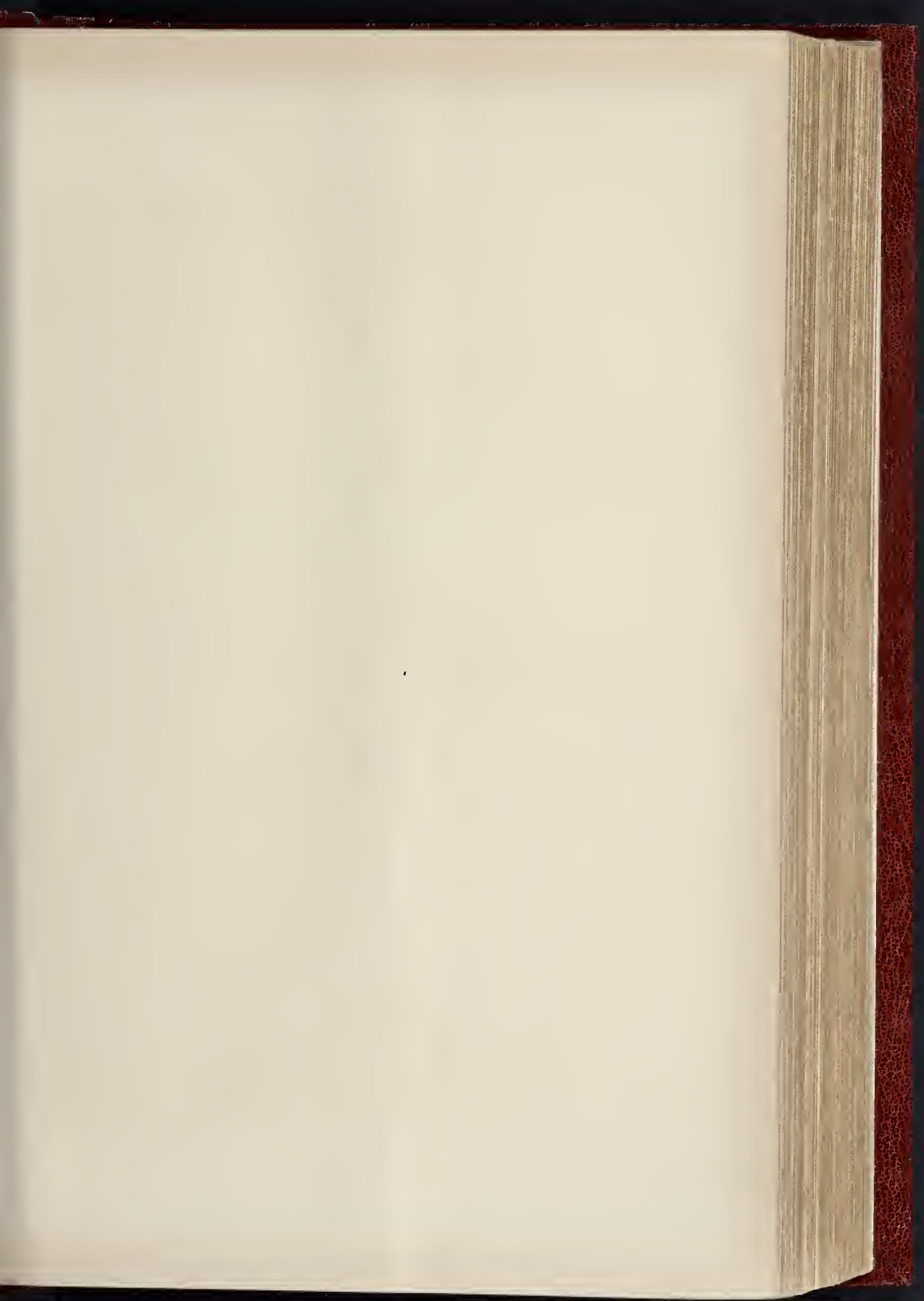


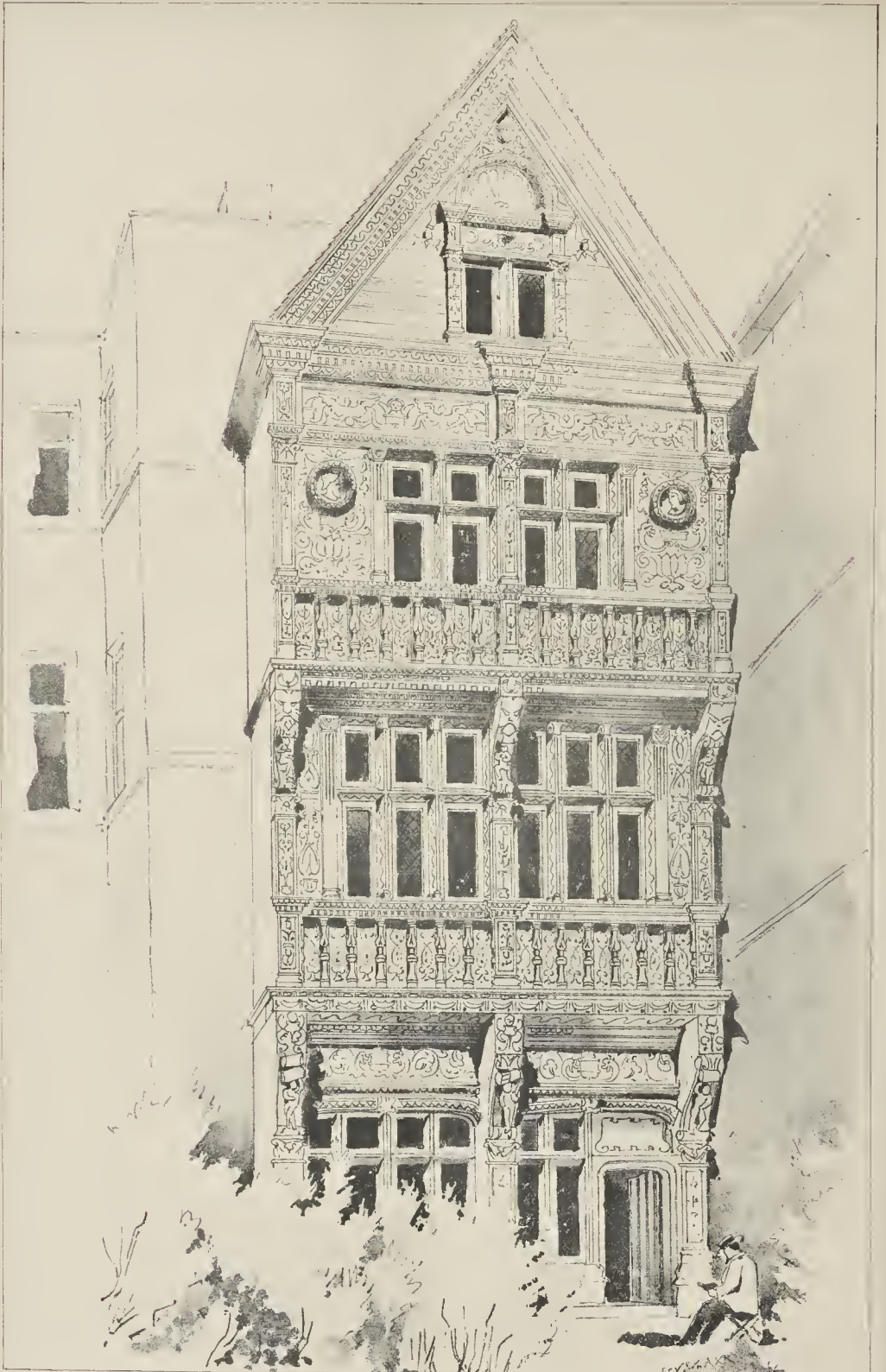
THE BUILDER, FEBRUARY 19, 1887



DESIGNED BY MR. J. H. STUBBS, & CO., ARCHITECTS, 10, SOUTHAMPTON STREET, LONDON, W.

ERECTED BY THE REV. J. H. STUBBS, & CO., ARCHITECTS, 10, SOUTHAMPTON STREET, LONDON, W.





INK PHOTO EPHRAÏM & CO. 82 MARTINS LANE CANNON ST., LONDON, E.C.

OLD HOUSES, RUE DE LA GROSSE HORLOGE, ROUEN.—FROM A SKETCH BY MR. ARNOLD B. MITCHELL, A.R.I.B.A.

*Pugin Studentship Competition, 1887.*



1/161 PHOTO, SPRADUE & CO. 22, MARTIN LANE, CANONIC ST., LONDON, E.C.

CHURCH OF NOTRE DAME DE L'EPINE, NEAR CHALONS SUR MARNE.—FROM A SKETCH BY MR. ARNOLD B. MITCHELL, A.R.I.B.A.

*Pugin Studentship Competition, 1887.*



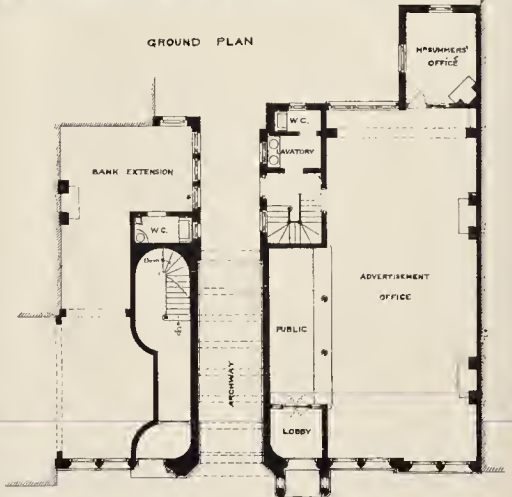




THE  
YORKSHIRE POST.  
PROPOSED NEW OFFICES  
LEEDS.

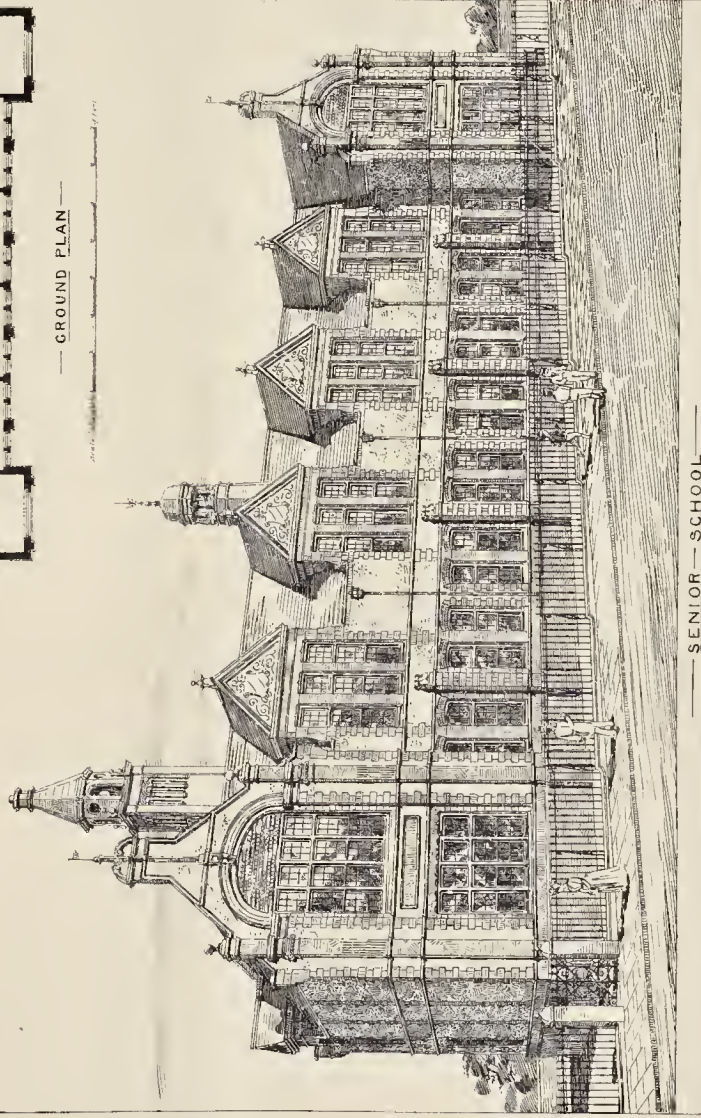
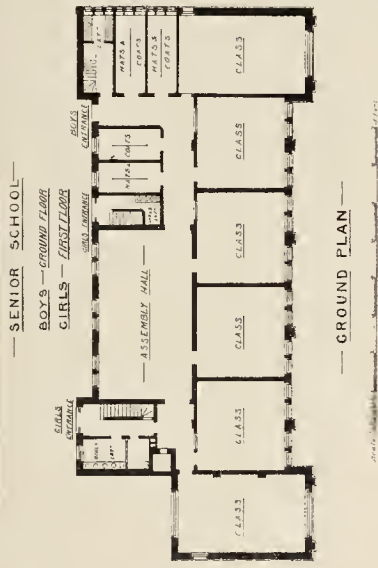
MESS<sup>RS</sup> CHORLEY & CONNOR ARCHITECTS

GROUND PLAN






  
**THE**  
**BASINGSTOKE BOARD-SCHOOLS**  
 CHARLES BELL, CIVIL  
 ARCHITECT  
 1887



Printed by the Architect and Engineer, 1887



THE EDINBURGH MUNICIPAL BUILDINGS COMPETITION.

The exhibition of the designs sent in to this competition was opened on Monday, but we defer a detailed notice of them until next week. The designs will remain on view for three weeks longer.

The Edinburgh papers state that Mr. Waterhouse has provisionally approved of the six designs bearing the following mottoes, viz.—“Edina Classica” (estimated cost 98,000L.), “Fortuna” (125,000L.), “In my Defence” (102,000L.), “Light and Air” (75,000L.), “Nineteenth Century” (120,000L.), and “Ora et Labora” (280,000L.). It will be seen that there is a wide margin of cost between the estimated cost of the last-named design and the one marked “Light and Air.”

The Scotsman gives the following list of the other designs submitted, with the estimated cost of each, viz.—“Fiat,” 125,000L.; “Kathleen Mavourneen,” 130,000L.; “N.D.I.V.” 120,000L.; “Rathhaus,” 170,000L.; “Virtus in Ardis,” 98,011L.; “Olympus,” 150,564L. 6s.; “Am Freiceadan Dubh,” 127,500L.; “Iona,” 100,000L.; “Line upon Line,” 102,000L.; “Crevecoeur,” 66,000L.; “Golden Star,” 135,000L., including 4,000L. for statuary; “Waverley,” 110,000L.; “St. Giles” (1) 170,000L., “Quien Sabe,” 151,000L.; “Si Monumentum Requirit,” 140,000L.; “Excipere Laboravi,” 132,800L.; “Fors,” 128,000L.; “Scotia,” 120,000L.; “Municipalis,” 165,000L.; “The Heart of Midlothian,” 80,000L.; “Dora,” 160,000L.; “St. Giles” (2), 190,000L.; “Ravensraig,” 90,268L.; “Res Publica,” 116,560L.; “Fors,” 178,000L.; “Rex,” 112,000L.; “Finis Coronat Opus,” 137,258L.; “Tanma,” 150,000L.; “Civis,” 141,618L.; “Edina, Scotia’s Darling Seat,” 149,245L.; “Waverley,” 112,200L.; “Edina,” 79,580L.; “Baronia,” 80,000L.; “City Cross,” 126,400L.; “Tannahill,” 135,700L.; “Warriston” (1), 115,000L.; “Aihinis,” 118,000L.; “Dignity and Simplicity,” 135,000L.; “St. Andrew,” 120,741L.; “In My Defence,” 161,352L.; “Warriston” (2), 120,000L.; “Orion,” 150,000L.; “Experience,” 150,000L.; “Rob Roy,” 145,791L.; “For Queen and Country,” 150,000L.; “Heriot,” 121,537L.; “Jubilate,” 95,000L.; “Omega,” in cypher, 130,000L.; “Quadrangle,” 82,000L.

The Scotsman of Thursday says it is understood that Mr. Waterhouse, R.A., has given his decision, and that the Lord Provost on Wednesday received the assessor’s report. The Sub-Committee on the Plans, as also the Lord Provost’s Committee and the Town Council were to meet on Thursday, when it was expected that the contents of the report would be communicated to them. “Light and Air,” “Edina Classica,” “Nineteenth Century,” and “Fortuna” were generally spoken of as the likely designs to which the awards would be given.

By the courtesy of the Editor of the Scotsman, we learn by telegraph (just as we go to press) that the following are Mr. Waterhouse’s awards:—

- First, “Edina Classica,” author, Leeming, Westminster.
- Second, “Nineteenth Century,” author, Stark, Vincent-street, Glasgow.
- Third, “In My Defence,” (with heraldic device), author, Simpson & Allen, Strand.

Birmingham Architectural Association.

The seventh ordinary meeting of the current session was held at Queen’s College on Tuesday evening, February 15th. The Vice-President, Mr. John Cotton, was in the chair. Mr. E. F. Tibley was elected a member of the Association. Mr. E. Westwood was nominated for membership. A paper was read by Mr. E. R. Taylor (Head Master of the School of Art), entitled “Servants of Architecture.” The lecturer pointed out the necessity of all architectural students studying the art of modelling in clay in addition to the various branches of freehand drawing. A hearty vote of thanks was proposed by Mr. W. Donbleday, and supported by Messrs. W. H. Bidlake, T. Timmins, J. Cotton, and Victor Scrpton (Hon. Sec.). After a response from Mr. Taylor the meeting terminated.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The sixth ordinary meeting of this Institute for the present session was held on Monday evening last, Mr. Alfred Waterhouse, R.A. (Vice-President), in the chair, in the absence of the President in Italy.

Obituary.

Mr. W. H. White (Secretary) announced the death of Mr. T. H. Sapsford, the City Architect of Sydney, New South Wales. Mr. Sapsford was only elected a Fellow at the last meeting of the Institute, and the letter announcing his decease was received two days after the notice of election had been posted.

The Royal Gold Medal.

The Chairman.—This being the meeting at which the proposal by the Council as to the Royal Gold Medal is announced, I will call upon the Hon. Secretary to read by-law 76, which affects the question.

Mr. Macvicar Anderson (Hon. Secretary) read the by-law.

The Chairman.—In accordance with that by-law, I beg to announce that the Council propose that the name of Mr. Ewan Christian, past-President, be submitted to her Majesty as that of a fitting recipient of this year’s Royal Gold Medal. (Applause.)

A Member.—Mr. President, I do not know whether I am out of order, but I cannot help expressing my feeling that a very worthy man has been passed over.

The Chairman.—I am afraid you are out of order. We cannot discuss the question to-night.

In reference to a complaint made that Mr. Ewan Christian had been prematurely mentioned in a Liverpool paper as the Council’s intended nominee for the Medal,

The Chairman remarked that the subject had been discussed at the Council that afternoon, and deep regret had been expressed by every member present that such a thing should have occurred.

Mr. H. Dawson considered that something more than a mere expression of regret was called for. This was a betrayal of trust quite unworthy of any gentleman.

Mr. Macvicar Anderson took the same view as Mr. Dawson, but the difficulty was to find the individual who ought to be censured.

Mr. Ralph Nevill thought that would make it all the easier to pass an expression of censure.

The Chairman added that a considerable amount of indignation was expressed at the Council meeting, and he did not believe the thing would occur again.

The matter then dropped.

The Imperial Institute.

Mr. Macvicar Anderson, the hon. secretary, next read a communication from Sir Frederick Abel, on behalf of the Prince of Wales, inviting the co-operation and subscriptions of the members in favour of the Imperial Institute. The Council had, therefore, ordered the communication to be read before the members, and to be published in the Journal of Proceedings.

The Liverpool Cathedral Designs.

A Member drew attention to the statement in the public press as to a certain memorial which had been circulated among some members of the profession in regard to the Liverpool Cathedral competition. It was desirable that it should be stated officially whether the Institute had put its hand to this thing or not, because it seemed a very dangerous precedent.

The Chairman replied that the committee in question had not yet reported to the Council on the subject. But that the Council had had the question forced upon its consideration, was evident from the fact that they had passed a resolution which would now be read.

Mr. Macvicar Anderson.—The resolution that the Chairman has referred to, which was passed this afternoon by the Council, is as follows:—

“Resolved, that a letter be addressed to the Builder and certain other newspapers, stating that the modified circular referring to the Liverpool Cathedral competition, which appeared in their last week’s issue, has in no sense been approved by the Council or the Competitions Committee of the Royal Institute of British Architects; and further, the Council feel very strongly that nothing should be done, by exhibition or otherwise, to upset an

\* The letter referred to, as well as one on behalf of the Competitions Committee of the Institute, will be found on p. 301 of this number.

award conscientiously arrived at by a professional assessor.”

Mr. Macvicar Anderson added that it was his opinion that the circular was one which should not have been issued. He threw it in the waste-paper basket when he received it, on the broad ground that the Liverpool Competition had been conducted in accordance with the recommendation that the Royal Institute of British Architects had promulgated, that no competition should be conducted without a professional assessor being appointed. He thought that for any members of the Institute to take such action as had been taken by the memorialists was simply an effort to make the Institute eat its own words.

Professor Kerr said he had signed the memorial merely because it seemed a courteous and business-like request to those in charge of this important national competition to allow the drawings to be exhibited in London.

Mr. J. P. Seddon remarked that he was rather in a difficulty because he had been out of town, and had not been able to see Mr. Scott, who had, however, written to say that he had modified the thing. He (Mr. Seddon) had not sent it until it had appeared in print,\* therefore he was rather in a difficulty as to making any explanation of the matter. He was ready, however, to support everything he had said in connexion with it.

Mr. Henry Currey, as the chairman of the Competitions Committee, said that the amended memorial had not been submitted to the committee.

Mr. Seddon added that he would not let the memorial go in until it had been again sent to the members who had signed it, giving any one liberty to withdraw. For his own part, he thought the whole action of the Competitions Committee most undesirable for the profession (laughter). Therefore, he maintained what he had done, but would withdraw it until each member who signed it knew exactly what he had signed for.

The Chairman said the members must be obliged to Mr. Currey and Mr. Seddon for their explanations, and they would at the same time feel that the Council had expressed itself strongly and fully in the matter.

Notes on Greek Architecture.

Professor T. Hayter Lewis, F.S.A., then read a paper entitled “Notes made during Tours in Greece, 1881 and 1884.” The Professor, after referring to his first visit to Greece in 1842, described what he saw there in 1881 and 1884. As the greater part of what had been uncovered had been admirably illustrated by the Society of Dilettanti and the Greek and German archaeologists, the Professor restricted himself to a general description, supplementing this with details of any of the remains which are more specially interesting by means of diagram drawings. He said that at Menidi, near Athens, is a remarkable circular tomb, of the bee-hive form so well known in Western Europe, 27 ft. in diameter and 23 ft. high. The courses of stone are built, not radiating, but having horizontal beds, as have all the other buildings of the same type known to the Professor. The most remarkable feature of this tomb is the peculiar construction of the masonry over the entrance doorway, which closely resembles that employed by the builders of the king’s chamber of the Great Pyramid. The Professor confessed that he did not quite understand the principle on which these successive lintels were erected, but thought that the intention may have been that, if the top one were broken, its two pieces would tilt down and be stopped by the next lintel, and, if that were broken, by the next one, the stonework above being wedged together into a solid mass as it followed the lintel. Two drawings of tombs, found in the old Athenian cemetery,—the Cerameicus,—were then referred to, and a third tomb, built of rough stones, having just the appearance of a dolmen, was more particularly described. The tomb contains two chambers, side by side, with a third cross-wise at the end. The total size is 9 ft. by 6 ft. Few discoveries of importance, as compared with those at Eleusis and other places, have been made at Athens; and, as such there are would probably shortly be described by Mr. Penrose, the Professor passed on to describe the group of buildings at Eleusis. The building first referred from the village is the little temple of Diana Propylea. This measures

\* See Builder, p. 268, ante.

about 24 ft. by 16 ft. internally, and only the foundations and pavement now remain. Its dimensions confirm the theory of proportions so ably worked out by Mr. Watkias Lloyd for Professor Cockerell. Beyond this temple is the Propylæum, built entirely of Pentelic marble, nearly as a copy of the centre part of that at Athens. Beyond this, again, is the gateway, called the inner vestibule, which gives access to the remains of the Temple of Ceres. There are scarcely any ancient descriptions of this building, owing to the dread entertained of incurring the anger of the deity by revealing any of its secrets. It is about 170 ft. square, exclusive of the portico. It was built on the side of a steep hill, and, quite exceptionally, the angles, not the sides, of the building, face the four cardinal points of the compass. The date of the erection and the architect of the temple are matters of doubt. The portico, which may be considered apart from the main building, is there can be little doubt, purely Greek in design and execution. The Professor thought it might be possible to reconcile the conflicting statements as to the architect of the *cella*, and that so celebrated an architect as Ictinus might have given the design, as consulting architect; the execution of the work itself being placed in the hands of Corebus and Metagenes. The late Mr. Fergusson supposed that the centre part of the building was originally left quite open, without the row of columns shown on the Professor's plan; and produced a most ingenious restoration, based on the meagre statements which we have from ancient writers. The Professor thought that this restoration must be accepted as the nearest yet suggested to the original design; but we were still left in doubt as to the mode of covering the central portion. All translators agree that Xenocles of Cholarus roofed, or domed, or arched, or completed in some way, the top; each employing a different word, and arriving at different results, according to his interpretation of the word *σπαιον*. The question is how was the work done? It might have been, the Professor thought, that the central portion had originally been left open, as suggested by Mr. Fergusson, and that Xenocles afterwards covered over the open space in a manner similar to that employed in the Egyptian halls, but with sloping instead of flat roofs. But in attempting to discover the reason for the glowing descriptions of this temple, given by various ancient authors, the Professor was led to suspect that this cell might not be Greek at all, but a rebuilding by the Romans: a suspicion supported by historical references and by Mr. Penrose, who describes the columns as being late Roman. The result, then, of all these excavations appears to be that the original form of this temple is still as much a mystery as the Eleusinian mysteries themselves, for the celebration of which the building was designed. After passing Corinth, Mycenæ, Argos, and Tiryns, the Professor had visited Epidaurus, and he described the Theatre and, later on, the Tholos, when describing that at Olympia. The theatre is of gigantic proportions, and is especially interesting in that it is purely Greek throughout. Its general plan is the ordinary Greek one, but with some peculiarities as to orchestra and stage. Usually the orchestra was much lower than either the front seats or the stage, so that there was a high podium before the seats, and a high proscenium to the stage. At Epidaurus, however, the whole is level, with the singular exception of a wide trench or surface drain passing half round the orchestra in front of the seats. Nearly all the seats remain, but are a good deal misplaced, owing to the giving way of the ground under. The Professor could find no traces of the great masts or other supports that must have been used if the theatre had ever been covered by a velarium; nor of any covered gallery or portico, though remains of an enclosing wall were shown on his plan. It is quite clear, he stated, that there must have been some such protection, yet in the shape of a high wall the echo would, he thought, be very great. There may, perhaps, have been a high curtain or velum to prevent the actors' voices being carried away by a high wind. He had examined the seats to see if they sloped at different angles as they receded from the position occupied by the actor, and found that such is the case to a limited extent in this theatre, as also in one or two other Greek theatres referred to. But he had been unsuccessful in endeavouring to find any

acoustic vases disposed between the seats in the manner described by Mr. Gordon Hills, who cites various authors to show that such vases, or the cavities containing them, have actually been found in several Greek theatres. The Temple at Bassæ, built in a commanding position, is in ruins, but some of the columns are erect, and are carefully watched by the Athenian Archaeological Society. The external columns were Doric, the internal Ionic, with one solitary column in the centre Corinthian. The architect was Ictinus, and the date of the building therefore was circa 440 B.C., i.e., some forty years before Callimachus, who, according to Vitruvius, invented the Corinthian order. The temple runs north and south, not east and west, as is usual; and there is the unusual feature of a side entrance. The internal columns are not detached as elsewhere, but are united by buttresses to the walls. Surely Ictinus was too good an architect, the Professor remarked, to do this without a reason! If so, what was his special reason? It could not have been the support of cross-beams of marble, as usual in flat ceilings, as there was nothing out of the common way to support. Pausanias, in describing this example, says,—"A temple of Apollo, the roof of which is of stone. This temple would stand first of all the temples of the Peloponnese, except that of Tegea, for the beauty of the stone and the neatness of the structure." This reference to the roof clearly refers to some peculiarity in its structure, and has led to a very interesting controversy. It had occurred to several architects that possibly the arched canopies to statues found on several Greek coins were real representations of the forms of the roofs under which they were placed. This theory has been worked out by Mr. E. Falkener, and his drawings, showing his proposed restoration, are very graceful. The Professor showed drawings of several of these coins. In conjunction with his son, he had made a careful search throughout the mass of fallen stones, in order, if possible, to find anything to solve this problem, and showed drawings of two stones found by him, splayed to a form of abutment; but he was unable to assign any definite position to either, and was doubtful as to whether the splay of one of them might not have been an accidental fracture. The Professor then described the excavations at Olympia, and showed a diagram plan,—a copy of the German plan,—which shows the state of the ruins as he saw them in 1884. The Temple of Juno is an object of great curiosity to an architect, on account of the difference in size and proportions of its columns, of which it has the unusual number of sixteen at the sides to only six in front. There are the Professor said, many other edifices of great interest in and about the Altis, but he must content himself with noticing one other only, viz., the Tholos, west of the *Hærem*, known as the Philippeum. It is thus described by Pausanias:—"A round building, on the top of which is a brazen poppy, as a clamp for the beams. It is built of baked brick, and there are some pillars round it." The general impression, supported by Freeman and Fergusson, appears to have been that such circular buildings were unknown to the Greeks. But we now have the Tholos at Elis, and another more curious at Epidaurus,—this round building having the hitherto unknown range of columns internally. Of the Tholos of Elis, nothing remains *in situ* but the foundations; but these are perfect, giving the general dimensions 49 ft. 6 in. in diameter, measured on the hottest step, the interior diameter of the *cella* being 24 ft. 8 in. in the clear. The Professor had carefully examined and measured the fragments scattered about, and with the help of the German restoration had succeeded in making out the greater part, and showed diagrams representing the building as restored by him. The fragments found enabled him to easily restore the peristyle and its ceiling, but the restoration of the *cella* presented a more difficult task. The most valuable fragment found was one which shows distinctly that the interior was decorated by a row of semi-engaged columns, said to have been Corinthian. The German drawings show nine of these, but the Professor thought that if there had been ten of them the present remains would fit in, and there would not be a column directly in front of the door. The Germans also have restored the roof with a kind of clearstory,—a restoration with which the Professor hardly agreed.

He had reason to think that the architect of this building, and of the Tholos at Epidaurus, lived in the fourth century. If so, these buildings, and that of Lyciscrates, would all be of the same date. The Professor's notes were, he said, but a summary of the result of the patient labour and research of others, and showed how many problems had still to be worked out in considering the architecture of the Greeks. This could best be done in the bright clear air of Greece, and the school at Athens, with Mr. Penrose at its head, was a boon to all, especially to those who might be fortunate enough to pursue their studies on the spot.

In the discussion which followed, Mr. W. Watkias Lloyd said he had felt much pleasure in going through the drawings with Professor Hayter Lewis, and there was a great deal undoubtedly that could be said and written about them. He would first of all notice that the circular building excavated by the Athenians, and which had been alluded to, was mentioned by Pausanias as having been built by Polyclethus, the great sculptor, to whom also the architecture of the theatre was due. He (the speaker) was particularly interested in the temple at Elis. That building was in direct contrast to any other Greek temple, having been evidently planned to accommodate a large concourse of people, which was not the case in Greek temples generally. The Greek temple was distinctly a *naos*, or dwelling-place for the statue of the god or goddess, and was not intended to accommodate large congregations, but for sacred ceremonies. The building at Elis, however, was distinctly the *Telesterion*—a great hall where the Eleusinian mysteries were celebrated. The seats all round the building evidently indicated that purpose, but it was a great relief to him when Professor Hayter Lewis demonstrated so clearly that the columns were not part of the original plan, for it was exceedingly difficult to explain how an assemblage of people could have taken part in any common ceremony if there was so much of what was now called "clerical eclipse" produced by a forest of columns. The general outline of the celebrations was known. The chief ceremony was performed on moonless nights, and a great and imposing effect was produced by the sudden transition from intense darkness to brilliant illumination. Besides that, a regular sacred drama was performed, with a good deal of singing and considerable movement of the congregation, each individual taking part in the ceremony, which, according to the ancient descriptions, was very much like what could now be seen in the Levant at Easter. The object of a large, square capacious building was to give a very considerable area for these celebrations, and to enable the Athenians to take individual and collective part in them. He had not quite lost hope that with the progress of investigation traces might still be found of the original bases of some of the supports. For, although the celebration took place on moonless nights, and, consequently, in the dark, he could not but suppose that a considerable part of the building must have been covered, especially from the use of the word *opæion*. He could not understand how any one could explain this, except as a distinct opening, but how it was managed he could not tell. For the information of those who cared to take further interest in the subject, he might say that in the recent edition of the "Encyclopædia Britannica" there was an article on the Mysteries, admirably written, and very satisfactory taken in conjunction with the architecture. That site might be said to be the most sacred of antiquity, the celebrations practised there being of a more imposing, and, he might almost say, of a more religious, character than any other celebrations which the Hellenic religion comprised. The entire genius of the Greeks was apparently bestowed in rendering them as impressive as possible. Æschylus himself was a native of the Eleusinian district, and is said to have designed the costumes for the celebrations. When it was considered how, in the passage from pagan to Christian ceremonies, there was so great a tendency to graft the old ceremonies on the new, he had a strong conviction that the cozes, chasubles, and other vestments used by the clergy at the present day were largely derived from the imagination of Æschylus, that great master of scenic effect. Professor Hayter Lewis had been good enough to refer to what he (the speaker) had done with respect to the little Temple of Diana, one of the

most remarkable examples of the application of proportion to architecture by the Greeks. Looking back to his old studies on the subject, made some thirty years ago, he had found a note which recalled the difficulty he had experienced in one part in finding what the principle was on which it had been planned and designed. It came right in every other respect, and at last he found the dimensions on the margin of Stuart's drawing did not correspond with the geometrical plan; when he corrected that he found everything to be right.

Professor Kerr proposed a vote of thanks to Professor Hayter Lewis, and expressed the pleasure it gave the members to see him that evening. It reminded him of old times. He was delighted to find that Professor Hayter Lewis had still leisure to pursue the most exalted studies of the profession. They would all agree that what had been so modestly laid before them that evening had been of the greatest aesthetic and archaeological value. Professor Hayter Lewis was a credit to the profession, and long might he continue to be so.

Mr. Charles Fowler seconded the resolution, and remarked that part of the pleasure of listening to their old friend was to observe the youthfulness, freshness, and vigour with which from time to time he put some interesting matter before the members.

The Chairman added that it was much to be regretted that the hour was so late. He was sure that other members would have wished to join in the discussion, and say something about the Professor's paper. Indeed, he himself would have liked to ask some questions, but he refrained from doing so on account of the lateness of the hour.

The vote of thanks was then put and carried by acclamation.

Professor Hayter Lewis replied, and expressed the pleasure it had afforded him to meet the members again.

The Chairman then announced the adjournment of the meeting to the 28th inst., when a paper will be read by Mr. Josiah Conder, on "The Architecture of Japan." Mr. Conder, he added, was now in England, and had an immense collection of drawings with him.

WILLESDEN NEW PUBLIC OFFICES COMPETITION.

The Willesden Local Board have received fifty-four sets of drawings in reply to their invitation to architects to send them designs for new offices to be erected in the Dyne-road, at the corner of Dunster Gardens, and just off the Kilburn high road. A large proportion of the competitors have succeeded in producing thoroughly practical working plans, and a good many of the designs have also a reasonable amount of architectural beauty, so that, although the two are not always in combination, the committee should have no difficulty in finding twelve sets of drawings to submit to a professional arbitrator (which is, we hear, what they propose to do), all of them representing buildings which would perfectly answer their purpose, except, perhaps, as regards the cost. The sum of 6,000*l.* allowed, and which is to cover boundary walls and all incidental expenses, including the architect's commission, is really too small if anything in the shape of architecture worthy of a public building is expected, and, although a few of the designs could no doubt be carried out for the money, that result has only been attained by a too evident economy and the smallest possible use of any architectural features.

No. 53, "Favete Linguis," is one of those that combine the charms of good architecture with a convenient and sensible plan. The drawings show a symmetrical Classical building of red brick and stone, with high-pitched green slate roofs; the centre portion, two stories high, with the large windows of the board-room in the upper part, surmounted by a stone dormer, and the roof crowned with a simple but well-designed lantern; the wings, projecting in front of the centre block, and being only one story high, complete a pleasing group. The entrance to the building is in the centre, and opens to a small hall, with the grand staircase beyond; the offices of the surveyor and his subordinates are to the left hand, where they get the north light, and those connected with the clerk's department are on the right, together with the larger committee-room and the collector's office. On the

upper floor the hoard-room occupies the whole of the front, and the back part is taken up with the smaller committee-room, the waiting-room, and a large cloak-room, &c., for the use of members of the Board. The drawings are spirited and neat, and do justice to one of the best designs in the collection.

Opposite to this set, as the designs were arranged in the Brondesbury Hall, was hung another very good one, No. 11, under the motto "Plan." This design is similar in conception and general disposition to No. 53, but great pains have been taken to keep it within the limit of cost. The elevations show a plain red brick and stone building, well grouped, but comparatively bare of architectural adornment, which is, indeed, almost wholly confined to a couple of plain stone cornices, some coupled brick pilasters between the windows of the first floor, and a simple lantern on the main roof. The general arrangement of the plan is similar to that of "Favete Linguis," but both committee-rooms are placed on the first floor and there is less lavatory accommodation. "Plus," No. 45, puts the clerk's offices on the upper floor and one committee-room, with the waiting-room, on the ground-floor to the right of the entrance, which is not so good an arrangement as that before described; otherwise the plan is a good one and the architecture above the average. "Bona Fide," No. 7, is another somewhat similar design, illustrated by a very taking perspective drawing. The mistake has been made of putting the surveyor's offices to the right of the entrance or on the south side of the building, and a large stone porch and other expensive features are shown; but in other respects the building would be a convenient as well as a dignified one. "Pro Bono Publico" is a good design of Jacobean character, with a good working plan, but expensive.

"Plan," No. 10, the second with this motto, has good Flemish Renaissance elevations, but the plan is straggling.

"Apex" is a good specimen of an asymmetrical design, which would produce a convenient building of a rather less ambitious type than most of the others.

"Nemesias" is a little too much like a private house. "Art" is a very good design indeed, but the entrance is rather awkwardly placed. "Dunster" is not done justice to by a poor set of drawings.

We noticed also "Forward," "Juhilee," "X. Y. Z.," "Brick," "St. Augustine," "Utile Dulci," "Per Ardua," Triangle in circle, and "Quod Petis hic est."

THE ARCHITECTURAL ASSOCIATION.

VISIT TO A NEW CHURCH AT WIMBLEDON.

The first Saturday afternoon visit of the Architectural Association for the present session was made on Saturday, the 12th inst., to the Roman Catholic Church of the Sacred Heart, Dalston-road, Wimbledon. The party of members was received by Mr. T. A. Walters, the architect.

The church is situated on a very sloping site, and at present only the nave is being built. The character of the work is Decorated, of a Lincolnshire type. The nave is 26 ft. 6 in. wide, and upwards of 50 ft. high. The aisles when built will be 16 ft. wide. Over alternate piers in the nave arcade are richly-carved niches, which will be filled with statues, and the aisle roof will be carried with pierced stone principals. It is proposed to brick up the chancel arch for the present, but a large decorated roof will be fixed in the opening at once. The internal stonework is executed in Beer stone, and the walls are to be plastered and decorated. The roof will be of stained deal, with decorated bosses. The external stonework is Ancaster, and the facing knapped flints. The internal effect of the church, even in its present incomplete condition, is very effective, and when completed it will be a very interesting specimen of modern church architecture.

**Friern Barnet Sewerage Works.**—The sewers in the above district, which have been constructed under the direction of Mr. Baldwin Latham, O.E., of Westminster, and comprise outlet sewers, "of which nearly four miles have been laid in tunnel at depths varying from 20 ft. to 70 ft.," have just been completed by Messrs. B. Cooke & Co., of Battersea, the contract sum being 23,000*l.*

THE LIVERPOOL CATHEDRAL COMPETITION.

SIR,—In the *Builder* of last week [p. 266] there appeared a letter, signed by Mr. J. Oldrid Scott and Mr. John P. Seddon, and headed "Liverpool Cathedral Memorial," stating that, at the suggestion of the Committee on Competitions of the Royal Institute of British Architects, the proposed memorial would be modified, and giving the terms of the new circular as modified.

This was laid before the Council of the Royal Institute, at their meeting on Monday, the 14th inst., when the subject of the proposed memorial and of the recent Liverpool Cathedral Competition was for the first time brought before them. We are consequently to ask you to allow us to state in your columns that the modified circular referred to has in no sense been approved by the Council or by our Competitions Committee; and that the Council feel very strongly that nothing should be done, by exhibition or otherwise, to present an award conscientiously arrived at by a professional assessor in any architectural competition.

J. MACVICAR ANDERSON, Hon. Secretary.  
WILLIAM H. WHITE, Secretary.  
Royal Institute of British Architects,  
Feb. 16.

SIR,—As the wording (no doubt unintentionally) of Messrs. Scott and Seddon's letter in your last week's issue has led many to think that the modified memorial had been approved by the Competitions Committee, allow me to state that this is in no way the case. Mr. Cole A. Adams being away unwell, I was deputed to see Mr. Scott by the Committee, and point out to him the portions to which exception was most strongly taken, which I did, and heard no more of it till the modified memorial appeared in your paper, without its ever having been before the Competitions Committee at all.

An exhibition of the drawings may or may not be desirable in London, but if entertained for the purpose of upsetting the assessor's award, would, I am certain, be strenuously opposed by the Competitions Committee.

ASTON WEBB.

19, Queen Anne's Gate, Feb. 17.

THE PROPOSED IMPERIAL INSTITUTE COMPETITION.

SIR,—I take the Imperial Institute to mean, 1st, a building (such as is suggested) to be erected by the contributions from all parts of the empire; to be 2ndly, consolidated into a useful repository for products and manufactures the results of the industries of the British Empire. Surely, if this is right, the competition ought to mark the Jubilee year with a lead in the higher direction in competitions, by making it wide in its scope, embracing every architectural student, offering substantial premiums (and many of them), that the result may be truly imperial, worthy of the committee in charge, the people from whom it has sprung, and the architect who shall create the successful design.

LIVERPUDDLIAN.  
February 16th, 1887.

SANITARY INSTITUTE OF GREAT BRITAIN EXAMINATIONS.

SIR,—With Mr. W. H. Colbran [see his letter, p. 201, ante], I was greatly astonished at the unprovoked attack made by your correspondent, Mr. Scott (p. 164), upon the Sanitary Institute, and I regret that he, himself a member of the Association of Municipal and Sanitary Engineers and Surveyors, could discover no better method of advocating the cause of that Association than by traducing the Sanitary Institute. His statements concerning the Institute are of so inaccurate a nature that I am again, and finally, induced to address you on the subject.

With regard to Mr. Scott's assertion that but few Local Authorities have even so much as heard of the existence of the Sanitary Institute, I may state that the Institute has, by special invitation of the respective Local Authorities, held successful Annual Congresses at various towns (including Leamington, Exeter, Croydon, Stafford, Newcastle, Leicester, Dublin, and Glasgow), attended by distinguished scientists, engineers, neighbouring and other local sanitary surveyors, medical men, and the public generally. By reason of the valuable papers there read and the discussions held thereupon, as also by the exhibition of sanitary apparatus and appliances and the awards of "diplomas" in connexion with meritorious sanitary inventions (adjudicated upon by some of the most able men of the day), these congresses have been the means of enormously advancing the popular interest in, and knowledge of, sanitary

science. (Over 40,000 persons visited the Sanitary Apparatus Exhibition of the last Congress.)

I am also told that I attach too much importance to the Sanitary Institute certificates in supposing they influence local authorities. Within late years it has, however, not been rare for a local authority in advertising for a surveyor or inspector of nuisances to specifically state that "other things being equal, preference will be given to a gentleman holding the Certificate of the Sanitary Institute." Did space permit I could produce abundant evidence to prove beyond doubt that not only do these certificates carry great weight, but that they afford a degree of security to a local authority in its choice of a surveyor far above such as is obtainable from ordinary testimonials.

Conducted by experts and men of great distinction, these examinations, owing to their difficult nature, are to all except real workers but as sour grapes. That they, nevertheless, have attained considerable popularity is indicated by the fact that nearly 200 Nuisance Inspectors' and over 40 Local Surveyors' Certificates have been awarded to gentlemen residing in every part of Great Britain, not to mention about 250 Inspectors, among which I trust the members of the Association of Municipal and Sanitary Engineers and Surveyors are numbered. In view of these Examinations being held only in the metropolis, their voluntary nature, and the fee attached thereto, also of the fact that surveyorships change hands but slowly, Mr. Scott's statement that a dozen Local Surveyors hold certificates is further evidence of popularity.

Feb. 16.

J. A. A.

\* The concluding portion of our correspondent's letter is not strictly relevant to the question, and is therefore omitted by us.

#### "HOUSE AGENTS."

SIR,—You would not willingly allow your columns to be the means of doing injustice to any class, and I therefore hope that you will admit a few words of comment on the article in your issue of the 12th instant on the subject of House Agents.

You think that the principal function of the agent is to bring the proposed purchaser and vendor together, and that for all further purposes the business would be better completed were he "eliminated from the proceedings." Now, of course, there are, as in most other callings, "agents and agents," but it is certain that this is utterly inapplicable to the case of offices of standing and reputation. In their case I venture to assert that their work subsequently to the introduction of the property to the notice of the tenant or purchaser is frequently of much more value and importance than the introduction itself. That clients are of this opinion is evinced by the frequency with which, after receiving a proposal themselves, they bring the business to the agent, that he may carry it out.

One of the most patent mistakes in your article is the assumption that the carrying out of the negotiation by the agent increases the expense to both parties. The agent is paid by a commission on the amount, payable if he does no more than find the tenant or purchaser, so that it is of no advantage to him that negotiations are prolonged; on the contrary, it involves expense to him and trouble without corresponding remuneration. You are very angry with agents for not promoting personal communication between principals. Now, an owner will often employ an agent precisely because he does not desire these "personal communications," which involve trouble and, of course, often lead to no result. Moreover, intending tenants and purchasers will not generally adopt your happy idea of "eliminating the agent," or, as they sometimes express it, "preferring a personal interview with the owner"; and this simply because they consider they may be able to drive a better bargain personally with an owner who may be less shrewd and "wide-awake" than themselves,—perhaps a lady inexperienced in business, an elderly gentleman, or an invalid. The agent is here only doing his duty in standing between his client and the sharp man of the world.

I have nothing to say of the supposed practice of agents misleading their clients as to prospects of disposal of their property and amount of inquiries, except that the practice does not exist in reputable offices. As to the agent maintaining high prices and preventing a settlement on lower terms, it is clear that if he looked only at his immediate profits it would be his interest to do just the reverse. He would let or sell twice as many properties if he were able and willing to offer them below their market value, and it is obvious that the commission on two sales at 1,500*l.* each would be better than one at 2,000*l.* Hence, when he advises a client, as he often has to do, to stand out for the higher price or rent, he is entitled to the credit of doing his duty to his employer, against his own immediate interest, and certainly does not deserve the somewhat hasty and ill-considered censures of the writer of the article.

EDWARD CHESTERON.

Kensington, Feb. 14, 1887.

\* As to the last matter, we will offer one experience as typical. A house was offered by an agent for a certain rent; the agent expressing himself willing, however, to submit an offer 10 per cent. lower. Customer declined this, but, finding out who the

owner was (not from the agent), offered him 20 per cent. less, which was accepted with an alacrity which showed even that less would have been taken. The premium, again in many cases, a mere farce, held up in the hope that some one will be good enough to take it *à discrétion*, and really serving only to frighten away offers.

#### "MASONS' WAGES."

SIR,—When perusing your valuable paper I was very much surprised at the suggestion made by your correspondent "G. C. W.," viz., that the masons' alleged grievances in London should be settled or alleviated by the master builders being persuaded to have their stone worked in London instead of at the quarries.

Why should an employer pay a quarter as much more by so doing than by having the stone worked at the quarries, to satisfy the whims or grievances (?) of men who (so far as my observation as a large employer of masons extends) would profess a grievance after every demand was supplied? To the best of my judgment all these "grievances" are known only to "Society" men, and were they not sought out and shown to them by others who are apparently paid for so doing, and have nothing else to do, my impression is they would never be known.

I do not hold with paying men less than their worth (nor more), and I feel sure every employer of labour will bear me out by stating that a different rate of wages should exist, so that indifferent, ill-tutored, careless, slow, or (more frequently) intemperate, and consequently unreliable and irregular men, should not be paid the same price as a constant, quick, good, reliable man. It is no encouragement for such to maintain his ability, or for the inferior to endeavour to better his powers, and so attain an increase of wages *pro rata*.

Now, reverting to "G. C. W.'s" remark about stone being worked at the quarries, the very statement he mentions as to the "builders taking contracts, then sub-letting the masonry to a sub-contracting mason, and the latter again letting it to be worked at the quarries," proves that stone can be, and is, worked cheaper there than anywhere, and consequently should be, and is, on the increase; and if the masons are grieved about it, let them come down to the quarries and work there, although, for my part, I would rather the "Society" men kept away.

In conclusion, if masters and men were only left alone more it would be better for them; and then, if the masters found good men, and the men good masters, they would work well together; and the bad, on the other side (masters and men), might also be left alone, and allowed to progress as best they could.

A QUARRY OWNER.

#### WASTE WATERS FOR FLUSHING PURPOSES.

SIR,—Will some of your readers kindly give their experience in using waste-water from kitchens, sculleries, &c., for flushing water-closets?

I believe some such an arrangement is in existence in some towns, and saves much expense in cost of fittings, water, &c.

HEALTH.

### The Student's Column.

#### FIELD WORK AND INSTRUMENTS.—VIII.

##### Surveying Instruments.

##### VIII.—THE CIRCUMFERENTOR.

THE circumferentor is an instrument principally intended for subterranean surveying, but is also useful for completing the survey of any thickly-wooded portion of a country, where it is found difficult to connect the direction of any particular base line with the adjacent portion of the work. In its simple form it constitutes a miner's dial, consisting of a circular box containing a very sensitive magnetic needle, mounted upon a stand with folding sight-vanes, which are raised perpendicular to the compass-box. In each vane there are slots and holes, one over the other, a fine line of silk, horsehair, or wire being strained down the centre of each slot, in a similar manner to the sight-vane of a prismatic compass, and the circular holes are each crossed by lines at right angles to one another, the intersection of which is used in ranging the opposite sight-vane in line with a distant station. These sight-vanes are alternate, the aperture serving as an eye-piece in the one, being exactly opposite the aperture by which the centre of an object is ranged in the other. With this instrument the direction of the roads and workings of a mine, or of a stream through a wood, may be roughly determined by a comparison with the magnetic meridian. In the prismatic compass the needle was seen to be attached to the card upon which

the degrees of a circle were graduated. In the circumferentor the needle revolves upon its bearing in the centre of the dial, and the divisions are marked upon the compass-box, as shown in fig. 2, which represents a plan of the instrument with the sight-vanes raised ready for use, as in fig. 1. In fig. 5 the instrument is shown closed with a cover over the compass-box and the sight-vanes folded down for the convenience of packing. The needle in fig. 2 is released to play freely by pulling out the stop-piece marked M. Fig. 3, which represents a plan of the underneath portion of the instrument, shows the position of this stop-piece with reference to the set-screw H, which clamps the instrument to its stand.

The fixed divisions upon the dial in the compass-box are marked very distinctly upon a raised circular rim, which forms the outer edge of the silvered plate, marked A, in the centre of which the needle is carried. These divisions are engraved consecutively to 360°, in a contrary direction to the figures upon the face of a watch, and are usually cut upon both the outer and the inner edges of the face of this rim, with the figures indicating the degrees placed in order in a circle between them, as shown in fig. 2. Upon the inner portion of this plate, the letter N. denotes the north, coincident with the line marked 360° upon the graduated rim, and the letter S., immediately opposite, denotes the south point upon the dial coincident with the line marked 180°. The plate over which the needle travels is further divided within the raised rim by cross lines at right angles to one another into four parts, each quadrant being semi-divided, and containing subdivisions reading from zero at the points marked N. and S., advancing in tens of degrees to 90° at the points marked E. and W. The inner circle of divisions upon the raised rim enables us to read to degrees the angle of intersection at the centre of the compass-box, between the direction of the needle pointing to the magnetic north over the line marked N. and S. upon the dial, and the line ranged by the sight-vanes, while the addition of the vernier,—an enlarged view of which is given in fig. 6,—enables us to record angles within three minutes, or one-twentieth of a degree.

The compass-box is connected with an exterior gimbal ring, the latter carrying the arms, upon the ends of which the sight-vanes D, D, are attached. The best instruments have spirit levels, B and C, fixed at right angles to one another upon these arms. The vernier is fixed to the inner edge of the box which holds the compass, its zero point being placed in the same vertical plane as the centre line of the sight-vanes, and in a line at right angles to the axis of the gimbal ring. A circular rack and pinion, worked by the milled screw, K, shown in fig. 3, communicates to the vernier plate an absolute horizontal motion round the outer circular rim of the dial-plate. By means of this rack-and-pinion movement, great steadiness of action is obtained. The gimbal ring carrying the sight-vanes can be fixed rigidly to the compass-box, by means of the turn stops, L, L, as shown in figs. 1 and 3, or inclined, as shown in fig. 4, when required to suit the declivity of a heading or tunnel. In fig. 4 it will be observed that the turn stops, L, L, are unclamped by reversing. With the use of an arc marked F, which can be attached by the screw E, or removed at pleasure, the gradient of a heading may be measured, while the compass-box remains level, and records the magnetic bearing. Two scales of graduations are engraved upon this arc, one indicating the degrees of a circle between zero and 45°, while the other scale gives the corresponding values of the versines of the angles registered, these amounting to 1.52 in 100 for an angle of 10°, 6.02 in 100 for 20°, 13.4 in 100 for 30°, 23.4 in 100 for 40°, and 29.29 in 100 for 45°.

The compass-box is commonly mounted upon a ball-and-socket tripod, fitted with a turned and bored ferrule-joint. In this respect it differs from the screwed head shown in the illustration of a ball-and-socket tripod stand, which accompanied our description of the prismatic compass. In mining work it is found convenient to have the legs of the tripod jointed in the centre, as low headings often occur. When the legs are required to be shortened to suit the headway, three pegs each, similar to the one marked P in the diagram, are supplied in the box, for screwing on to the middle portion of each leg.

In order to find the bearing of a line by the



THE CIRCUMFERENTOR

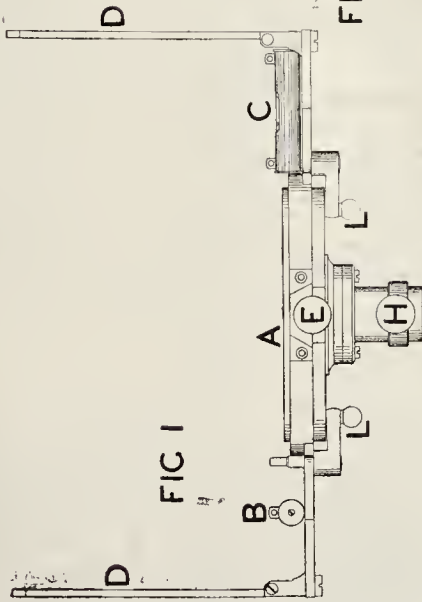


FIG 1

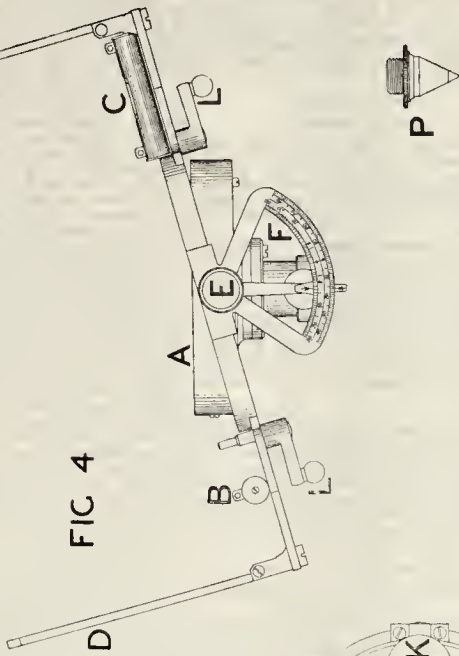


FIG 4

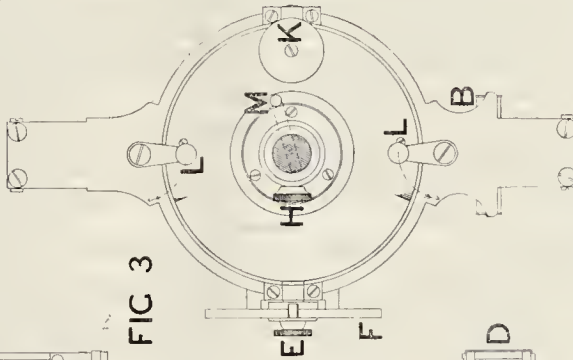


FIG 3

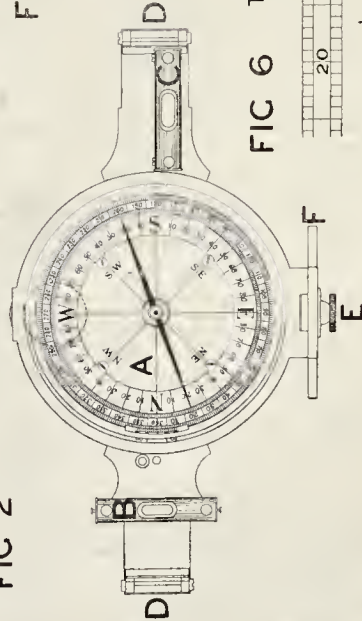


FIG 2

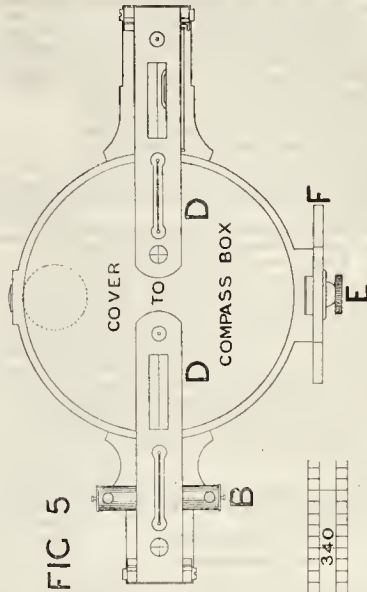
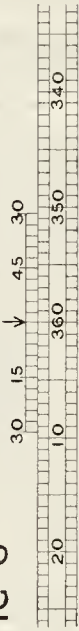


FIG 5

FIG 6 THE VERNIER - ENLARGED -



$\frac{1}{19} - \frac{1}{20} = \frac{1}{380}$   $\times \frac{19}{1} = \frac{1}{20}$  OF 1° OR 3 MIN

circumferentor, place the instrument over the station point, with the gimbal ring clamped to the compass-box, as in fig. 1, and guided by the spirit bubbles, set it level by means of the ball-and-socket joint. The needle should be immediately released on setting the instrument. If the circumferentor has no spirit levels attached, it may be set up approximately level, by unclamping the needle, and noticing when it swings freely. Then turn the instrument round, so that the 360° or point marked N. upon the dial, is coincident with the marked or north end of the needle, and carefully make this coincidence when the needle comes to rest, as accurate as possible by turning the milled screw K, which is situated below the compass-box, and hence shown dotted in fig. 2. Having done this, tighten the set screw H. Then by means of the milled screw K, turn the sight-planes in the direction of the proposed line. Open if necessary the turn stops L L, and so place the sight-planes D D that the centre of the object viewed is bisected by the cross hairs. The dial-plate being as shown by the plan in Fig. 2, open upwards, the divisions can be read entirely round the circle, and the miner's lamp can be held over the compass-box without disturbing the instrument. It will be observed upon reference to the dial-plate in fig. 2 that in some instruments the right hand of the point marked N., when looking towards the north from the centre of the plate, is lettered west, and that the opposite point upon the left is lettered east. Thus the relative positions of east and west are reversed. The expression, the reverse bearing of a line, simply means that the bearing has been taken in a contrary direction; thus the reverse bearing of 34° east of north would be 34° west of south. It will, however, be found an advantage to maintain a uniformity of method in registering the angles, and always to book the relation that the magnetic north bears to the line of observation as recorded by the figured dial-plate. The process of "dialling a pit" is called by some "latching."

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

|                                                                                         |       |
|-----------------------------------------------------------------------------------------|-------|
| By C. FORBES & SON.                                                                     |       |
| Abridge, Essex—The residence called "Whitehall," and house adjoining, freehold          | £840  |
| Millwall—32, Maria-street, 34 years, ground-rent 5l.                                    | 200   |
| FEBRUARY 8.                                                                             |       |
| By DEBENHAM, TOWNSEND, & CO.                                                            |       |
| Finchley-road—An enclosure of land, 12a. Or. 20p., freehold                             | 1,580 |
| Brixton Rise—No. 34, 52 years, ground-rent 20l.                                         | 1,005 |
| By E. J. GARDNER.                                                                       |       |
| Tottenham Court-road—5, 10, and 43, Whitfield-street, freehold                          | 2,710 |
| Mill End—Nos. 87 to 116 odd, Buxton-street, held at a peppercorn, reversion in 34 years | 4,905 |
| Buxton-street—Ground-rents of 10s. 10d., reversion in 34 years                          | 1,830 |
| Baker's-row—Ground-rents of 12l., reversion in 34 years                                 | 2,770 |
| FEBRUARY 9.                                                                             |       |
| By J. & R. KEMP & CO.                                                                   |       |
| Mill End—17 to 25 odd, Philipot-street, 16 years, ground-rent 16l.                      | 650   |
| 85 to 87 even, Varden-street, and 27, Great-street, 13 years, ground-rent 11l.          | 305   |
| Stepney—81, 83, and 85, Esmouth-street, 27 years, ground-rent 7s. 11d.                  | 765   |
| 72 and 74, Dempsey-street, 27 years, ground-rent 6l.                                    | 520   |
| By W. A. BLAKEMORE.                                                                     |       |
| Paddington—38 and 39, Eastbourne-terrace, 52 years, ground-rent 23l.                    | 2,160 |
| Hamstead-road—7 and 8, Oakley-square, 37 years, ground-rent 20l.                        | 1,315 |
| Highbury—9, Elwood-street, freehold                                                     | 205   |
| By E. J. GARDNER.                                                                       |       |
| Mill End—80 to 110 even, Buxton-street, held at a peppercorn, reversion in 34 years     | 2,820 |
| Ground-rent of 4l., reversion in 34 years                                               | 428   |
| 59, 61, and 63, Underwood-street, peppercorn, reversion in 34 years                     | 2,700 |
| 1, Buttress-street, freehold                                                            | 245   |
| Underwood-street, freehold                                                              | 660   |
| Underwood-street—Ground-rents of 14l., reversion in 34 years                            | 2,700 |
| 40 and 42, Underwood-street, peppercorn, reversion in 34 years                          | 930   |
| Ground-rent of 4l., reversion in 34 years                                               | 440   |
| 60, 68, and 70, Underwood-street, peppercorn, reversion in 34 years                     | 850   |
| FEBRUARY 10.                                                                            |       |
| By D. YOUNG.                                                                            |       |
| Clapham—13, Sibella-road, 75 years, ground-rent 9l. 15s.                                | 640   |
| By J. SCOTT.                                                                            |       |
| Stoke Newington—79, Midday-grove, 62 years, ground-rent 6l. 10s.                        | 310   |
| 89, 85, and 91, Midday-grove, 62 years, ground-rent 19l. 10s.                           | 1,500 |
| 77, Midday-grove, 62 years, ground-rent 6l. 6s.                                         | 370   |
| By B. BROWN.                                                                            |       |
| Forest Gate—125, Forest-lane, freehold                                                  | 470   |
| By C. C. & T. MOORE.                                                                    |       |
| Mill End—13, Sydney-square, 134 years, ground-rent 8l.                                  | 155   |

|                                                                                                                                     |       |
|-------------------------------------------------------------------------------------------------------------------------------------|-------|
| Limehouse—118, Rhodeswell-road, 25 years, ground-rent 3l.                                                                           | £165  |
| 94 to 112 even, Rhodeswell-road, 25 years, ground-rent 30l.                                                                         | 1,465 |
| 86, 90, and 92, Rhodeswell-road, 27 years, ground-rent 8l.                                                                          | 4,760 |
| 8, 760, Rhodeswell-road, 27 years, no ground-rent                                                                                   | 2,400 |
| 31, Tomlin terrace, 27 years, no ground-rent                                                                                        | 1,255 |
| 1 to 4, Bridge-terrace, 28 years, no ground-rent                                                                                    | 255   |
| By W. C. HEBON.                                                                                                                     |       |
| Commercial-road—24 to 30 even, Lower Chapman-street, 13 years, ground-rent 16l. 19s. 6d.; also a ground-rent of 3l. 10s., same term | 530   |
| By J. P. RIBBE.                                                                                                                     |       |
| Westbourne Park—171 and 173, Kensal-road, 90 years, ground-rent 16l.                                                                | 655   |

MEETINGS.

|                                                                                                                                              |  |
|----------------------------------------------------------------------------------------------------------------------------------------------|--|
| SATURDAY, FEBRUARY 19.                                                                                                                       |  |
| Builders' Foremen and Clerks of Works' Institution.—Annual Dinner (Holborn Restaurant). 6:30 p.m.                                            |  |
| MONDAY, FEBRUARY 21.                                                                                                                         |  |
| Royal Academy of Arts.—Professor Middleton on "Early Medieval Sculpture." 1. 8 p.m.                                                          |  |
| Society of Arts (Gospel Lectures).—Mr. W. Y. Dent, F.C.S., on "Building Materials." 11. 8 p.m.                                               |  |
| Surveyors' Institution.—Discussion on Mr. T. A. Dickson's paper on "Artificial Manures." 8 p.m.                                              |  |
| Victoria Institute.—Mr. McK. Hughes, F.G.S., on "Caves: their Age, Origin, and Age of Deposit." 8 p.m.                                       |  |
| Leeds and Yorkshire Architectural Society.—Associates' Soiree.                                                                               |  |
| TUESDAY, FEBRUARY 22.                                                                                                                        |  |
| Society of Arts (Applied Art Section).—Mr. J. Starke Gardner, F.G.S., on "Wrought Ironwork." (Mr. E. J. Peyster, A.A., in the chair. 9 p.m.) |  |
| Institution of Civil Engineers.—Mr. William Willecks on "Irrigation in Lower Egypt." 8 p.m.                                                  |  |
| Manchester Architectural Association.—Mr. W. H. Rawie on "The Architectural Assistant." 7:30 p.m.                                            |  |
| WEDNESDAY, FEBRUARY 23.                                                                                                                      |  |
| Society of Arts.—J. W. Urquhart on "Recent Advances in Sewing Machinery." 8 p.m.                                                             |  |
| THURSDAY, FEBRUARY 24.                                                                                                                       |  |
| London Institution.—Mr. Harold B. Dixon, F.R.S., on "The Lighthouse Experiments at the North Foreland." 6 p.m.                               |  |
| Society of Telegraph-Engineers and Electricians.—8 p.m.                                                                                      |  |
| FRIDAY, FEBRUARY 25.                                                                                                                         |  |
| Royal Academy of Arts.—Professor Middleton on "Early Medieval Sculpture." 11. 8 p.m.                                                         |  |
| Society of Arts (Indian Section).—Mr. Holt S. Hallett on "New Markets and Extension of Railways in India and Burma." 8 p.m.                  |  |
| Royal Institution.—Captain W. de W. Abney, R.E., F.R.S., on "Sunlight Colours." 9 p.m.                                                       |  |
| SATURDAY, FEBRUARY 26.                                                                                                                       |  |
| Architectural Association.—Visit to Slon College and St. George's Cathedral Schools. 2:30 p.m. (See advertisement last week.)                |  |
| Edinburgh Architectural Association.—Visit to Catholic Apostolic Church and College of Physicians.                                           |  |

Miscellaneous.

**Sanitary Institute of Great Britain.**—The Right Hon. G. Slater Booth, M.P., has accepted the Presidency of the Congress of this Institute to be held at Bolton in September next.

**Obituary.**—The death took place on the 15th inst. of Mr. Henry James Phillips, one of the founders, and for thirty-three years secretary of the Temperance Building Society, in the sixtieth year of his age.

**Birmingham Students of the Institution of Civil Engineers.**—The members of the Association of Birmingham Students of this Institution held a meeting at the Colonnade Hotel, New-street, on the 10th inst., when a paper upon "The Sewerage of Towns," by Mr. J. S. Pickering, Stud. Inst. C.E., was read, in the absence of the writer, by Mr. W. Franks, Stud. Inst. C.E. Mr. E. Pritchard, M. Inst. C.E. (President), was in the chair.

**District Surveyors.**—Referring to the paragraph on p. 270 of our last issue, we see from the agenda of the meeting of the Metropolitan Board of Works for the 18th inst. that the Works and General Purposes Committee will present a report stating that they are not prepared to recommend the making, in the cases of future appointments to the office of District Surveyor, the additional regulations proposed by Mr. Samuel Price.

**The American Exhibition at Kensington.**—We hear that work on the buildings of the American Exhibition of the Arts, Industries, Manufactures, and Products of the United States, to be opened May 2nd at Earls-court, Kensington, is progressing very rapidly. Over 400 men are now at work on the grounds, and when the electric-light plant, for which a 600 horse-power engine and boiler are being put in place, is completed, night-work will be begun. The managers report that the applications for space in the building far exceed its capacity. Several large American railroad companies will make exhibits, illustrative of the agricultural and mineral products of the territory through which their lines ran.

**The Briton Insurance Office Buildings.** The block of buildings at the corner of Agar-street, in the Strand, which was originally occupied as the notorious British Bank, and until recently by the Briton Insurance Company, has been purchased by the British Medical Association, by whom it will shortly be occupied. The building has just been undergoing alterations and internal reconstruction to a very great extent. The ground-floor, which is intended to be set apart as the chief business offices of the Association, is being entirely rearranged. The walls and partitions dividing the offices on the first floor have all been removed, and a larger apartment formed, extending the entire depth of the building from the Strand frontage northwards, which is intended as the council-room of the Association, and immediately adjoining, on the east side, are several clerks' offices. The second and third floors have also been re-arranged as general offices. The whole of the roof has been removed, and a new roof constructed, lighting the top floor by a lantern, carried to the entire length. This last-named floor is intended to be occupied as the compositors' room in connexion with the *British Medical Journal*, which will be printed on the premises. The basement floor has been lowered to the extent of 18 in., and will contain the machinery for printing the *Journal*. The stone staircases from the ground to the upper floor of the building have been reconstructed and diverted, and lavatories formed at each floor landing. A lift has also been constructed from the basement communicating with the several floors to the top of the building. The works are being carried out from the designs of Messrs. Arding, Bond, & Buzzard, of Surrey-street, Strand. Messrs. G. H. & A. Bywaters, of King-street, Regent-street, are the contractors, and Mr. L. Williams is the foreman. Messrs. Wenham & Waters, of Croydon, have done the heating and ventilation work.

**The Sanitary Assurance Association.**—The sixth annual meeting of this Association was held at the Offices, 5, Argyll-place, W., on Monday, Sir Joseph Fayer in the chair. Mr. Joseph Hadley, secretary, read the annual report, from which it appeared that the business of the Association during 1886 had been much greater than in any previous year, the income having been 804l. as against 462l. in 1885. The report said that of all the properties inspected, in only two cases of first inspection had the arrangements been such that the Council could certify the sanitary condition of the property without alteration. The Executive Council reported having held several meetings for the purpose of revising the Sanitary Registration of Buildings Bill of 1886, and a new Bill had been prepared for presentation to the House of Commons. In the new Bill the principle of compulsory registration would be restricted to schools, colleges, hospitals, asylums, hotels, and lodging-houses. In the absence of Dr. Farquharson, M.P., from England, Mr. C. C. Lacaita, M.P., had taken charge of the Bill. General Sir Peter Lunsden, G.C.B., proposed the adoption of the report. This was seconded by Mr. Andrew Stirling, supported by Dr. Danford Thomas and Surgeon-General Cornish, C.I.E., and carried unanimously. The retiring members of the Executive Council, Lieut.-General Burne, C.B., and Mr. Andrew Stirling, were re-elected. Sir Joseph Fayer was re-elected President of the Association, and Professor T. Roger Smith, F.R.I.B.A. was re-elected Vice-President. With regard to the Sanitary Registration of Buildings Bill, to be introduced by Mr. C. C. Lacaita, we are informed that it will be backed by Dr. Farquharson, Sir W. Guyer Hunter, and Dr. Cameron.

**The New English Church at Cannes.**—St. George's Church, Cannes, was consecrated on Saturday last by the Bishop of Gibraltar. It has been erected as a memorial to the Duke of Albany, the design being submitted by Mr. A. W. Blomfield, M.A. The decorations of the church include two large stained-glass windows and a mosaic reredos, the gift of two English ladies and the work of Heaton, Butler, & Bayne, who have also other memorials in hand for the same church. We have already (p. 165, ante) published some particulars of the church, and we hope to give an illustration of it in an early number.

**Theatre Burned Down at Northampton.** The New Opera House at Northampton was burnt out early on Sunday morning.

PRICES CURRENT OF MATERIALS.

Table listing prices for various timber types such as Greenheart, Teak, Elm, Fir, etc., with columns for quantity and price.

TIMBER (continued) table listing prices for Box, Turkey, Saffin, St. Domingo, Porto Rico, Walnut, Italian.

METALS table listing prices for Iron-Bar, Welsh, in London, in Wales, Shaftshire, London, Sheets, single, in London, Hoops, Nail-roads.

COPPER table listing prices for British, cake and ingot, Best selected, Sheets, strong, CHIL, bars, YELLOW METAL.

LEAD table listing prices for Pig, Spanish, English, common brands, Sheet, English.

SPELTER table listing prices for Silesian, special, Ordinary brands.

TIN table listing prices for Straits, Australian, English ingots.

OILS table listing prices for Linseed, Cocoanut, Ceylon, Palm, Lagos, Refined, English pale, brown, Cottonseed, refined, Tallow and Oleine, Lubricating, U.S.S., refined.

TAR table listing prices for American, in casks, Stockholm, Archangel.

BRACKNELL (Berks).—For the erection of Gothic lodge, "Martin's Heron," for Major-Gen. Millman, Mr. Frederic W. Fryer, architect, Falmouth-lane ... £180 0 0

BERMONDSEY.—For rebuilding factory premises at Millatres-road, Dockhead (lately burned down), for Mr. William Joyce. Mr. Edward Cross, architect, Bermondsey-square:— Smith & Son ..... £1,777 0 0 Clarke & Bracey ..... 1,643 0 0 Grover & Son ..... 1,638 0 0 A. White & Co. .... 1,897 0 0

BERMONDSEY.—For erecting furnace chimney-shaft, 80 ft. high, at the Manor Gill Works, Galley Wall-road, South Bermondsey, for Messrs. Johnson, Cals, Brier, & Cordrey (Limited). Mr. Edward Cross, architect:— B. Wells, Bermondsey ..... £265 0 0 J. Appleby, Lambeth ..... 265 0 0 W. Shepherd, Bermondsey (accepted) 225 0 0

CLAPHAM.—For alterations and additions to business premises, High-street, Clapham, for Mr. W. Edwards. Mr. J. William Stevens, architect, 21, New Bridge-street:— White & Co. .... £198 0 0 Lamprell (accepted) ..... 147 0 0

EDMONTON.—For the erection of chimney shaft at the Edmonton Workhouse, for the Edmonton Board of Guardians:— Wainwright ..... £180 0 0 Linzell ..... 150 0 0 Franklin ..... 147 0 0 Neill ..... 126 0 0 Ivory ..... 125 0 0 Brooks & Meader (accepted) ..... 121 19 0

EXETER.—For the restoration of the interior of the Guildhall, Exeter, including panelling, re-seating, upholstery, flooring, heating, ventilating, masonry, &c. Mr. E. Lyne Parsons, architect, High-street, Exeter:— W. Dart, Crediton (accepted) ..... £261 11 0

GREENWICH.—For the erection of saw-mills and office, for the Improved Wood Pavement Company, at East Greenwich, under the superintendence of Mr. William Eve, architect, Union-court, Old Broad-street:— Downes ..... £1,365 0 0 Perry ..... 1,366 0 0 Brass ..... 1,347 0 0 Reading ..... 1,385 0 0 Dowell ..... 1,354 0 0 Kirk & Randall ..... 1,329 0 0 Harris & Wardrop ..... 1,318 0 0 Salt ..... 1,297 0 0 Holland ..... 1,249 0 0 Stubbs ..... 1,200 0 0 Higgs ..... 1,170 0 0

HAMMERSMITH.—For the erection of bakery and stable, for the Hammersmith Co-operative Society (Limited), Mr. O. P. Edwards, architect:— Ovens, Bakery ..... Total. O. Plumridge ..... £235 0 ..... £235 0 G. Harrington ..... 139 0 ..... 327 10 Webb & Rosser ..... 113 16 ..... 288 14

HASTINGS.—For the restoration of premises, High-street, Hastings, for Mr. J. Griffith Richards, Mr. Henry Ward, architect, Hastings:— C. Tanner ..... £1,197 0 0 W. B. Warriner ..... 1,153 0 0 Moon & Gardner ..... 1,498 9 3 H. Chapman ..... 1,094 18 0 A. White ..... 1,093 0 0 A. Vidler ..... 1,354 0 0 H. Ditch ..... 1,442 0 0 J. Taylor ..... 1,020 0 0 W. Elliott (accepted) ..... 1,000 0 0

LONDON.—For the completion of No. 15, Clarence-terrace, Bronesbury-road, Kilburn, under the superintendence of Mr. William Eve, architect, Union-court, Old Broad-street:— Salt ..... £325 0 0 Higgs ..... 323 0 0 Baber ..... 300 0 0 Jones ..... 270 0 0 Wadsworth ..... 240 0 0 Shakespeare ..... 160 0 0

LONDON.—For the completion of No. 17, Clarence-terrace, Bronesbury-road, under the superintendence of Mr. William Eve, architect:— Salt ..... £435 0 0 Higgs ..... 393 0 0 Rowe ..... 351 0 0 Baber ..... 300 0 0 Jones ..... 250 0 0 Wadsworth ..... 230 0 0 Shakespeare ..... 210 0 0

LONDON.—For the extension of premises at Pear-tree-street, Goswell-road, for Messrs. Carter, Paterson, & Co., under the superintendence of Mr. William Eve, architect:— Holland ..... £1,233 0 0 Johnson ..... 1,157 0 0 Harris & Wardrop ..... 1,127 0 0 Godfrey ..... 1,87 0 0 Higgs ..... 1,075 0 1 Godfrey ..... 1,049 0 0 Brass & Son (accepted) ..... 1,033 0 0

LONDON.—For the completion of No. 19, Clarence-terrace, Bronesbury-road, under the superintendence of Mr. William Eve, architect:— Salt ..... £392 0 0 Higgs ..... 370 0 0 Rowe ..... 350 0 0 Baber ..... 300 0 0 Jones ..... 250 0 0 Wadsworth ..... 250 0 0 Shakespeare ..... 210 0 0

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitomes of Advertisements in this Number.

COMPETITIONS.

Table with columns: Nature of Work, By whom required, Premium, Designs to be delivered, Page.

CONTRACTS.

Table with columns: Nature of Work, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page.

PUBLIC APPOINTMENTS.

Table with columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page.

TENDERS.

Table listing tenders for BATTERSEA (Baptist Chapel) and BARNET (cottages) with columns for name, amount, and date.

LONDON.—For alterations at the Grapes Public-house, Mill-street, Hanover-square, for Mrs. Brook. Mr. F. Ponder Telser, architect, Chancery-line. Quantities supplied:—  
 Wood ..... £885 0 0  
 Chessum ..... 768 0 0  
 Campkin ..... 781 12 0  
 Castle ..... 744 0 0  
 Fittings, &c. Deduct if in Cnba. Pitch-pine.

LONDON.—For sundry alterations and fittings at the Green Man Public-house, 383, Euston-road. Messrs. Walters & Bird, architects. Quantities supplied:—  
 Williams ..... £2,844 ..... £250  
 Perkins ..... 2,676 ..... 245  
 Goodall ..... 2,508 ..... 145  
 Fotheringham ..... 2,439 ..... 250  
 Anley ..... 2,325 ..... 270  
 Mark ..... 2,079 ..... 300  
 Birch ..... 2,057 ..... 325  
 Goad ..... 2,248 ..... 300

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 [No competition.]

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 Lyne, Kingston ..... 2,620 ..... 217  
 W. Oldridge, Kingston ..... 2,925 ..... 219  
 O. Constable, Hampton Wick ..... 2,300 ..... 223

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 W. R. Wood, Hampton Wick ..... 423 0 0  
 G. Huckle, Norbiton (too late) ..... 415 0 0  
 A. Brett, Hampton Wick ..... 410 0 0  
 Howard & Johnson, Camberwell ..... 407 10 0  
 Henley & Co., Upper Norwood ..... 388 0 0  
 Newton & Idle, Clapham ..... 387 0 0  
 A. E. Addie, Hounslow ..... 377 0 0  
 R. L. Wood, East Greenwich ..... 375 0 0  
 W. Hicklinbottom, Teddington ..... 365 0 0  
 Aylott & Co., Theobald's-road ..... 310 0 0  
 E. Woodhouse, Stanley-road, Woodford (accepted) ..... 255 0 0

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Map of London,

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### The History of Art in Flanders.



THE three sumptuous volumes with which Canon Dehaisnes\* has enriched students of Medieval art deserve much more attention than the English press has thus far devoted to them.

The first volume consists of a *résumé* of the results arrived at by the author, and is adorned with some fifteen Dujardin plates. The other two volumes contain a series of documents or parts of documents mostly never before published. The learned editor has devoted his leisure time year after year to the search. He has hunted through one collection of archives after another, and found here the record of a payment made for a work of art, there an inventory of the possessions of an abbey or of a prince; now a huilder's account for work done at some château or other palatial residence; and again, the list of valuables robbed by highwaymen from a rich traveller. As we turn the pages we catch the strangest and most varied glimpses of the past, now and then lightened into actual visibility by some keen word or well-chosen expression unexpectedly flashing forth from the gloom of account-hooks or legal records. The Comte de Lahorde's somewhat similar work, entitled "Les Ducs de Bourgogne: Études sur les Lettres, les Arts, et l'Industrie pendant le XV<sup>e</sup> Siècle" (Paris, 1849-54), is well known to every student. It has been M. Dehaisnes' aim to do for the earlier centuries what M. de Lahorde did for the wonderfully busy and richly productive epoch which was contemporary with the reign of the Dukes of Burgundy over the provinces which now form the chief part of Belgium.

It will not be expected of us, in a notice like the present, that we should go further into the nature and extent of the documents published. Nine hundred and forty quarto pages are not to be quickly read, nor is it possible to test in a short time the accuracy of the transcriptions and printing contained in them. The ultimate test can only be applied by time and use. Our function is rather to point out to the possible reader what a work of this magnitude contains that is not to be found in existing books, so that he may be in a position to judge for himself whether it is worth his while to purchase it or not.

\* Histoire de l'Art dans la Flandre, &c., avant 1<sup>o</sup> XV<sup>e</sup> Siècle. Par Canon Dehaisnes. Three vols. Lille, 1886.

The first volume is divided into two parts, dealing respectively with the periods intervening between the barbarian invasions and the Crusades, and between the Crusades and the fifteenth century. An introductory chapter is followed by one dealing with social life and its relation to art in the earlier epoch. Four chapters are next devoted to the history of painting, sculpture, tapestry, goldsmith's work, and miniature between the same limits of time. The second portion of the history likewise commences with a general chapter, after which the reader is conducted to the towns, Tournai, Bruges, Ghent, Ypres, Lille, Douai, Valenciennes, Mons, Cambrai, Arras, and Saint-Omer, and to the abbeys near them, and shown how different arts were cultivated at these several centres. The influence exercised upon art by the reigning houses forms the subject of some half-dozen more chapters. A general *résumé* and discussion brings the historical portion to an end.

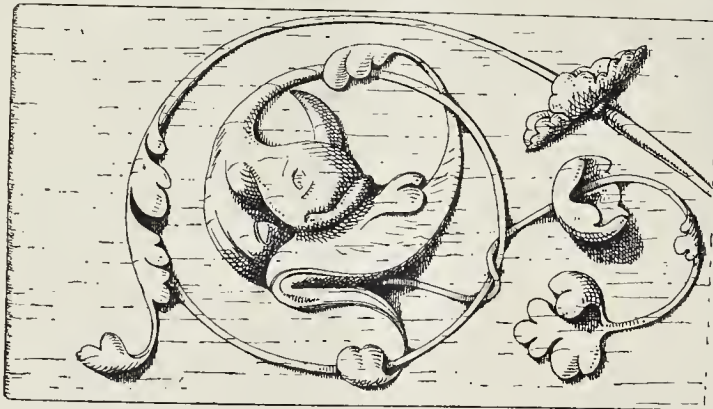
The author, in his preface, after sketching the scheme of his own work, proceeds to point out that no existing hook covers, or attempts to cover, the same ground, and undoubtedly he is right in his contention. He has undertaken to replace a chaos of disjointed studies made by men whose chief interests were with other places or times, by a cosmos of orderly statements based on thorough and exact investigation; and we may say at once that he has done his work, as it seems to us, very well indeed. He has not forgotten (as so many forget) that archives are interesting only in proportion as the things mentioned in them can be made visible, and the facts discoverable about those things interesting. He has carried on the study of works of ancient art along with the study of archives, and each study has served to quicken the other.

When the power of the Roman Empire faded away in the West, and the barbarian invasions began, the ancient culture was not at once submerged. Century after century saw important revivals attempted or achieved. In the district under consideration the seventh century was a very productive period. Christianity had taken root; churches and monasteries were raised and fitted in many places, and art in many forms flourished. The Merovingian kings were (for their day) enlightened patrons of the arts, especially of the art of the goldsmith. Still more successful was Charles the Great's attempt to revive the arts of the ancient world. Europe at the beginning of the ninth century seemed on the fair way to a productive civilisation. Before that century wore to a close the invasions of the Norsemen had devastated all the northern parts of the Continent, and most of the build-

ings which had survived from antiquity, or been made in the preceding centuries, were utterly destroyed. The craftsmen themselves were slain or sent wandering, and the nadir of civilisation was reached. The Abbey of St. Bavon, at Ghent, alone (in Belgium) possesses ruins of earlier date than the Crusades. It was built in the seventh century, and the very walls of that edifice seem, by some miracle, to be, in part at any rate, standing. In the tenth century new beginnings were made, but they were no longer attempts to revive past ideals. The barbarian deluge had finally done its work and spread over the district a new human soil with new ideals latent in it.

We have to wait for the great Renaissance till the twelfth century, and then it came, along with feudalism and an organised and powerful church, finally and for ever replacing the Imperial pagan Roman civilisation. Every art began to raise its head anew. Buildings of all sorts were wanted for the newly-constructed society which lived and laboured in towns, and fought behind and around castle walls, which worshipped in churches, required storehouses for its goods, heltries for its hells, town-halls for its magistrates. Tournai Cathedral is the Belgian edifice which contains within its fabric an epitome of the art of this epoch,—from the end of the eleventh to the beginning of the sixteenth century. Examples of both Romanesque and Gothic architecture are found in its different parts. Its walls were covered with paintings, its windows filled with storied glass, and its treasuries enriched with priceless works, amongst which the still existing shrine of St. Eleutherius, one of the finest works of thirteenth-century goldsmiths' work, always held the first place.

The provinces under consideration, like the rest of Europe, are to be regarded as an agglomeration of towns, each practically an independent republic. Art, therefore, developed along different lines in these various centres, and the student must pursue its course first in one place, then in another. Our author's chapters on the various towns are amongst the most valuable in his work. Ghent is memorable for her corporation of painters, who already possessed written statutes in the year 1338, whilst between that date and 1410 no fewer than 131 painters and 29 sculptors were entered upon the books. Bruges, of course, cultivated all the known arts, and led the way in civil architecture,—her town-hall, which fixed the type afterwards adopted in all the larger towns, being rebuilt between the years 1376 and 1402. Ypres is famous hoth for her splendid thirteenth-century Cloth Hall (about which the archives are unfortunately silent) and for being the home of the painter Melchior Broederlam. The archives of Douai



Details from the Organ-Screen, King's College Chapel.

yield excellent spoil. Our author has patiently read all the wills of her burghers, and thus is able to give us a glimpse into the houses of the rich men there, and to show us what splendour of tapestry, painted cloths, jewelry, cups, and the like they contained. Valenciennes produced the previously forgotten artist, Andieu Beauneven. His name was brought to light by M. Léopold Delisle, who proved him to have been the sculptor of the tomb of Charles V. at St. Denis. We now behold him as painter and miniaturist too, widely famed, and we are able even (by the aid of photography) to look upon two specimens of his excellent handicraft. He flourished about the end of the fourteenth century. Cambrai is full of varied interest. Its cathedral has a notable history. Not far off is Honcourt, where are the ruins of a famous Benedictine abbey, and whence came Villard de Honcourt, the architect, whose sketch-hook is known to all students of Medieval architecture. Arras, of course, brings with it the story of the tapestry industry, as to which M. Deshaimes has discovered two documents of the highest importance.

The inventories of the princes of the period are full of interesting records, by means of which we are enabled to reconstruct much that is lost. Future historians of art will have to devote careful attention to the chapters dealing with this part of the subject.

In conclusion, it may be said that the volumes are excellently printed, and are furnished with the most elaborate indices and with a glossary supplementary to the usual sources of information.

"Scientific News" is the name of a new sixpenny illustrated monthly, the first number of which will appear on the 1st of March.

#### ANCIENT WOOD AND IRON WORK IN CAMBRIDGE.

**U**NDER this title we have a valuable and interesting illustrative work\* on the very fine examples of wood and iron work to be found scattered about among the college buildings of Cambridge. The principal interest of the book is in the woodwork examples, which are more numerous and fine in their way than the ironwork, and which have been very well drawn, for the most part by Mr. Redfern, who has been, however, prevented, partly by illness and partly by official duties, from entirely completing the work (so we understand from the preface), and some of the concluding plates have been furnished by Mr. H. Chapman, of the Fitzwilliam Museum. The authorship of the letterpress portion, by Mr. J. Willis Clark, the author of the splendid "Architectural History of the University of Cambridge," which we reviewed last year, is a guarantee for the value and reliability of this portion of the work.

In a short preface Mr. Clark observes that the history of English woodwork has not received the attention it deserves, partly from the difficulty of dating the examples, "partly from unaccountable neglect on the part of archeologists." This last charge does not, we think, apply to architects and architectural students, who have drawn English woodwork as diligently as any other branch of our national architectural art, of which it may be considered to form a section; but they have naturally been more taken up with the artistic interest of the work than with questions of

history and archaeology. Cambridge offers the advantage of possessing a certain number of dated examples, a fact which gives them a historical interest in addition to their artistic value. We do not find, however, that so many of the works illustrated are actually dated as we should have been led to expect from the terms of the preface, nor does there appear to have been any attempt, in making-up the book, to arrange them in any definite or approximate chronological order. It would have been better if this had been done, as far as possible.

The greater part of the work illustrated is of the seventeenth century. There are two or three examples of Gothic work, of which the most important and the best is the desk-end and finial from King's College Chapel (plate 16). An ancient wooden door-frame from Jesus College, with a segmental head within a square-headed moulding (plate 14), is believed to have been part of the work carried out by Thomas Alcock, bishop of Ely, who transformed the nunnery of Rhadegund into Jesus College between 1497 and 1500. "It is framed," says Mr. Clark, "out of a few pieces of timber, moulded and chamfered; not, like modern doors, composed of several small members attached to each other by nails." This latter sarcasm refers, we presume, to the planted-on mouldings of the modern joiner; but all modern doors (*pace* Mr. Clark) are not made in that way. The other Gothic example is the door leading into the Hall Screens at Queen's College, assigned to about 1450, a date confirmed by the general style of the work, which, however, is not of the best type of that date, and is, in fact, a rather poor example, clumsy in execution and tame in character.

The richly-carved cabinet in the Master's Lodge at Trinity College (plate 13) may be regarded as a kind of link between the Gothic

\* Ancient Wood and Iron Work in Cambridge. By W. B. Redfern. Member of the Cambridge Antiquarian Society. The Letterpress by John Willis Clark, M.A. Cambridge: W. P. Spalding. London: W. Kent & Co.

and the Renaissance stamp of work of this kind. In this respect it is a highly curious and interesting example. Its general aspect is much more Medieval than Renaissance, in the manner in which every portion is crowded with ornament, and in the severe and straight lines within which this ornament is mostly confined. The front presents five main horizontal bands of ornament, divided by smaller subsidiary bands, formed by inlays in light yellow and brown woods on the front of the rails between the drawers. The upper drawer is faced with a pattern of common occurrence in early Renaissance or very late Gothic woodwork, consisting of radiating quasi-shell forms confined within semicircular bands. Then comes a rail, with inlaid leaf ornament of nearly Classic character; then the second drawer front, with a flowing naturalistic design of grapes and vine-leaves, distinctly Late Gothic in character, but growing from the mouth of a grotesque mask in a manner more common to Renaissance work. The rail under this is inlaid with a rather weak modification of the bead-and-reel ornament, the members separated by large spaces, and connected by a straight line running along the centre of the rail. The next drawer is a semi-Elizabethan strap pattern, but with leaves of a more Gothic form sprouting from it; and the front of the fourth and lowest drawer is of Late Gothic type, formed of a cresting of a common "Perpendicular" type, with an inverted cresting filling in the interspaces of the lower ornament. Below this, the band of ornament affixed as a finish is completely Renaissance in character, though rather rudely executed; the details are a central vase, with flowers springing from it, and sea-horses in relief on either side; the bottom line of the woodwork, which is clear of the floor, making a broken line, following the sinuosities of the design, in a manner quite out of keeping with the severe lines of the upper portion of the cabinet. The end uprights have an Ionic capital, with cherubs' heads and foliage of a Renaissance type. Altogether, it would be difficult to find in a single example a more curious and interesting illustration of Transition in ornamental style. The date is assigned, for reasons given, to 1612-13.

One of the best examples given is the Library Door of St. John's College, a portion of the woodwork finished in 1628, of a grand and massive Jacobean type. The door itself is framed with nine equally-spaced deeply-moulded panels, with ornamental devices in the centre; it is flanked by massive pilasters, with faces carved in strap ornament within panels. A carved oak settle, the property of Mr. Redfern (plate 7), very richly and beautifully decorated with detail of a more refined type than is always found in Jacobean work, is another example worthy of note. In regard to this and one or two other specimens of furniture which have the well-known form of very massive leg characteristic of the period (with a central bulb, as it may be called, a great deal thicker than the upper or lower portion of the leg) no information is given as to whether these legs are turned out of the solid, or whether the thicker portions are planted on. It is melancholy to think, but this bit of humbug is known to have been practised in some examples of the period, at all events.

One of the most interesting illustrations is the Bookcase-end from Pembroke College (plate 15), with a segmental pediment at the top, and a carved scroll projecting from each side at the foot. Mr. Clark's note on this latter feature is worth quoting:—

"To understand the meaning of the scrolls (or wings, as they are sometimes called) at the base of the bookcase-end, we must consider the ancient mode of arranging libraries. Throughout the Middle Ages, and in some of the seventeenth century, or even later, books were secured by chains. The reader sat on a fixed seat in front of the bookcase, and the chains were made long enough for him to hold his book on his knees, or to place it on a desk attached to the lower part of the bookcase. Subsequently, as the number of books increased, the seat for the reader was replaced by a case to contain books, and his seat was transferred to the bottom of the bookcase, where he sat with his back to the books, and with the volume which he wished to

consult on his knees. The end of the seat was concealed by ornamental scroll work, such as we see in the example before us. As time went on chaining was given up, and the reader's seat was no longer required. The scroll, however, had become a customary termination to a bookcase end, and survived throughout the seventeenth century. In many cases the ornamentation is exceedingly rich and beautiful."

But by far the finest piece of work illustrated is the example of carving from the details of the organ-screen in King's College Chapel (plate 18), of which we are enabled to give a reduced reproduction. The combination of breadth and holdness of style with delicacy and grace in detail in this work is truly remarkable, and we quite concur in Mr. Clark's opinion that it was probably executed by Italian artists. The style and *tournaire* of the head of the figure, especially, is essentially Italian. The letters H A on the shield stand for "Henry" and "Anne." Mr. Clark speaks of the whole work as "the most beautiful piece of wood-carving out of Italy," and he is probably not wrong in this estimate. "Some special good fortune," he adds, "seems to have protected it, for it has been spared alike by the fanatic and the restorer, and is standing at the present day in the same perfect condition as when it was executed three centuries ago."

Of the ironwork illustrated in the book, the best examples are from the gate at the west end of the avenue of Trinity College, and from the gates under the library of the same college. The details of the former, on Plate 23, are in a very fine and free wrought-iron style, but the main value of the book consists in the illustrations of woodwork, and in this respect it is a real acquisition, for which the best thanks are due to its producers.

#### NOTES.

WE are glad to see that Professor Huxley, whose opinion certainly ought to have great weight in such a matter, has been speaking out plainly, in more than one letter to the *Times*, against the ill-judged proposal to locate the Imperial and Colonial Institute at South Kensington, about which we have already expressed our opinion in equally decided terms. The only excuse really put forth for the proposed locality is the possibility or probability of obtaining a cheap site; and it is stated that the cost of any adequate site in the neighbourhood of Westminster would be practically prohibitory of the enterprise. We can only say that if the matter of the new building is not taken up as a national concern, on such a scale and in such a situation as will make it a worthy outward and visible sign and form of the intellectual, political, and commercial relations between England and her colonies, it had better be let alone altogether. It is a kind of thing that must be done well or not done at all. Professor Huxley seems disposed to advocate the view that the Institute should be situated in the City; we consider the neighbourhood of the seat of the Imperial Government the proper place for it: each view may have something to recommend it, according as we emphasise the commercial or the political significance of the proposed institution. Professor Huxley evidently regards it as, to use his own expression, "an intelligence department for the army of industry." Without undervaluing that side of the matter, we would regard it also as a centre for drawing closer the political relations between England and the Colonies, and in that light Westminster is certainly the proper neighbourhood for it, and the most dignified one in every sense. A South Kensington site is at variance with both conceptions of the functions of the Imperial Institute.

IN reply to Sir J. Goldsmid's question last week in the House of Commons as to whether the First Commissioner of Works intended to proceed with the new Admiralty and War Office buildings, Mr. Plunkett replied that a Special Committee had been appointed last April to reconsider the question, which Committee lapsed with the dissolution of

Parliament; but that a similar Committee would be appointed in a few days to consider the matter afresh. We are glad to hear it. We have always said that every justice should be done to the architects who had, by the mistakes of a former Committee (apparently mainly managed by an incompetent amateur "person of taste" who did not know the difference between drawing and architecture), been put into a position which their design certainly did not merit; but it is a very serious thing that a national building of such importance should be erected which will add nothing whatever to our metropolitan architecture but a bulk of architectural commonplace. It is to be hoped, however, that when the Committee is appointed, some care may be taken to select members who really know something of art and architecture, instead of such a party of mere nonentities (in this respect) as a late First Commissioner of Works got round him in order to carry out his silly scheme for making a sham-antique of Westminster Hall.

THE Government have had plenty of opportunity of judging how far their Railway Bill is likely to meet the grievances it is designed to remove, as deputations representing many different trades and industries have waited upon Baron de Worms and Lord Stanley of Preston to express their views and opinions. Like the representatives of the Railway Companies, however, they have failed to elicit any definite forecast of the proposed measure, but it will probably be brought forward early next week. Lord Stanley promised to hold the scale as fairly as possible between the conflicting interests, though the directors of the Companies,—judging from the remarks at the half-yearly meetings last week,—are very apprehensive of unfavourable results to themselves. They have apparently availed themselves of the opportunity which the delay in settling the controversy has afforded them of making various concessions in favour of the public, as Mr. Moon stated at the London and North-Western meeting that a large proportion of the falling-off in receipts (compared with the tonnage carried) was due to reductions in rates. He strongly advises all railway shareholders to study the book recently published by Mr. Grierson, to which we have had occasion to refer, and which, though open to criticism, is well worth perusal as a powerful contribution to the controversy from a managerial point of view, and as indicating some of the difficulties the railway companies have to contend with. It justifies the remark made by Mr. Thompson to a dissatisfied Midland shareholder at their meeting on Friday last: that it would be penny wise and pound foolish to run the risk of losing such men as the general managers and other leading officials by cutting down salaries. The fact is, the Midland chairman knew by experience that attractive and successful baits are held out from the Colonies and elsewhere to able and experienced railway officials, and that they can ill afford to play into the hands of such competitors at the present juncture.

THE debate on the Ambleside Railway Bill last week, which resulted in the second reading being passed by a majority of twelve (189 to 177), followed the usual lines to which we have been accustomed on such occasions; on the one side the opposition of those who would keep a quiet and picturesque district from intrusion, on the other side those who maintain that the people who want a railway know best why they want it, and that the working of the line as a paying concern depends upon the fact that a certain portion of the population, in the district and elsewhere, actually require it, since people are not in the habit of paying for railway tickets from purely philanthropic motives towards the promoters. We had the usual allegation made, that this is a line only promoted "in the interests of contractors," as if contractors could get a company formed to pay their charges without any prospect of the railway forming a substantial source of revenue. The chief opponent of the Bill, Mr. Bryce, is, of course, far too reasonable and enlightened a man to

give utterance to the foolish anathemas against all railways and railway works which we generally hear from the people who oppose a railway Bill on sentimental grounds; and he admitted that considerations of scenery must give way where great public benefit was concerned; he only denied that this was the case here, and Mr. Graham opposed the Bill "on the true democratic principle of preferring the happiness of the greater number of inhabitants," implying, of course, that the public beyond the immediate district had an interest in the preservation of the neighbourhood from railways. In that case let them show it by petitioning largely against the scheme, which it does not appear that they have done. On the other hand, both Mr. Lowther and Mr. Cavendish Bentinck, who knew the district well, gave strong evidence as to the wishes of the residents in favour of the railway. If this is the case, it is to no purpose to say that people in another part of the country do not wish for it. The inhabitants of the district are not to be deceived what they want, in order to please people who have no claims upon them. If the district is to be preserved intact for the benefit of the country, the Government should purchase it, as Mr. Labouchere proposed in the only practical sentence in a speech which was otherwise little more than amusing rant. We should regret seeing the railway made as much as any one would, as far as our own tastes and pleasures are concerned; but if it is understood that the residents wish for it, we do not see what argument is to stop the way fairly. We may observe, however, that in other similar cases, railways, when once made (in process of making they are always a nuisance), have not been found to deteriorate the landscape to anything like the extent predicted.

THE want of success of the Hull and Barnsley Railway, the fact that the Newbury and Didcot Railway Company are unable to pay the interest on their debenture stock in full, and the acknowledged failure, from the interest-bearing point of view, of the addition to the Underground line, are likely to make railway directors more careful than ever not to begin new extensions. In every country the time must come when branches and new lines cease to be profitable in themselves or to bring profit to trunk lines. Such a time has, it would seem, arrived in this country, and though here and there from time to time changing circumstances may allow a new line or a new branch to be made without loss, it seems pretty evident that the railways of England have nearly attained their permanent size.

WE understand that the following architects are to be invited to send in designs for the Imperial Institute building.—Dr. Rowand Anderson, Mr. Blomfield, Mr. Colcutt, Mr. Deane, Mr. T. G. Jackson, and Messrs. Aston Webb & Ingress Bell. No complaint can be made of the selection; from among these competitors we are pretty certain to have a fine building, and we only hope the authorities will secure the right site on which to place it.

WE referred recently (p. 209 and p. 214) to the decision of the Superintending Architect with reference to a proposed building on the west side of Brixton rise, at the corner of Trent-road, and to the reply of the Chairman of the Metropolitan Board of Works to a question put by Mr. Broadhurst in the House of Commons as to the position of the Superintending Architect. Several letters and a memorial were recently presented to the Board on this subject, asking, for reasons stated, whether means could be found for reviewing the decision, on the ground that the wrong portion of the road had been inadvertently brought specially under notice. These letters and memorial were referred by the Board to the Works and General Purposes Committee for consideration and report, and the Board, on the recommendation of the Committee, informed the parties that the Board had no power to take any action in the matter. It appears from the report of the Committee that the Vestry of Lambeth, having

received notice from a builder of his intention to erect three houses at the corner of Trent-road, requested the then Superintending Architect to decide the general line of buildings in that part of Brixton Hill with reference to the site upon which it was proposed to build. Mr. Hebb gave a decision to the effect that the general line of buildings on Brixton Hill, between Cornwall-road and Horsford-road, was a line 16 ft. back from the public footway. Mr. Hebb considered that the question was one of fact, and that he had no power to review his decision, and the Solicitor to the Board reports that there is high authority for the opinion that the certificate of the Superintending Architect, if valid, cannot be altered or withdrawn. The memorialists appear to have been under the impression that the Superintending Architect acts under the authority of the Board as regards the determination of general lines of buildings, but this impression is an erroneous one, and the Solicitor to the Board is clearly of opinion that the Superintending Architect, as a statutory officer, should not receive any directions from the Board as to the exercise of his discretion. The Metropolitan Board, on the 11th instant, on the motion of Mr. E. Rider Cook, passed a resolution referring it to the Works and General Purposes Committee to consider and report as to the advisability of applying to Parliament to give a right of appeal from the decision of the Superintending Architect with regard to questions of general lines of buildings.

IT is a coincidence worthy of passing note that the first two sessional papers which were read at the Institute this session, and which form the bulk of the reading in the first part of the new volume of "Transactions," just issued, are both by foreign members, and both upon the subject of colour. The importance of the subject has been too much overlooked both at Conduit-street and elsewhere in this country, but it is now steadily, if slowly, forcing itself to the front, and by the aid of such papers and the by no means unimportant assistance of the Owen Jones Studentship, and the removal of the prohibition of the use of colour in drawings submitted in competitions, it will, we may hope, very soon be better understood and more frequently called in to aid the architect. Signor Boni's paper is especially noticeable as giving an authentic and somewhat detailed account of a famous building of which little or nothing was really known to the present age before Signor Boni's researches.

WE have received a collection of twenty-nine plates, constituting the second volume of "The Glasgow Architectural Association Sketch-Book." The collection comprises a great number of pretty sketches and notes,—some of them executed with much taste and skill,—and a certain number of useful studies of detail. The sheets of scraps from France and Switzerland by Mr. A. N. Paterson and Mr. J. A. Campbell are particularly good; the same may, indeed, be said of Mr. J. Keppie's Italian doorways and of Mr. A. N. Prentice's sketches at Lincoln, Mr. J. Thomson's St. George's Windsor and Dryburgh Abbey, and Mr. William Ferguson's gables and dormers at Shrewsbury. Mr. A. R. Scott's west front of Dunblane Cathedral is quite the best of the measured work. The reproductions of water colours are rather black and heavy, but in other respects the "get up" of the plates is exceptionally successful.

THE extensive demolitions for the widening of Upper-street, Islington, are nearly completed. They include, along the eastern side, all the buildings,—excepting Dowbiggin's parish church of St. Mary, opened in 1754, and the quite modern dispensary,—from the Unity Church southwards to the Green, *olim* old Paradise-row, being Nos. 276 to 331, and comprising the Fox tavern and the Congregational chapel; and, along the western side, Nos. 156 to 168, between the approach to Waterloo-terrace and Barnsbury-street. On this latter ground a site of about 10,000 ft. superficial is reserved for the construction thereon of artisans' dwellings. Very nearly

all of these houses are planned in the large-scale map of 1805-6 belonging to the parochial authorities. The index to that admirable piece of work has, we are informed, been mislaid; but we gather from other sources that the rows of houses along the church side of the street were, at one time, severally known as Upper-terrace, Rufford's-buildings, and Church-row. On the opposite side of the way yet remain one or two tenements of much earlier date than the current century. Albeit in a local survey of the year 1735 the now Upper-street is set out, for the most part, in the guise of a village highway.

AFTER having been for some time in the market for sale at auction, the Jervaux Abbey demesne has just been purchased for, we understand, 310,000*l.* (exclusively of the value of the timber) by Mr. S. Cunliffe Lister, of Bradford, manufacturer. This important and beautiful old property, situated in the vale of Wensleydale, formed portion of the Yorkshire estates held by the Marquess of Ailesbury's trustees in the North Riding. Watered by the river Ure, it comprises some 10,002 acres, yielding a gross rental estimated at say 11,600*l.* a year. About five years ago Mr. Lister also bought of Admiral O. Harcourt's widow, for 400,000*l.*, the adjoining Swinton Park property of nearly 23,000 acres in extent. Whilst all trustworthy authorities do not agree in reckoning the abbots of this famous Cistercian monastery amongst the few "mitred" abbots north of the Trent, there seems to be small question that they did on occasion assume that proud distinction. This is apparent from the mitres which are carved on the incised slab in the chapter-house of Peter de Snape, seventeenth abbot, who died in 1436, and on the slab, in Middleham Church hard by, of Robert Thornton, died 1533, twenty-second abbot. Moreover, we learn from Stowe's chronicle that the lord abbot of Jervaux, taking precedence of his Cistercian fellows from Bellalund and Fountains, ranked as thirty-sixth on the roll of the sixty-one abbots who, with many other dignitaries, attended to King Edward I.'s summons for a great Parliament at Carlisle in 1307. Of ruins are extant the church, cloister, choir, transept, chapter-house, and refectory. This property, lying in a district that has for several generations been famed for its horse-breeding, passed to the Bruce family by the marriage in 1676 of Elizabeth, daughter of Lord Beauchamp, with Thomas, Earl of Elgin and Ailesbury. We follow the now customary spelling of the name, but may observe that in the earlier charters and down to Abbot Thornton's time it appears as Jorevall, Jorevalle, and Jorevalis. We subsequently meet with more than twenty-five other forms, including Gerovall, Gervise, and Yorevank, until we come to the quite modern and prosaic Jarvis. The worldly "Prior Aymer of Jorvaulx Abbey" will be remembered by all readers of "Ivanhoe." The East Tanfield, the Tanfield Lodge, the Wath, and the Swainby and Whorlton Castle properties form the complement of the whole estates. The sale was made by private arrangement with Messrs. Chinnock, Galsworthy, & Chinnock.

THE numerous suggestions put forward for "holstering up the Crystal Palace, both at the special meeting of Saturday last and in the letters of individual correspondents, each offering his panacea, form, it must be admitted, sufficiently amusing reading, and suggest the idea that most of the persons interested in the concern are more or less out of their minds. Mr. Morgin Howard, M.P., the mover of the first resolution at the meeting referred to, concluded his speech by asking "Why should not the Crystal Palace be the home of the proposed Imperial Institute?"—a query followed by "loud and renewed cheers." If the management of the Palace has been influenced by any persons who are idiots enough to make and to applaud such a proposition, it is not difficult to understand how it has come to grief. The whole meeting seems to have been a demonstration in favour of the eleemosynary support



of the Palace for the benefit of shareholders and season-ticket-holders against all ordinary considerations of logic, fairness, and common-sense. The letter of Mr. G. P. Witt, which followed the report of the meeting in Monday's *Times*, made some practical criticisms as to the management (or want of management) of the Palace; the *laissez-faire* way in which it has for some time been allowed to go on; the neglect to seize such an opportunity, for instance, as the sale of "Old London," which was allowed to go for an old song as builder's materials,—and so on. It seems to have been supposed for some time past that the Palace could go on merely from its acquired reputation, with little attempt at putting new life into it. "A Bystander" suggests that the directors should try private enterprise, and invite tenders for leasing the building for a term of years. But those who make these suggestions forget the nature of the structure they are dealing with. What contractor in his senses would take, at any remunerative rent, a great greenhouse like that, with all the inevitable and increasing expenditure for repairs, with the expectation of obtaining an adequate percentage on the enterprise? That is what is at the bottom of the difficulty. The building is a glass and iron structure of an essentially temporary character, and it has now arrived at a period in its history when extensive repairs and even a great deal of reconstruction must be necessary,—a side of the matter which none of the writers to the *Times* seem to be in the least aware of. The moral of the whole business is,—if you want a permanent institution, erect a permanent building for it.

#### EDINBURGH MUNICIPAL BUILDINGS COMPETITION.

In response to the advertisement issued by the Magistrates and Council of the City of Edinburgh in August last for competitive designs for the proposed New Municipal Buildings, fifty-six sets of designs have been sent in, each illustrated by an average of fourteen sheets of drawings. These comprise plans, elevations, and sections to a scale of 10 ft. to an inch; block plan to a smaller scale, and one or more sheets of half-inch-scale details of parts. The greater number of the designs submitted come from across the Border, most of the more eminent Scotch architects having refrained from competing, believing that some of the conditions of competition were unsatisfactory, and, further, that there was some uncertainty as to whether the buildings would be carried out or not. Several of the younger Scotch architects show designs of conspicuous merit, and one of them has secured the second premium, the other two premiums falling to London practitioners.

The site, which is an enlargement of that at present occupied by the Municipal Buildings, may be described as a square with a notch out of one angle, or as a short L, having its base to High-street, opposite the eastern end of St. Giles's Cathedral, Parliament-square, and the Crown Offices, with its head stretching northwards to Cockburn-street. The northern end, though nominally the back of the building, is really its most important frontage, as it stands at an elevation of 65 ft. above Princes-street, from which an uninterrupted view of it will be obtained across the intervening valley and gardens. The site may be said to occupy the eastern end of the crest of the Castle Hill, the western extremity of which is occupied by the Castle itself, while the *coup d'œil* between the two embraces, such important public buildings as the Bank of Scotland, the Free Church Assembly Hall, the Established Church Assembly Hall spire, and the crown-topped tower of St. Giles's, to say nothing of the historical and picturesque old buildings which crowd the Castle Hill. Another feature which adds to the architectural possibilities of the northern frontage is the fact that the level of Cockburn-street is considerably below that of High-street. Most competitors have recognised the paramount importance of the mass and grouping of their designs towards Princes-street, and, while giving due consideration to the treatment of the High-street façade, have directed their chief efforts to the realisation of an effective composition as viewed along the

line of Princes-street. The eastern and western limits of the site are bounded by open closes or lanes of a minimum width of 20 ft., but the adjacent buildings on the northern half of the site are so low as to leave the greater part of the new building visible above their roofs. Regarding the height and openness of the site, which is eminently one to be seen from numerous stand-points, and in the view of which the surrounding buildings cannot be excluded, it is a matter of special regret that perspective drawings were prohibited in the competition.

Mr. Alfred Waterhouse, R.A., was appointed architectural assessor to advise the Corporation in the award of the premiums, and after a careful examination of the whole of the designs submitted, which are advantageously hung in the Waverley Market, he has made the award which we announced last week, and the full text of which we now give on another page.

The premiated designs become the absolute property of the Magistrates and Town Council, who are at liberty to employ any one they think fit to carry out the work.

"Edina Classica."—This is the design to which the first premium has been awarded. The plan shows a long quadrangle or courtyard, 108 ft. by 70 ft., with the buildings ranged round the east, west, and north sides, the south side being open except for a colonnaded screen, arranged for foot and carriage traffic towards High-street. In the centre of the north end of the courtyard is the principal entrance and staircase, while immediately within the colonnade in the south-east and south-west angles of the courtyard are placed two minor entrances, with staircases for the ordinary business public. Continuous corridors connect these three staircases on the several floors. They are lighted from the side closes or lanes, the apartments entering from them being lighted from the courtyard. Availing themselves of the inequalities of ground-level, the authors (Messrs. Leeming & Leeming) have provided what they call two ground-floors, one a flight above and the other a flight below the level of the courtyard. On the latter level are placed the Burgh Assessor and Burgh Engineer, the Collector of Police, several of the Registrars, and the City Roads department, and on the latter level the Town Clerk and City Chamberlain. To right and left of the principal entrance are located the Burgh Court-house and the rest of the Registrars. On the first floor, occupying the north block, immediately over the Town Clerk and City Chamberlain's department, and overlooking Princes-street and the Firth of Forth, are the Council Chamber and committee-rooms, Lord Provost's room, &c., while on the same level, in the east and west wings, are placed the Water Trust Offices, the Dean of Guild Court-room, and the Superintendent of Works office. The Clydesdale Bank premises are entirely detached from the Municipal Buildings, which is a very good feature. Over the bank premises are the Heriot Trust offices, connected by a bridge on the first-floor level with the main building. The architecture is a severe type of Palladian Classic, the various parts towards High-street being well composed. The extremities of this façade are accentuated by small domes, and a large dome is placed over the grand staircase, centering with the courtyard and the north elevation. This elevation is much lacking in interest. The architectural base of the building is four stories high, and all of equal height, while the rustication and fenestration are the same in each. Over this is a columnar treatment extending through two stories, with an entablature and balustrade over, which gives a perfectly straight sky-line,—there being no roof or chimneys shown,—broken only by the great dome. The great severity of style and simplicity of treatment towards Cockburn-street is insisted upon by the authors as most suitable for the situation by contrast with its surroundings. This is not the view we should take of the situation, the whole grouping of the Castle Hill appealing for something in harmony, not in contrast, with its picturesque formation. While it is true that the breaks in the line of frontage would give a less rigid sky-line in perspective than is seen in the geometric drawing, yet an elevation of 170 ft. in length and 120 ft. in height seems to call for more than one feature in its composition. The drawings are a marvellous example of painstaking and careful draughtsmanship, and are beyond all praise in their style; it is not a type of draughtsmanship that every one would care to emulate; and the constantly-increasing

importance given to draughtsmanship in competitions is a matter to be regretted. Draughtsmanship is not architecture, and the most beautiful execution of drawings will not atone for want of force and originality in the actual building. The estimated cost of the building is 98,000*l.*, but it may be said of this as of the majority of the other estimates, that it is rather under than over the mark.

"Nineteenth Century."—This design is by Mr. Malcolm Stark, of Glasgow, and was awarded the second premium. It has a central quadrangle with buildings on all four sides, those on the east, west, and south sides being restricted in height to 45 ft., measuring to the top of the balustrade. The plan, which is perhaps the most easily read in the room, is strikingly symmetrical and well balanced. The principal staircases and the two minor staircases, with their connecting corridors, are placed similarly to those of "Edina Classica." The Council-rooms, which are arranged with much staleness and convenience, are, as in "Edina Classica," placed on the first floor in the north block, but in this case the Town Clerk and City Chamberlain are on the same level, occupying the east and west blocks, the officials' rooms being placed so as to give them command of their departments, and easy access to the Council and Committee rooms. The Collectors' offices, in connexion with the Police and Water Trust, are most conveniently placed for the ratepayers, while the Burgh Court and Dean of Guild Court, in the eastern extremity of the High-street front, are well isolated from departments with which they have no connexion, and are themselves convenient of access. The architectural treatment shows a free rendering of Classic, recalling some portions of the Louvre. A high campanile is placed at the east end of the High-street façade, while towards Princes-street the composition is well grouped by a central colonnade with pediment over, supported by two towers finished after the manner of the two western towers of St. Paul's, and supported by side roofs running at right angles to that over the central pediment. The sheet of details is beautifully drawn, and exhibits a familiarity with the ornamental detail of the free type of Classic chosen. The estimated cost is 120,000*l.*, with the great tower, and 112,740*l.* without. An alternative elevation is shown omitting the tower, by which the design loses nothing and would be less likely to detract from the tower of St. Giles's.

"In my Defence."—This design, which was submitted by Mr. J. W. Simpson and Mr. E. J. Milner Allen, has taken the third premium. The plan is arranged with buildings round the four sides of a central quadrangle, but the quad is divided across its centre by a lavatory block, which reduces it to two courts, each about 45 ft. by 35 ft., which become simply wells for light. The northern one measures 105 ft. from the ground to the top of the balustrade. While the two other premiated designs light their corridors from the surrounding closes, and their apartments from the central quadrangle, this design reverses that arrangement, and lights the corridors from the courts and the apartments from the closes. To secure good light at the side, the east and west wings have been set back from the boundary-line, so as to secure a sufficient open space between them and the adjacent buildings. By placing the corridors to the inside of the block their length is greatly reduced, but the dignity and beauty of the open quadrangle is lost, and in this case has not been compensated for by any special dignity in the entrance-halls and staircase. This design also differs from the others premiated in that it places the Town Clerk and City Chamberlain on the ground floor and the Council Chambers on the first floor, towards High-street, and the minor officials and offices in the north block. By this means a south light is obtained to the important apartments, but a due regard to the site and outlook would dictate the north wing as the proper place for the Council Chambers. In the matter of architectural style "French Renaissance" has been adopted by the authors because, while susceptible of great dignity and breadth of treatment, it is also more readily adapted to modern requirements in regard to the proportion of window to wall space than the Italian, while it possesses a common resemblance in many of its forms to the Scottish Baronial Architecture." The authors have not made the most of the style chosen, the treat-

ment of the various façades being thin and over-restrained, while the detail shows more of modern French feeling than a close acquaintance with the Renaissance of François I. They have also placed themselves under voluntary restriction by omitting any tower or dome which might compete with St. Giles's. This is a point which it would be well to observe in the execution of the building, and the authors would probably not have suffered by the omission of perspectives showing the grouping of the building with its surroundings had been permitted.

"Fortuna."—The plans sent in under this motto are hung next to those of "Edina Classica," to which they bear a striking resemblance in general disposition. Starting upon the same basis, that is, with the axis of the building struck from the centre of the Market Cross, the buildings surround three sides and part of the fourth side of a quadrangle, the centre portion of the south side being open, with a colonnaded screen. The principal and minor entrances and staircases, the Town Clerk's and City Chamberlain's offices, and the suite of rooms for the use of the Town Council, are placed identically as in "Edina Classica." The corridor in the east wing has a break in the centre of its length, which gives the plan a somewhat involved appearance. The type of architecture chosen is the Scottish phase of the Classic Renaissance, of which the author quotes the quadrangle of the present Municipal buildings as a good example. He has certainly treated it in an able and skilful way, and shows a set of elevations in every way superior to those of "Edina Classica," and much better suited to the situation. The fenestration and mural treatment of the walls all round are well proportioned and full of interest, while the details show this type of Classic to be at once dignified, refined, and plastic. There is a dome over the centre of the Cockburn-street front, and a tower at the east end of the High-street front. The estimated cost is 125,000.

"Ora et Labora."—This plan also has the buildings grouped round three sides of a quadrangle, 95 ft. by 80 ft., open on the south side. The position of the Council Chambers on the first floor of the north wing, and the arrangement and lighting of the grand staircase, are very similar to those of "Nineteenth Century," but the rooms of the various officials are not so well disposed. The authors have selected Italian Renaissance as being "a style combining the simplicity of outline required by the site, the dignity of appearance befitting the abode of a great civic body, and the freedom of treatment rendered necessary by the more complex requirements of the age," and it is not too much to say that they have attained all the objects which prompted them in their selection. For scholarly handling, dignified treatment, and refinement of detail, especially as exhibited in the Cockburn-street elevation, this design is probably without a rival in the room. A broad massive base, pierced with windows just sufficiently enriched and varied to avoid monotony, supports a rusticated story with square-headed windows. The upper floor which rests upon this has a range of Corinthian columns standing clear from the wall behind and carrying a full entablature. These columns are spaced into three groups in the length of the façade, and between each group is a deeply recessed balcony from the Lord Provost's and the Town Councillors' rooms respectively. To the left the receding masses terminate in a great campanile modelled closely upon that of St. Mark's, Venice, the whole combining in producing an effect which it would be an acquisition to Edinburgh to obtain. The cost is put down at 250,000, but is probably much overestimated.

"Light and Air."—This plan, which is so highly spoken of in Mr. Waterhouse's report, stands quite alone in its arrangement. It is cruciform in shape, with the head of the cross next High-street, and the four extending northwards towards Cockburn-street, while from the extremity of the cross arms corridors lead to east and west wings at the respective extremities of the site. Like "Edina Classica," the authors have availed themselves of the inequalities of ground level to form two so-called ground floors. On the lower of the two are placed the Collector of Police and some minor officials, and on the upper the City Chamberlain in the left arm or transept, the Town Clerk in the right, and the Water Trust office in the centre or main body of the cross. The first

floor is principally occupied with the suite of apartments for the Town Council, the Council Chamber being placed at the northern extremity of the cross. Whatever its merits may be as an ideal plan,—and Mr. Waterhouse has given his opinion in no uncertain language,—it is not at all adapted to the site in question; while the elevations can only be described as bad specimens of modern German-Greek, which would produce a jarring discord if set upon the Castle Hill.

"Fiat."—This design, while adopting the three-sided courtyard centring with the Makret Cross, differs from those previously described, in that it aims at the isolation rather than the connexion of the various departments into which the municipal business is divided. To secure this there are, in addition to the principal entrance in the centre of the north side of the quadrangle, four minor entrances giving direct access to the offices of the various officials, internal communication between the departments being also provided. This arrangement is possibly one which would work well enough in practice, but is not one which produces an effective or telling plan upon paper. The Council Rooms are placed where they ought to be,—in the north block on the first-floor level. The architectural treatment is Classic, of a healthy masculine type, with a dome over the centre of the north wing, and a tower in the centre of the eastern wing of the High-street façade. The elevations are holdly and well drawn, and show a familiarity with Italian Renaissance. The estimated cost is 125,000.

"N. D. L. V."—The authors of this design seem to have had the same object in view as that of the authors of the design last described, viz., the isolation of the various working departments, which they have sought to accomplish in a similar manner, though in the first floor in this design there is a wide and well-lighted corridor running round the four sides of the quadrangle. The state entrance to the Council Room is directly from the High-street, and the principal staircase is placed in the centre of the east side of the quadrangle. The elevations are Classic, of the same healthy character as that of "Fiat," with bold late sixteenth-century detail. They are most effectively drawn, and show an individuality rising far above the conventional setting-out of Classic façades, though exception might be taken to the main tower rising from the top of a pedimented portico.

We will return to the subject next week, when we hope to illustrate the three premiated designs. In the meantime we give on p. 330 the official report of Mr. Waterhouse as the professional referee in the competition.

#### CLISSOLD PARK, STOKE NEWINGTON.

STATUTORY notice is given of a project to purchase the freehold of certain lands and buildings at present held by the Ecclesiastical Commissioners in St. Mary, Stoke Newington, parish, for purposes of public recreation and benefit. The land consists of some fifty-three acres, now known as Clissold, or Stoke Newington, Park, which it is proposed to vest, as regards their maintenance and regulation, in the Metropolitan Board of Works. The residence and its site therein are to be committed to the Vestry for use or adaptation to "the purposes of a vestry-hall, public museum, free library, public baths, or washhouses, or any other parochial purposes." The intended Act provides for contribution towards the necessary funds by the Metropolitan Board of Works, the Corporation of London, the South Hornsey Local Board, together with various other local or district boards; as well as by the Charity Commissioners and the trustees of the City of London Parochial Charities when established as provided by the City of London Parochial Charities Act, 1883.

Lying within the Fishery Division of Ossington Hundred, the area in question is bounded by thoroughfares whose names bear witness to the once universally rural character of their surroundings. Thus, to the east and west respectively are Queen Elizabeth's-walk and the Green-lanes; Lordship-park and Manor-road pass northwards; its southern confines extend to Church-street and Paradise-row. Through its broad rich meadows meanders the New River, whose gently-flowing stream, fresh from the reservoirs and filter-beds near to Fishery Park, sweeps with bold curve, and amidst some of the most varied and luxuriant foliage that

northern London can show. Hard by, beyond Queen Elizabeth's-walk, behind the church, lies the *ci-devant* seat\* of Thomas Gunston, whose sister, Mary, became second wife to Alderman Sir Thomas Abney, the zealous Hanoverian member for the City. Watts had been received into his house at Theobalds by Sir Thomas in 1712. On his host's death (1722) he continued with Lady Abney and her daughters, and with them removed, in 1733, to the house her brother had built in Newington. Watts had, ere this, spent five years at Newington as tutor in Sir John Hartopp's family. With a constancy of friendship and uniformity of conduct not often to be found, writes Dr. Johnson, Sir Thomas Abney and his family treated Watts for thirty-six years with all the kindness that friendship could prompt and all the attention that respect could dictate. In the 115 acres of Finsbury Park we see what still remains of the Bishop of London's hunting-ground, Hornsey Wood, being another relic of the forest which, here traversed by the Emainic Way, extended over Middlesex. Before the Dissolution, Hornsey formed one of the great shire manors that appertained to the see of London. Brownswood, in Hornsey, and Newington manors are commemorated to this day by prebendal stalls at St. Paul's Cathedral. Stoke Newington figures in Domesday Survey as Newtome; as Stoc or Stoke Neweton in the fourteenth century; and here, in 1649, were yet left 77 acres of woodland in demesne.

We gather that this estate, lately the residence of the Rev. Augustus Clissold, belonged for many years past to the Crawshaw family. From a published letter of Mr. George Crawshaw it appears that twelve months ago the property consisted of two portions, one of 25½ acres, freehold, and the other a perpetual leasehold of 27½ acres, over which the Ecclesiastical Commissioners had such rights as to hunting, fishing, and hawkling, as were set up by the lease which was first granted by the sport-loving Dean and Chapter of St. Paul's. This lease was held at 100l. per annum and a fat turkey. That the park preserved much of its pristine character is doubtless due to conditions which prevented the granting of building leases or the felling of trees. Mr. Crawshaw used to admit visitors on Saturday and Sunday afternoons, in summertime, into the leasehold portion of his grounds. So sensible was he of their value to the public that, whilst ready to sell 20 acres of the freehold, he reserved the remaining 5½ acres on which the old house stands, because, he says, of the extreme beauty of the grounds, which, together with the well-timbered leasehold, and the shaded and encircling waters of the New River, make up a whole which he trusted would never be destroyed. "But," adds he, "my power to prevent this is limited by my life." Mr. Crawshaw, however, has since parted with all his interest in the whole of the property. The parishioners are most anxious to secure this, the one only space that is left to them, and it is to be hoped that, as at Kilburn and Highgate, the Commissioners will prove willing to meet them with a liberal spirit. It is understood, as matters now stand, that they are ready to accept a sum of 95,000l. for the property.

#### Manchester Architectural Association.

The ordinary fortnightly meeting of this Association was held on the 22nd inst., at the Diocesan Buildings, Mr. L. Booth, President, in the chair. Mr. W. H. Rawle read a paper on "The Architectural Assistant," which dwelt more upon the social prospects than upon the technical details pertaining to the duties of that member of the profession. His argument was that the complaint of want of employment was due more to the overcrowding continually going on of pupils, &c., rather than to the low state of the building trade. This ultimately affected every architect, of whatever standing. The author proposed as the most immediate attempt to lessen this evil that statistics should be collected as to the real number of pupils, and disseminated in pamphlet form throughout the architects' offices of the country. A discussion followed, in which Messrs. Hodgson, Mould, Ward, Stelfox, and the Chairman took part.

\* Now the Abney Park Cemetery, south of Stamford Hill. The house was pulled down in 1814.

† Vide the *Times*, January 14th, 1886. With this letter should be read a communication, in that paper of 7th inst., by Mr. H. R. Williams, Chairman of the Hornsey Local Board.

## MR. WALTER CRANE ON "THE ARCHITECTURE OF ART."\*

ART AND COMMERCIALISM.

THE architecture of art is a somewhat comprehensive title, and you might not unreasonably expect of me, before proceeding with the structure and treatment of the subject in perspective, to give some sort of scale sketch, ground plan, and elevation, so that the general drift of my argument may be understood.

I do not propose to deal exactly with the various forms and styles of architecture as they are and have been manifested in plastic or graphic art; or with the predilections of different designers and painters for certain forms over others as accessory to their compositions, interesting as such a comparative study might be. I am taking the term "architecture" in its widest sense, considering it not only as an art in its connexion with and effect upon other arts, but as the fundamental, comprehensive, and sustaining framework both of life and thought,—the historic and living background which influences and moulds all our ideas,—the set-scene upon which is enacted the ever shifting drama of art.

In comparing the art of the present day with the art of the past, especially of any well-defined epoch, whether Mediæval or Classical, we cannot fail to be struck with one great distinction underlying all superficial differences. Whereas art in past ages seems to have germinated and to have been continually evolved in new forms,—to be alive, and spontaneous, as it were, growing like a thing of nature, and expanding with man's ideas of nature, beauty, and life,—in our day this sense of spontaneity, this natural growth, is scarcely felt. Conscious and laborious effort takes the place of spontaneous invention, and originality is crushed by the weight of authority and precedent. The student is confounded and abashed by the mass of examples,—the dry bones in the strata of museums and hooks of what were once living and breathing organisms in the world of beauty. No form of architecture or art seems to spring naturally and unaffectedly out of the actual necessities and demands of daily life.

I have heard it said that the Great Exhibition of 1851 is to be held accountable to a great extent for the vulgarising and commercialising of art, and especially for the great break-up of old traditions of craftsmanship and design. But in so far as this took place it was only the effect of causes lying far deeper in the great economic changes affecting the conditions of the production of all works whatsoever, which had been going on during the three previous centuries. That exhibition, as succeeding ones have done, merely summed up the results of these changes, and showed their effects for good or evil, declaring, to all whom it might concern, that the apotheosis of commercialism meant the degradation of art.

"This will seem a hard saying to such as are accustomed to believe that the accumulation of riches and the welfare of art go hand in hand. It is the boast of modern commerce that, to use its own phrase, it has placed art "within the reach of all." But will this fair picture bear examination from more than one point of view? Does it not, like some others, look best at a distance? Is there not reason to believe that the promises of Commerce, even when kept to the ear, are broken to the hope?"

Take, for instance, one of the most obvious effects of its action in house-building. Trading on the national shibboleth, "An Englishman's house is his castle," and taking advantage of those centralising tendencies which have led to the enormous increase of cities, commercialism has produced those miles and miles of brick-edges which have ruined the architectural character and proportion of every large town in the kingdom. What then are these? These are your Englishmen's castles, on a small scale, it is true, and run together,—semi-detached or by the dozen. There are not hills enough for the castles required, and what hills there are belong to somebody else. What is easier than to build them side by side? They will help to support each other, and economise bricks, mortar, and ground; and why trouble to make a fresh design for each castle? The little lord's wants are much the same as the big one's, only on a smaller scale,

like his purse. He must, of course, have his outer line of defences,—his portcullis and draw-bridge,—well, at least, his iron railing and portico, that he may speak with his enemy, the tax-gatherer, in the gate. Then, as matter of course, dining-room, drawing-room, bed and bath rooms, gas and water laid on. Why should not he be happy and comfortable? It is all "so cheap, too!" Yet the speculative man, the man of profits,—the kindly builders who multiply these miniature strongholds for the average Briton, wherein he may defy all the world but his landlord,—we do not account exactly as public benefactors! Here are the bee-cells ready made for the occupants of the national hive,—dwellings for the average man. Never mind if they do not always fit him. We cannot be expected to take account of round or square bodies. If the majority are hexagonal the rest must put up with the inconvenience and a little squeezing. Great is Average! We will not speak of other cells and cellars, dear at any price, where our working-bees and bees-out-of-work have to pack with even less range of choice, and without even the pretence of art or comfort.

Jack is rarely able to build his own house nowadays, so Jerry builds it for him; but the well-known drama of rat and cat, the dog and the cow "with the crumpled horn" is still enacted, with, perhaps, some changes in the cast, and new scenery and dresses.

Meanwhile, how fares it with art in the house that Jerry built? Do the streets produced on these principles, and at such a terrible rate, lend themselves either to pictorial or decorative treatment? Do they suggest any ideas even, except, perhaps, of the dustman? How is it possible that they should?

Well, but the man of profits is ready again. The Briton can get his art cheap, too. "Wholesale or retail." He can have cheap dados and bits of coloured glass thrown in here and there. If these are not enough, he can fill his house with "Early" or late "English" furniture, "surmounted by something Japanese." Should his aspirations remain still unsatisfied, he can take the illustrated magazines to tell him about every art under the sun, and how it is done. In fact, if the literature of the subject could make artists and craftsmen, every street should be bristling with them.

Every Christmas scatters oil-paintings after our first masters, fresh from the printing-press, over the British empire. A shilling or so will secure a whole gallery. Was ever anything like it in any age of art? Truly no. Still, we are not happy. We are not happy about our art. We English, especially, we allow Frenchmen or Belgians to teach us painting, and our American cousin how to do nearly everything else.

Now, I am not going to say it is all the fault of the Royal Academy. That institution, as regards its chief feature, the annual exhibition, is only another engine of the man of profits, which, frankly recognising the commercialism of the age, endeavours, "by special appointment" and self-election, to adapt the business of picture-painting to it, without troubling much about architecture and sculpture, and leaving the applied arts to apply elsewhere, or shift for themselves. It is but due to say, however, that the Academy endeavours to counteract the influence of the new masters in the summer by the examples of the old masters in the winter; on the principle, perhaps, of the Mediæval system of doing penance.

In the course of evolution we are passing through a period of disintegration and differentiation. Art cannot escape the tendencies and influences of its time, which, indeed, it is of its very nature to illustrate. The artist, like all other workmen, has become more and more specialised, and the unity of the arts has been broken up. The painter is no longer the master-craftsman among his workmen and apprentices, prepared to do all things in the province of design from the pattern on the hem of a garment to the painting of an altar-piece. He is now rather the juggler in the market-place, who with a particular sleight of hand can command a particular phase of sea or sky; or he has the trick of the flattering glass in portraiture. Perchance he seeks to draw iron tears down the cheeks,—not Plato's, but of the philanthropic Plutus, and golden ones from his pocket by peculiar domestic pathos; or, in stage lights, by the contrasts of wealth and misery, chilling his blood by melodramatic horrors; or by seeking to glorify his patron in

his happy hunting-ground, surrounded by the images of his sacred animals.

Painting, perhaps, has always been more or less at the bidding of the dominant orders of its day, but more notably so since she left her roof tree and parted company with architecture and sculpture and all the fair and fascinating troop, controlled by a common impulse and a common devotion that throng in the splendid retinue of Design.

We look back down the long vista of ages and epochs and read their spirit in the unmistakable language of art, coloured as it is by the human systems and beliefs of which it is the monument. Whether, as in the wall paintings and reliefs of Ancient Egypt and Assyria, it is devoted to the glorification of military or sacerdotal despotism, or the systematised symbolism of an ancient nature-worship, humanised and made beautiful by the Greek informed by freedom and life; captive and decaying amid the corruption of ancient Rome; or, fused with a new splendour from the East, rising in the solemn magnificence of Byzantine architecture; and so, through the Gothic, flowering in the vivid imagination of the Middle Ages absorbed in the new mysticism, yet, through the Church, linked to the hopes as well as the fears of humanity. Then, with the new thoughts and ambitions of the Renaissance, art rekindles her lamp at the shattered shrine of classical sculpture and learning, until, overwhelmed with artifice and pedantry in succeeding centuries, she is forced back to nature and life again on the threshold of our own time.

But, again, she is in danger from a new tyranny in that unscrupulous commercialism, which is not less dangerous because less tangible, and not less despotic because it is masked under the forms of political liberty.

Steam machinery, like a many-headed, many-handed dragon, rules industry literally with a rod of iron, and fain would it make Art prisoner too. Intended for the service of man, and for the saving of human labour, it has, under our economical system, enslaved humanity instead, and becomes an engine for the production of profits,—an express train in the race for wealth, only checked by the brake of what is called over-production. Who can tell what will be the end of the journey? We are driven to the conclusion that the whole force of our economic system is against spontaneous art; that it is, in spite of it, if there is any life left in art yet.

As William Morris has so strikingly pointed out, the system of producing all things for profit, which has succeeded the old one of producing for use,—the necessity of selling in the big world market; division of labour; and lastly, machine labour, have rapidly destroyed the art of the people, as they are fast vulgarising and destroying all local characteristics in art in the surroundings of common life, in all countries open to the trader.

The system of absolute individual ownership of land, which, with the advance of commercialism, has displaced the ancient system of tenure, and defrauded the people of their common rights wholesale, naturally leads to much destruction of natural beauty, or where not destroyed, it is made inaccessible. The same system, too, is answerable for what may be called the destruction of architecture in the abnormal growth of the big towns, already alluded to, which year by year throw out their long and aimless feelers, that literally feed upon the green country. When we speak of our advance in the spread of education, we too often forget that no education of the schools can really compensate for the loss of those influences of an early life passed amid hills and woods, or by the sea, which are an education in a lore never to be forgotten. The village child who knows the birds, and can tell you where they build their nests, has learned straight from nature's book, which is the best of primers, and no system of elementary education can take its place.

Overshadowed by such conditions of life as falls to the general lot, what wonder is it that we should get our art by accident,—that it should be, in a great measure, the art of accident, in spite of elaborate systems of art-training, and the elaborate unlearning of them which sometimes follows. Happily the sense of beauty and nature cannot be altogether suppressed under the most perverse social condition. It is sometimes urged in defence of modern life that it has artistic aspects, that strange and wonderful momentary effects are

\* A paper by Mr. Walter Crane, read at the meeting of the Architectural Association on the 18th inst., as elsewhere mentioned.

seen in London smoke fogs, for instance, amid the fiery eyes of railway signals, and on our blackened Stygian rivers where the Charon of the coal-wharf plies his trade. I have even heard a mosaic of beauty defend those tattered monuments of commercial effrontery and theatrical competition on their advertisement boardings covered with vari-coloured posters, as, in certain lights, becoming transfigured so as to rival the tints of a Japanese fan. The glow, the light fades, and with it such momentary exaltations of spirit; the north-east wind succeeds the south-west, and there being no dignity of form or beauty of proportion in our streets and public places they are apt to look more sordid and miserable than before. It is one thing to point out accidental beauties in the midst of monstrosities,—jewels on dung-hills, as it were,—and quite another to defend the monstrosities for the sake of accidental beauties. Ours would, indeed, be a hard lot if the sun never shone or the seasons did not return. Grace and spirit of movement may, indeed, be shown by a child dancing to the strains of a barrel-organ in a squalid anucky street, but one would rather see her on a village green dancing to a shepherd's pipe. We should aim at a condition of things which would not keep beauty at a distance from common life, or on the footing of an occasional visitor. No artist should be satisfied with such a cold relationship.

If we believe that art is not the mere toy of wealth, or the superficial boudoirism of fashion, not a revolving kalidoscope of dead styles, but, in its true sense, the spontaneous expression of the delight in life, and the aspiration of a free people, before all things, then, in order that art may express itself in this way, it is necessary that there should be something like a common life. We have no common life, because we have no life in common. Art is split up into cliques as society into classes. Art should know neither. We want a vernacular in art, a consentaneousness of thought and feeling throughout society,—not mere formal or verbal agreement, or dead level of uniformity, but,—comprehending and harmonising individual variety with collective unity, which can only be developed among a people intellectually, politically, and socially free.

The signs of our times point unmistakably to great changes working in the direction I have indicated, which cannot fail to produce corresponding results in art.

Consider, for instance, the probable effect on domestic architecture of a collective, communistic mode of living. Instead of our rows and rows of brick boxes, only varied by piles of them in barracks, there would probably be a demand for quite another type of dwelling. We might see something like a revival or a development of the plan of house which for so many ages proved so serviceable to humanity, from Homer to the end of the Middle Ages. The great hall as the common living-room, with smaller ones for sleep or study connected with it. At all events, buildings of such a type, and groups, would certainly lead to more dignity of result in architecture than the houses built under the influence of our complex and artificial life, and under our present systems of tenure, are ever likely to do. We all know that a church gives higher opportunities to an architect than a private house, yet the Gothic church is but the survival of the Gothic hall. It was a secular form before it was sacred.

Then, too, the only chance for the mural painter and monumental sculptor is in public buildings. If buildings of the type I have mentioned became common, there would be plenty of scope and work for them, and the decorative artists generally; and so we might reasonably expect that painting and the sister arts would be restored to, perhaps, greater than their former dignity, beauty, and invention.

The decline of art corresponds with its conversion into portable forms of private property, used as material for commercial speculation. Its spirit and aims under such influences naturally become entirely different. All really great works of art are public works, monumental, collective, generic: expressing the ideas of a race, a community, a united people, not the ideas of a class. It is evident enough in our own time that art needs some higher inspiration than that of the cash-box. She suffers from an intellectual lethargy that cannot be cured by a prescription from the cheque-book. These are, at best, but stimulants that force an unhealthy excitement,—a feverish and fitful activity at the expense of the whole system.

Private patronage may be able to command a measure both of skill and beauty, no doubt; but it is, as a rule, beauty of a lesser kind, and conceived in a narrower spirit, because, being addressed rather to the personal tastes and preferences of an individual, it is less likely to call forth the full expression of an artist's mind. While the fancies of rich and great persons, when their day is past, often come to be looked upon as curiosities, the art of a people as expressed in their public buildings and monuments, possesses a kind of immortality. We know the splendid results in art which grow on the rock of Athens and the cities of Mediaeval Italy. Our own cathedrals, too, bear witness to the greater solemnity and impressiveness, as well as vitality, of public and co-operative art. Is it too much to suppose, seeing the intimate connexion between political and social condition and artistic expression, and how both are affected by economical laws, that in the free federated communes which, not improbably, will, in the future, succeed jealous nationalities dominated by centralised governments, with a large increase of leisure and opportunity for cultivation and enjoyment, the arts will reach a higher and fuller development than any the world has known?

Hence comes it that most of the present efforts made to revive the arts and crafts among the people, without reference to their economic condition, are like so many attempts to grow the tree leaves downwards; or as if an architect should put up an elaborate scaffolding and begin with his roof before he had decided on the ground plan, dug the foundations, or thought of the drainage.

Real progress we must not expect to make until we have re-established the unity of the arts,—a very different thing from uniformity. My friend Mr. Sedding, in a discourse read awhile ago, in his generous enthusiasm was for assigning, in his mind's eye, the mural decoration of an ideal modern cathedral to various well-known popular painters. I believe even I myself was allowed a corner to amuse the children in. I have as great an admiration for the talents of my contemporaries as any one, but I cannot conceal from myself that to let us all loose on the wall in this kind of way with no greater preparation for dwelling together in unity, in the artistic sense, than is afforded under the conditions of the modern picture-show would be a very doubtful experiment. It would be, metaphorically speaking, something like an attempt to anticipate the millennium by trying to persuade the lion to lie down with the lamb, or the cow and the bear to feed, in the same cage. But in the fifteenth century Mr. Sedding would have been safe enough. Architecture comprehended, as it should do, all the arts. The painter worked in harmony with the carver and metal-worker, because each probably had a considerable knowledge of the other's craft, as well as of the limitations of his own. Artists, therefore, knew what they wanted to do, and did it. There was nothing mysterious in this, taking into account the way in which men worked in these days, and learned their crafts; but it is a little depressing to think, with all our superiority in exact science and mechanism, how far we are from anything like certainty in art.

Whether the interest of scientific discovery and research has had anything to do with diverting man's faculty of invention into another channel, and life does not allow time for the exercise of both, I do not pretend to say; but when Science and Art touch each other with the tips of their fingers,—when Science, for instance, asks for the aid of Art in mounting electric lights, or in order to fit any mechanical invention in daily use, it is very noticeable how artistic adroitness of adaptation, applied so as to secure a logical and beautiful result, lags behind the scientific invention. It is as if Science, continually creating new systems of nerves and ganglia in working order, was hard put to it to find bodies or frames to fit them, to make them presentable to humanity.

No doubt the demands upon a designer in the present day, owing to the march of mechanical invention, are very heavy; but the commercial pressure and hurry which is greatly answerable for that are heavier still upon him. Thought is all-powerful, but there is no time to think. Fancy and imagination might play about the humblest accessory, but there is no time to play; and "all work" as well as the uncertainty of work,—and no play," as the

saw saith, "makes Jack," if not "a dull," certainly an anxious boy.

But depend upon it, in conditions fair to humanity, art wants but little encouragement,—only freedom and sympathy. The seed will grow fast enough in a favourable soil and climate, and bring forth flower and fruit after its kind in due season.

For art is in its highest sense the faculty of expression, the language of life. The richer, the fuller the life, the happier and more baronious its conditions, the more varied and beautiful will be the forms of its outcome in art.

But it is deep down in the life of the people that we must dig the foundations, and out of common speech and common labour and handicraft must be shaped the stones of this architecture of art. Without such foundations, and without the cement of fellowship; without due recognition of the equality and unity of all workers, and their mutual interdependence in building the great structure, we shall have no enduring monument to be a delight to ourselves, and a memorial of us to those that come after. Brilliant toys, it may be, we shall have; surprises and stimulants; joyless elaboration, and pedantic weight of learning; gorgeous exotics; and flowers and fruits forced for the jaded appetite of a society in its decline; but we must give up all hope of vital and harmonious art, enshrined in a casket of beautiful architecture.

#### PROFESSOR MIDDLETON ON THE EARLY DEVELOPMENT OF MEDIAEVAL SCULPTURE.

ROYAL ACADEMY OF ARTS.

PROFESSOR MIDDLETON delivered the first of two lectures on Mediaeval sculpture on Monday evening at the Royal Academy. He commenced by remarking that by the beginning of the fourth century, in the reign of Constantine, the art of sculpture had reached the lowest possible stage of degradation. That was due to the fact that men had gone on, with failing technical skill and rapid loss of any true feeling for beauty, copying and copying again,—each generation of sculptors growing feebler than the one before it,—till at last they could only produce work that was hopelessly dull in design and brutally coarse in execution. Nothing was more depressing than the sculpture of that period. The early sculpture of the Greeks in the seventh century B.C. was, perhaps, ruder and even uglier in form, but in their works there was a distinct promise of something better, a sort of dim foreshadowing of the glorious era that was to come. Even the rudest work of the savage had usually some spark of original design, and, consequently, some degree of life and vigour; but in the Roman sculpture of the fourth century there was nothing to redeem its hopeless, heavy stupidity. It was this exceedingly debased form of Classical art that the early Christians adopted, and though they possessed no superior or technical skill or knowledge of the human form, yet the mere fact that their subjects were inspired by a real living faith gave a value and vigour to their reliefs which was far beyond anything Pagan of the same time. In sculpture, as in painting, whatever art the early Christians had was purely Classical in style; and though completely new sets of motives were introduced, yet the older influence clung closely to all their conceptions and their methods of treating them. In that respect the contrast was very strong between the earliest Christian art,—that of Rome, as seen in the Catacombs,—and that of the next stage of the art of sculpture, that which was developed at Byzantium after Constantine's removal of the seat of empire. No gloomy subjects were introduced by the early Christian artist; Christ was never represented in suffering nor as threatening a coming judgment. The catacomb subjects were always scenes exemplifying His friendly power, His miracles, and His beneficence. His passion and sufferings were only hinted at by Old Testament scenes, which were taken as anti-types. This cheerful spirit was inherited from the older faith, in which terrors of Hell had practically little part. It was very different from the mental state shown in the later art of Byzantium, which seemed to be overshadowed by a gloomy sense of the fabled horrors of the Christian Hell. Instead of the beautiful Classical symbolical rendering of the mystery of death and the soul by a butterfly escaped

from its dead chrysalis body,—a notion invented by the Greeks, and adopted by the Pagan Romans,—instead of this, we found death associated with such things as grinning skeletons and hideous fiends hovering round the dying man, ready to dispute with the angels the possession of his escaping soul. The earliest Christian art was imbued with the Classical love of the beautiful, and with an evident wish to avoid the horrible. In another respect, too, it offered the widest possible contrast to the art of Byzantine times, in which Christ and sacred scenes were represented so as to be as unlike as possible to anything in the earlier art of Greece or Rome. The Early Christians, on the contrary, adopted as much as possible the artistic conceptions of their contemporary pagans. Christ was represented by them like the Greek Orpheus, wearing the Phrygian cap and holding the *pedum*, surrounded by a crowd of listening animals, or riding in triumph into Jerusalem with a face of the most exquisite youthful beauty. The art of this earliest Christian period spread over a space of about two hundred years or more, and owing to its close connexion with the contemporary Pagan art (in which a rapid decadence was going on) we found that the earlier the example the better it was, both in design and execution. The finest early Christian work was in ivory and wood; skill in these smaller branches of plastic art lingered long after large sculpture was very coarse and poor, as was often the way with the minor arts, as might be seen in Roman coins and gems, and in gold and silver work. The removal of the capital of the Roman Empire to Byzantium changed the whole character of art. Byzantine art was essentially ascetic, and strongly opposed to that of Classic times. What spirituality there was in Greek art was in the main such as could be expressed in the outward form, and there was no suggestion of those purely spiritual gifts and excellences which could exist more fully in a less perfectly constructed body. In the earliest Christian art this intimate connexion of outward and inward graces was still insisted on; but with the development of the Oriental ascetic form of Christianity a wholly different class of ideas came in. The moral and spiritual qualities became the essential ones: the body and its earthly perfection became not only subordinate, but was regarded as an obstacle to the higher gifts. Art was called upon to illustrate the inner life of the soul, unconnected with its earthly tabernacle. The chief Christian virtues had no necessary connexion with nobility of face or strength of limb,—any bodily beauty was an unimportant accident. The Greek god was necessarily strong and beautiful, but the Christian saints warned against the powers of Evil with the help of bodily emaciation and privations which were destructive to physical beauty, and thus the notions of ugliness and sanctity became most intimately connected in the monkish mind. The great struggles and victories of the Christian saints involved mental anguish and bodily pain, which were utterly foreign to the serene well-balanced state of mind and body in the Hellenic god or hero. The old tranquil spirit was gone, and life was made gloomy by coming shadows of judgment and hell, with its legions of hideous fiends,—malignant in expression and loathsome in form. These spiritual fears and trials and struggles of man could in no way be adequately expressed in sculpture, and hence for a long time painting and mosaic took the prominent place which in earlier times had been occupied by the plastic art. The sufferings of Christ, the Crucifixion, and subjects of that kind were insisted to an art like sculpture, which called for harmonious beauty, quiet dignity, and restraint of expression. For a long time the Church struggled hard to limit the use of art to decorative ornament, and strove to prohibit the representation, by painting or sculpture, of sacred persons or scenes. This struggle, fostered by the ascetic Oriental spirit which had then come over the church, lasted for a very long time. Ultimately, a compromise was made, and representations of sacred scenes and personages were permitted, but only with the stipulation that Christ and the saints should be depicted without any of the sensual beauty which had glorified the gods of Greece and Rome. A rigid set of dogmatic rules was framed by the ecclesiastical powers as to the way in which each saint or scene should be represented, and these rules prescribed the arrangement of the drapery, the

colours to be used, &c. Thus it happened that what should have been the highest branches of Byzantine art were petrified into a monotonous formalism, which, as years went on, became deficient in vigour of drawing and devoid of individual spirit. The result was the inevitable degradation which always followed on repeated copyism. Owing to this practice of repetition it was often very difficult to guess the date of a work of art from internal evidence. The practice of this petrified art was still going on in the monasteries and churches of Greece and Russia.

#### THE ARCHITECTURAL ASSOCIATION.

THE ninth meeting of this Association for the present session was held on Friday, the 18th inst., at 9, Conduit-street, Mr. J. A. Gotch (President) in the chair.

The following new members were elected, viz., Messrs. E. J. Baker, G. Westrup, A. E. Toms, L. W. Todd, H. J. Curley, W. Hynam, H. F. Clark, and H. C. Fitt.

The Chairman intimated that a special business meeting of the Association would be held on the 4th of March, for the purpose of making an alteration in Rule 3, by inserting the words "and periodical publication," after the words "special classes."

A letter was read from Sir Frederick Abel, on behalf of the Prince of Wales, inviting the co-operation of the members in favour of the Imperial Institute. The Chairman stated that the Committee would be happy to receive any subscriptions, and to duly forward them.

A vote of thanks was passed to Mr. T. A. Walters, architect of the Roman Catholic Church of the Sacred Heart, Wimbleton, for accompanying the members over the building the other afternoon, as mentioned in our last.

It was announced that a visit would take place this Saturday, the 26th inst., to St. George's College and to St. George's Cathedral new schools, where the architect of the latter building, Mr. Leonard Stokes, will accompany the members. Several other forthcoming visits were also notified, for particulars of which see our advertisement columns.

A letter was read from Mr. Thos. Blashill, thanking the members for their kindly expressions at the last meeting in connexion with his appointment as Superintendent Architect to the Metropolitan Board of Works.

The Hon. Librarian announced several donations to the library, cordial votes of thanks being passed to the givers.

Mr. Walter Crane then read a paper entitled "The Architecture of Art," which we print *in extenso* in other columns of this week's *Builder*.

Of the discussion which followed we postpone our report.

### Illustrations.

#### MARBLE CHIMNEY-PIECE, CHÂTEAU DE FONTAINEBLEAU.

THE marble chimney-piece here represented adorns the guard-room of the chateau. It measures 5m. 3c. in height, and 4m. in width. It is made up partly of fragments of a celebrated chimney-piece called *la belle cheminée*, which stood in a room fitted up by Louis XV. as a theatre, in 1725. It was rebuilt in 1835 by King Louis Philippe, who largely contributed to the restoration of the chateau. It is in consequence of this that the monogram LP may be observed engraved in the frieze, in a cartouche between two Cupids and surmounted by the Royal crown. The *belle cheminée* was the work of Matthieu Jaquet,\* who undertook it by order of Henry IV., in 1594, and took five years to complete it. The two standing figures, symbolical of Strength and Peace, are attributed to Pierre de Franceville, or Franqueville, a Flemish sculptor, who was born at Cambrai in 1510, died at Paris about 1615, and is frequently designated "de Franceville." He appears to have been assisted in the work by his pupil and son-in-law, Francesco Bordoni. These two statues are part of the *belle cheminée*, and so is the greater part of the ornament which sur-

rounds the bust of Henry IV. On the older chimney-piece was an equestrian statue, in blue marble, of this king, also executed by Jaquet, and which is at present to be seen on the chimney-piece of the Salle St. Louis. The bas-relief representing the battle of Ivry, which accompanied it, was removed to the museum of the Louvre.

#### UPPER PART OF CHIMNEY-PIECE, ETC., IN THE PALAIS DE JUSTICE, BRUGES.

This chimney-piece was erected after the designs and under the directions of Lancelot Blondell. The chimney-piece proper is of black Dinant marble, and was carved in 1529 by Guyot de Beaugrant. It consists of an entablature resting on two jambs in the form of pillars, the bases of which are Flamboyant in style. The alabaster frieze is decorated with four bas-reliefs illustrating the story of Susanna, designed and carved by the same artist, who also executed the four Cupids at the corners and the alabaster moulding under the statues. The wooden upper part (1529-31) was doubtless erected as a trophy to commemorate the victory of Pavia, February 24th, 1525, and the Treaty of Madrid, January 16th, 1526, confirmed by that of Cambray, called the "Paix des Dames," August 9th, 1529, one of the articles of which released Flanders from all subjection to Franco and recognised its independence. This portion is divided into three compartments; the centre is occupied by the statue of Charles V. as Count of Flanders, holding the insignia of the Order of the Golden Fleece. The coat of arms of the county adorns the front of his cuirass. He holds up a naked sword in his right hand, and in the left carries an orb surmounted by a cross, while behind him is a throne decorated with half-length portraits of his father and mother, Philippe le Beau and Jeanne la Folle. On the back of the seat are carved two portraits in medallions, one of Charles de Launay, the conqueror of Pavia, to whom Francis I. returned his sword; and the other of Margaret of Austria, the aunt of the Emperor, who, by negotiating the Treaty of Cambray, consolidated the power acquired by that victory. Two pillars support the pediment. The tympanum of the archivolts is occupied by two winged Cupids, holding laurel crowns. Over the pediment is an escutcheon containing the imperial arms surrounded by the collar of the Golden Fleece, and surmounted by a helmet with festoons, on which is the imperial crown with the Gallic cock for a crest in sign of victory. On each side of the throne are the pillars of Hercules, with the arms of the various States under the dominion of Charles, those of Naples and Navarre, the two latest acquisitions, being the most distant from the statue. Farther off are sixteen escutcheons with the arms of the Emperor's grandparents. On the pilasters at the salient angles two groups of boys support medallions with profile portraits of Francis I. and Eleanor of Austria, the Emperor's sister, whose marriage ratified the treaty. In front of the compartment to the right of the Emperor are placed the statues of Maximilian and Marie of Burgundy, his paternal grandparents, and in front of that, to the left, those of Ferdinand of Arragon and Isabella of Castille, his maternal grandparents, surrounded by escutcheons and streamers. Among the accessory ornaments may be observed, to the right, the Cross of Burgundy, with the flint and steel surrounded by flakes of fire and the motto of Maximilian, "Halt Mas." To the left is the bow and sheath of arrows, the emblem adopted by Ferdinand and Isabella to symbolise the union of the kingdoms of the Peninsula. The five statues were carved by Guyot de Beaugrant, the details by seventeen other sculptors, the chief of whom were Rogor de Smet, Herman Glosencamp, Jacques Crépen, and Adrien Rasch. The whole was without doubt meant to be coloured, and the empty cartouches to receive inscriptions. The admirably-conceived design of the monument reveals exquisite feeling and a profound study of the subject. The more one examines the arrangement of the details the more one is struck with the poetic feeling of the author. Everything is in its right place and in perfect harmony. The forms are those of the Renaissance period. It is a trophy erected in honour of Charles V. and entirely Pagan in its conception. The execution of all the details is perfect, and testifies to the great skill of the Flemish sculptors of that period.

\* Matthieu Jaquet, born at Fontainebleau about 1550, died in 1619. He was a pupil and coadjutor of his father, Jaquet of Limoges.

ST. SAVIOUR'S UNION INFIRMARY,  
CHAMPION HILL.

This infirmary has just been completed, and will shortly be opened. It is situated in East Dulwich-grove, near the Champion-hill station on the London and Brighton Railway, and is for the sick poor of the parishes of St. Saviour and St. George-the-Martyr, Southwark, and St. Mary, Newington, which three parishes constitute the St. Saviour's Union. The buildings stand on a piece of ground about seven acres in extent, having a frontage of 700 ft. towards East Dulwich-grove.

The sick wards are arranged as shown on the block plan, with their axes placed north and south, the main front of the building, shown in the illustration, facing East Dulwich-grove. Accommodation is afforded for about 732 inmates. There are twenty-four large wards, to hold from twenty-six to thirty beds each, and twenty-four separation wards for two beds each, for cases which require isolation. The open balconies at the ends of the wards are large enough to allow of three or four patients being wheeled in their beds on to them. The warming of the wards is partly provided for by two double open fireplaces in the centre, with descending flues carried through the floors, and by fresh air brought from the outside through zinc tubes to the backs of the fires, where it is warmed before passing into the wards. In addition to these fireplaces there are two rows of hot-water pipes down each side of the ward. Gratings under each bed, with sliding traps, admit fresh air, which in winter is warmed as it passes over the hot pipes.

There are six three-light gas pendants in each ward, having enamelled iron hoods which direct the products of combustion, and also the vitiated air from the wards, into tubes placed transversely above the ceilings. Each end of these is open to the air, and has a balanced flap, which closes at whichever end there is an inward pressure of air, leaving the other end open to allow of the egress of the heated air. The wards have glazed brick skirtings, 3 in. high, all round, and the floors will be waxed. The water-closets at the ends of the wards have Omer D. Ward's "Household" closets, with water-waste preventing cisterns. The baths are of porcelain, and are detached from the walls, with a space of a few inches between them and the floor. The floors of the bath-rooms, water-closets, and lobbies, are paved with red tiles. There is a dado of glazed bricks, in cream and brown bands, round the walls. The lavatories in the bath-rooms were supplied by Messrs. Finch & Co., of Holborn. Cannon's hot-water radiators are placed in the bath-rooms, lobbies, and water-closets. Each of the ward blocks has a hydraulic bed lift, and two hand-power lifts for food, &c., manufactured by Messrs. Clark, Bunnell, & Co., of Deptford.

Advantage has been taken of a fall in the ground from west to east to construct the end block (marked D), with a basement story, of open piers and arches, allowing a free circulation of the air beneath the ground floor.

The connecting corridors between the administrative block and the several ward blocks are 9 ft. wide. They are at the ground, first, and second floor levels. The ground-floor corridors are enclosed, but have large windows, the sashes of which will open. The first-floor corridors are open, with an arched ceiling at the sides to support the floor of the corridor over. The piers and arches of this arcade are of ornamental cement concrete, specially manufactured by the Imperial Stone Company, East Greenwich. The floors of the corridors are paved with asphalt. On the ground floors they have a border, on each side, of red tiles, about 2 ft. wide. The corridor on the ground floor of the administrative block is paved with ornamental tiles.

Beneath the ground-floor corridors are lower ones, partly underground, extending from the coal-cellars to the ward blocks. In these are placed the gas, water, and steam mains, where they are more easily accessible than if they had been buried in the ground. There is also a tramway, of 20-in. gango, for trolleys to convey coals, &c. By this means not only will a great saving of labour be effected, but the dirt and inconvenience arising from the passage of dirty clothes, coals, &c., through the building will be avoided.

The administrative block is central. A view of the front of it forms one of our illustrations. The west wing is the medical superintendent's

house. It is connected with the main corridor on the ground-floor only. The east wing contains the committee-room, with bedrooms over for the matron, assistant matron, head nurses, &c. In the central portion of this block are situated various offices for the superintendent, clerks, and stewards, and matrons' sitting-rooms. Over these is the chapel. It is 70 ft. long, 28 ft. wide, and 28 ft. high to the apex of the ceiling, which is of plaster, wagon-shaped, and with ornamental wooden principals. There is a panelled dado of painted wood, 4 ft. high, round the walls. The west wing at the rear of the administrative block contains the stores on the ground-floor, and in the east wing are the nurses' mess and day rooms. The basement, which extends under the centre and the two wings, contains extensive cellars for beer, coals, &c., and larders. The kitchen is in the centre at the rear of the administrative block, on the ground-floor level. The cooking apparatus consists of four large steamers, a Wareneizer, two gas roasting-ovens, and gas hot-plates, soap and tea coppers, vegetable steamers, open range, &c. Bedrooms for about seventy nurses and servants are placed on the first and second floors of the east and west wings at the rear of the administrative block; these bedrooms are entirely detached from the main block. Communication with it is provided in case of fire by light iron bridges on the second floor.

The laundry buildings consist of an officers' wash-house, 25 ft. long, 16 ft. wide, with laundry, 25 ft. by 21 ft. The patients' wash-house is 40 ft. long, 25 ft. wide. Adjoining it is a double drying-closet, containing thirty-two horses; and beyond is the laundry, 53 ft. long, 25 ft. wide; there is also a small wash-house for foul linen. Attached to each of the patients' wash-houses is a room for receiving the dirty clothes, and a delivery-room. Attached to each of the laundries are drying-rooms for the clothes. The steam washing-machines, wringers, and calendaring machine, steam mangles, &c., were manufactured by Messrs. Clements, Jeakes, & Co., of Great Russell-street, Bloomsbury, who also supplied the cooking apparatus.

The Boiler House adjoins the laundries. There are three "Lancashire" steam boilers, each 26 ft. long and 6 ft. 6 in. diameter. The chimney-shaft is about 70 ft. high; it is octagonal, 5 ft. diameter at the top, and stands on a base 7 ft. square. There are two of Marshall's horizontal engines, 12-h.p. each. Hot water is laid on to all wash-up and slopsinks, and to lavatory basins, the supply being obtained for them from Dudley steam water-heaters, which are placed in specially-constructed chambers under each ward-block, the steam being conveyed to the heaters from the boilers in pipes placed in the subways; the steam-pipes are coated with asbestos.

The water-supply will be obtained from an artesian well, sunk by Messrs. Baker & Sons 200 ft. into the chalk which underlies the site at a depth of 90 ft. from the surface. The water will be pumped from the well into cisterns at various parts of the building, and also into two large cast-iron tanks, holding 8,000 gallons each, which are placed in the towers of the administrative block, to form a reserved supply of water for use in case of fire. Hydrants are placed in all the wards and on the landings of the stairs adjoining them, also in the corridors of the administrative block.

The drains have been laid in straight lines, with manholes at intervals for access and for admitting fresh air where practicable. The foul air from the main sewers in the streets is cut off by Kenon's intercepting traps and ventilated manholes. There is a flushing-tank at the head of the main drain at the back of the building. All the soil-pipes are fixed outside of the buildings, and to insure a constant circulation of air in them they are open at the top and at the feet, just above the traps into which they discharge. The waste-pipes from baths, sinks, &c., discharge over open trapped receivers, and are carried above the eaves of the roofs, with open ends.

The receiving wards are situated close to the entrance-gates in front of the building. They contain two wards,—one for males and one for females,—with attendants' rooms, clothes-stores, bath-rooms. There are also two padded rooms lined with indiarubber also supplied by Messrs. Pocock & Co.

The porter's lodge adjoins the entrance-gates, and contains an office, parlour, and bedrooms for the porter.

Blenheim telephones are fitted in the medical

superintendent's house, the centre of each floor of ward blocks, and at various other points in the building.

Externally the walls are faced with Leicester red bricks with dressings of Ancaster stone; there is a wrought-iron railing along the front towards East Dulwich-grove.

The contracts for the building, the engineers' work, and the laying out of the grounds, have been carried out by Messrs. Kirk & Randall, of Woolwich, at a total of about 86,000/.

The gasfitter's work was executed by Mr. Clarke, of Moorgate-street, City, at a cost of 1,003/.

Mr. Davis has acted as clerk of works, and Messrs. H. Jarvis & Son are the architects.

ST. JOHN'S CHURCH, WELLINGTON-  
ROAD, RHYL.

This new church is erected on a corner site at the junction of River-street and Wellington-road, Rhyll.

The design has been ruled by the conditions under which the church had to be built, the site being broad in proportion to its length. The design was selected in a limited competition, the instructions to the competing architects being that the church was to be designed for a large congregation with the least possible obstruction by columns, &c. On plan the church is a parallelogram, 77 ft. by 57 ft., with a west-end bay and side aisles, the centre portion of the church being carried up in an octagonal form by arches springing from the main walls, the western bay being supported by two massive granite columns. The chancel, 30 ft. by 26 ft. in prolongation eastwardly of the western bay, opens into the nave by a massive stone arch. The organ-chamber, 19 ft. by 12 ft., is arranged on the south front, with choir and clergy vestries on the north elevation. Spacious porches are arranged at the west end.

Accommodation is provided for about 750 sittings.

The material used for walls is local limestone with Groespyr stone dressings.

The roofs are covered with green slates, and internally are of open-timber work in pitch-pine. The floors are of wood-block paving.

The cost of the edifice, complete, will be about 5,000/., and it is intended to consecrate it early in the summer.

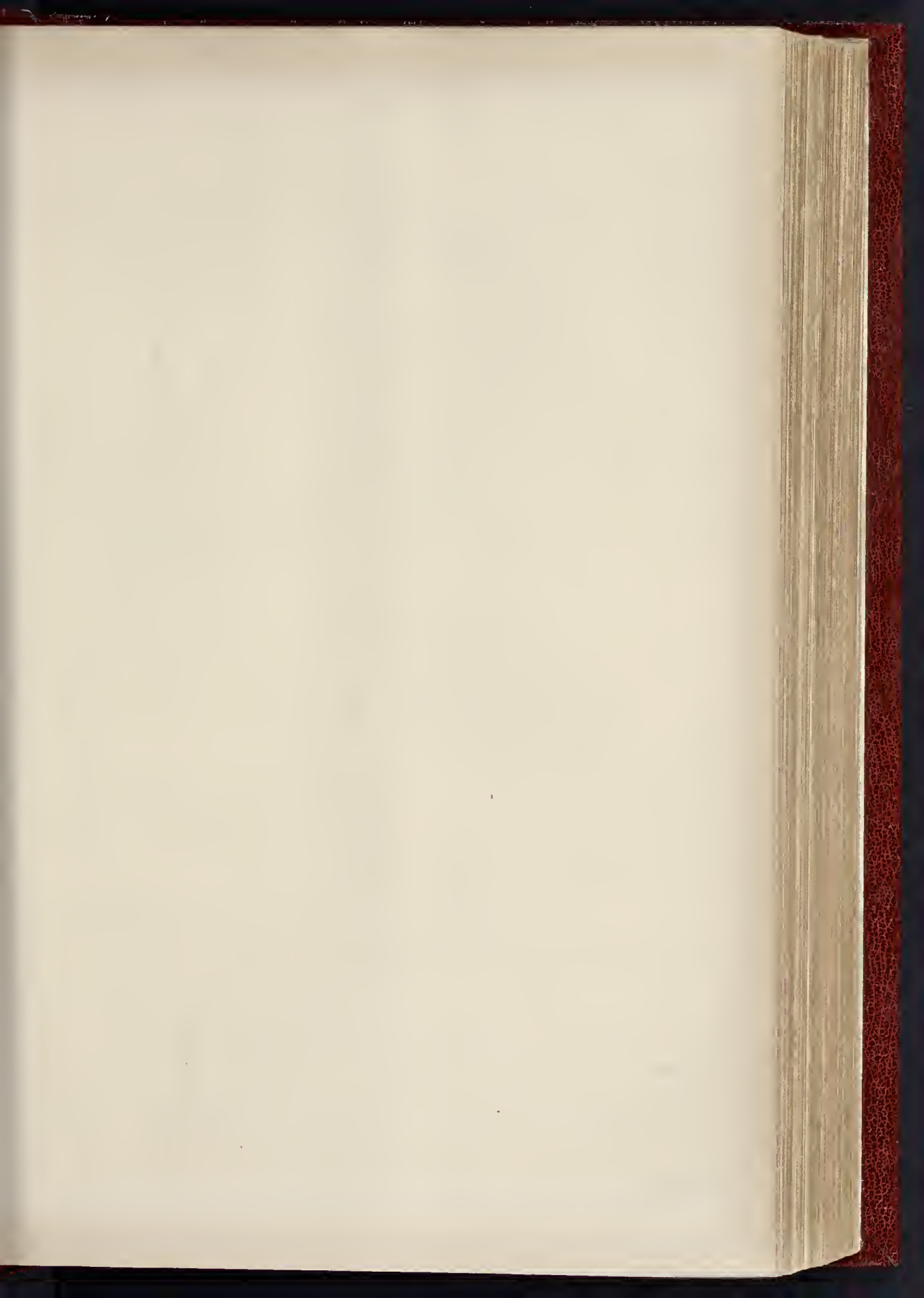
Mr. A. Torlington, of Rhyll, was the contractor. Mr. W. Webb acted as clerk of works, the architect being Mr. David Walker, of Dale-street, Liverpool.

COMPETITIVE DESIGN FOR ST. PAUL'S  
CHURCH, KENSINGTON.

This is a design lately submitted in a limited competition for the above church. It was proposed to erect the church in red brick and terra cotta. The drawing is by the architect, Mr. R. A. Briggs, A.R.I.B.A., of Devonshire-square, Bishopsgate-street.

**Free Lectures on Matters Connected with Building.**—Under the auspices of the Worshipful Company of Carpenters, the following course of lectures has been arranged for delivery at Carpenters' Hall, London-wall:—Wednesday, March 2, Mr. Banister Fletcher, F.R.I.B.A. Warden of the Company, on "English Carpenters and Foreign Competition"; March 9, Professor A. B. W. Kennedy, M.I.C.E., on "Girders and Beams"; March 16, Mr. F. Chambers, F.R.I.B.A., on "Joinery"; March 23, Mr. Lacy W. Ridge, F.R.I.B.A., on "Half-Timbered Houses"; March 30, Professor T. Roger Smith, F.R.I.B.A., on "Bricks and Brickwork"; and April 6, Professor A. H. Church, M.A., on "Wood,—its Chemistry, its Decay, and its Preservation." Admission will be by ticket, to be obtained at the Hall, and at all the large builders'; also of the Secretaries of the Royal Institute of British Architects, and the Architectural Association, 9, Conduit-street, W., and at the Architectural Museum, Tufton-street, Westminster. The lectures will commence at 8 p.m.

**Fareham Cemetery Competition.**—Mr. Albert L. Guy, High-street, Lewisham, has been appointed Architect to the Fareham Burial Board, Hants, from among thirty competitors for the erection of cemetery chapels, lodge, mortuary, &c.



THE BUILDER, FEBRUARY 26, 1887.

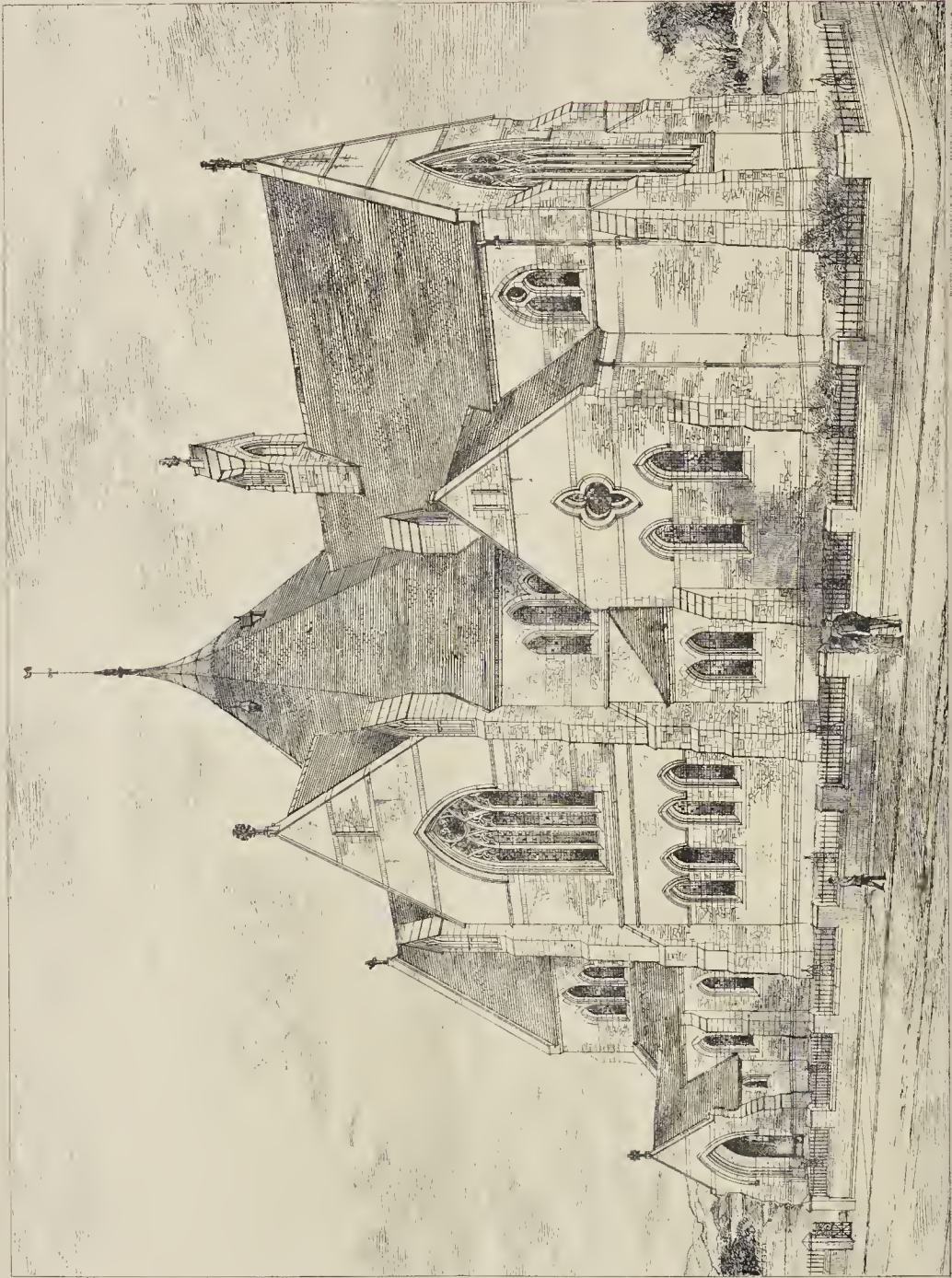
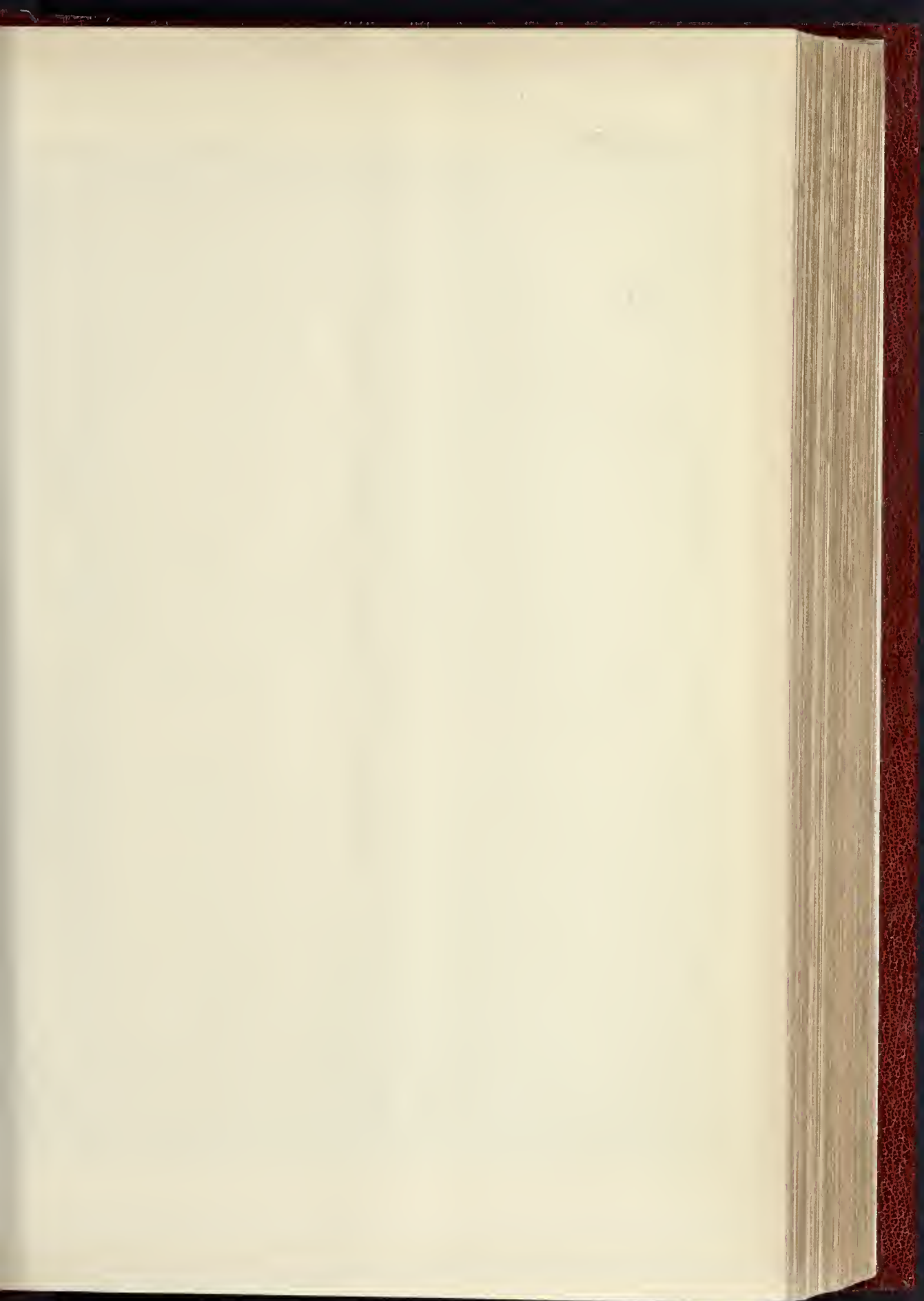
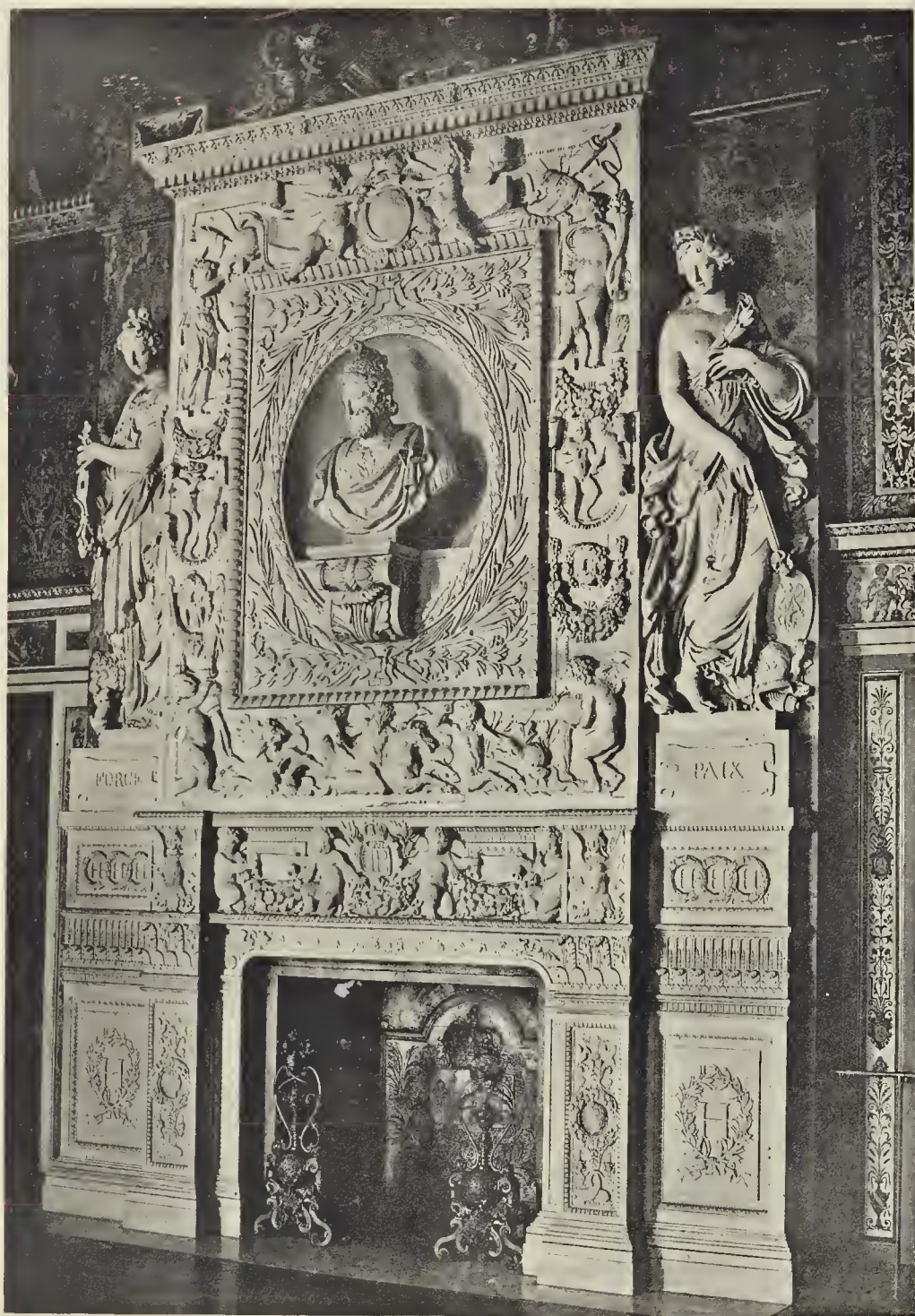


PHOTO BY THE ARCHITECTS OF THE BUILDING, NEW YORK, N.Y.

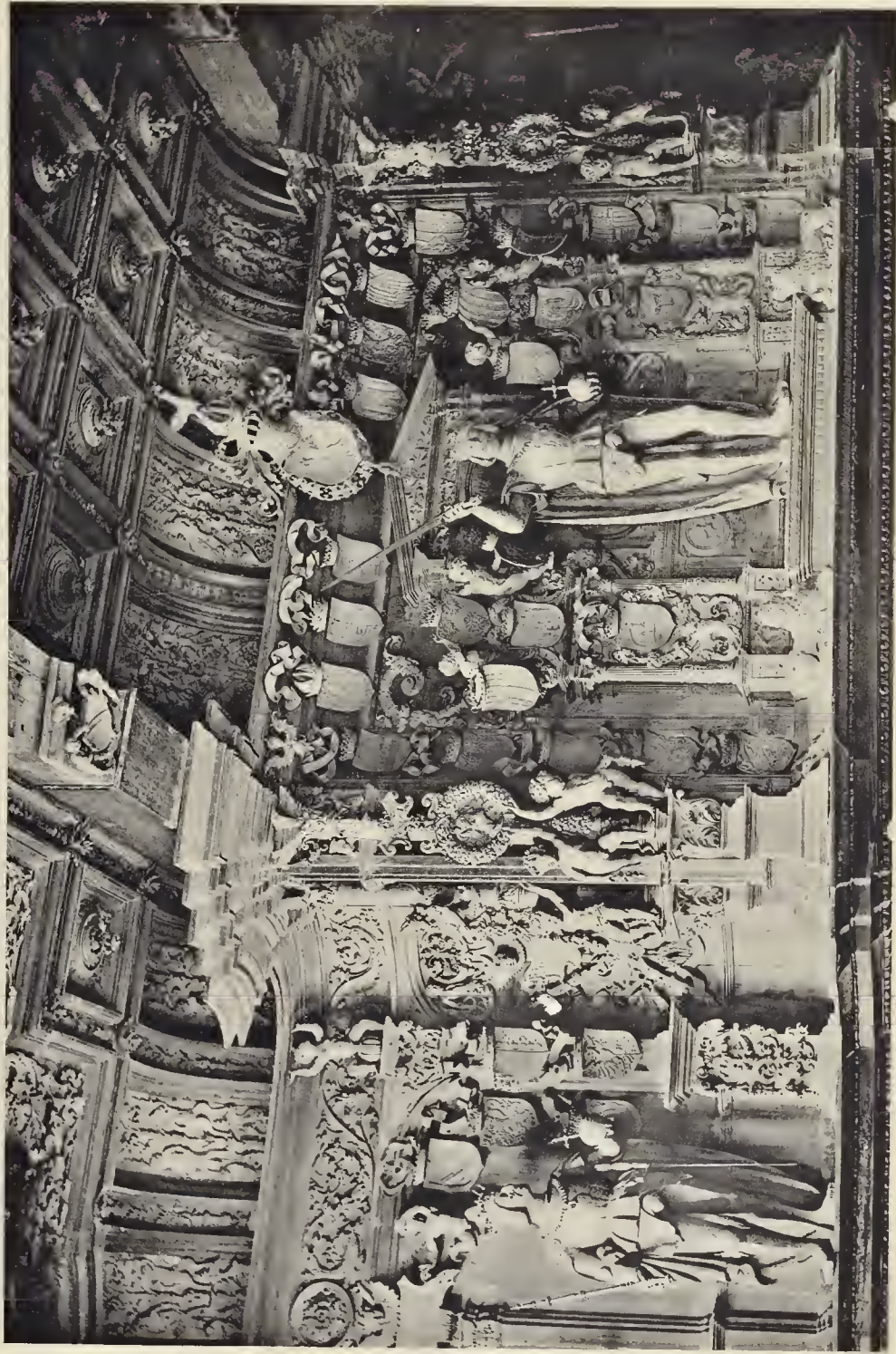






THE PHOTO TYPE CO., 39, STRAND, LONDON

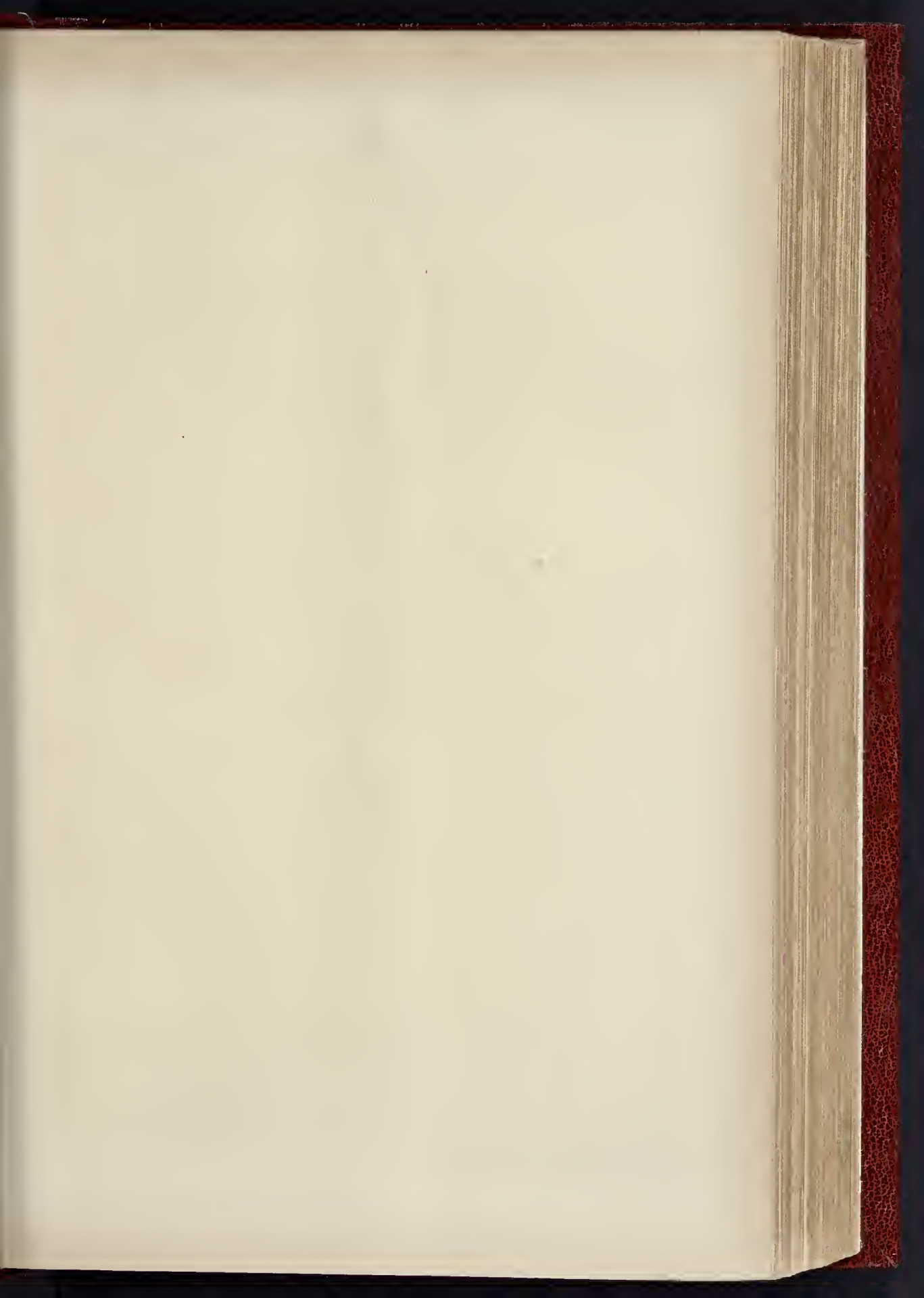
MARBLE CHIMNEY PIECE IN THE PALACE OF FONTAINEBLEAU.

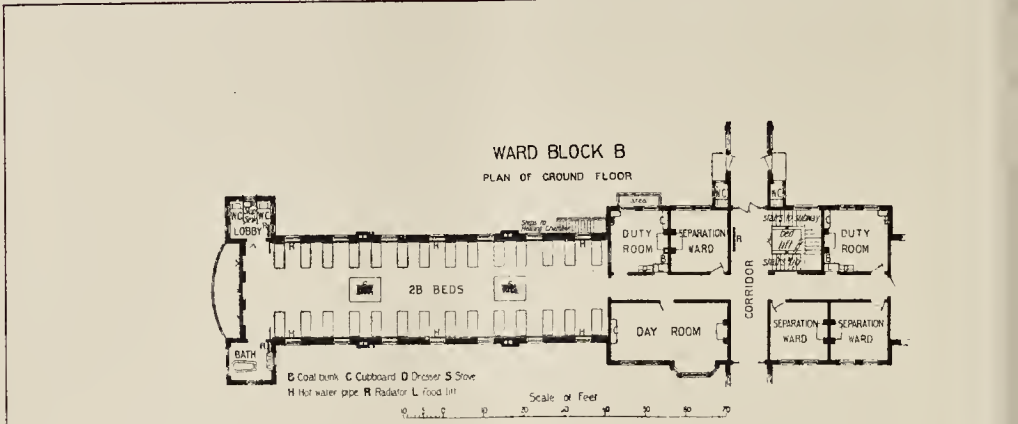


THE PHOTOGRAPH BY MR. STRAND, LONDON.

UPPER PART OF CHIMNEY PIECE ETC. IN THE PALAIS DE JUSTICE, BRUGES.







ST. SAVIOUR'S UNION INFIRMARY, CHAMPION HILL.—A.

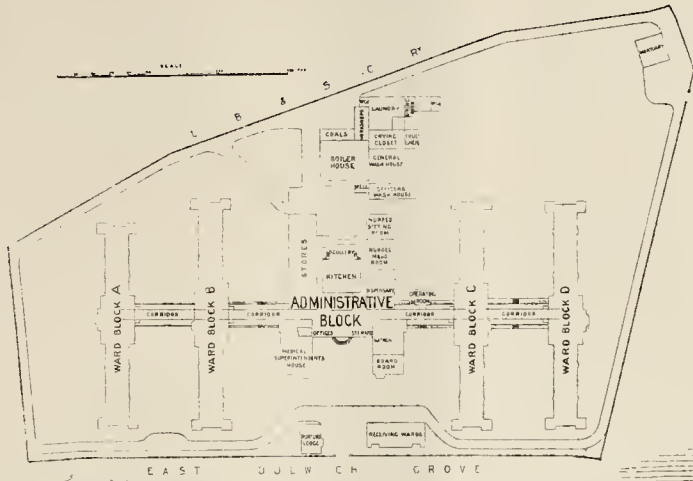


FIG. 1. H. JARVIS, LONDON, E.C.

ADMINISTRATIVE BLOCK. — MESSRS. HENRY JARVIS AND SON, ARCHITECTS.





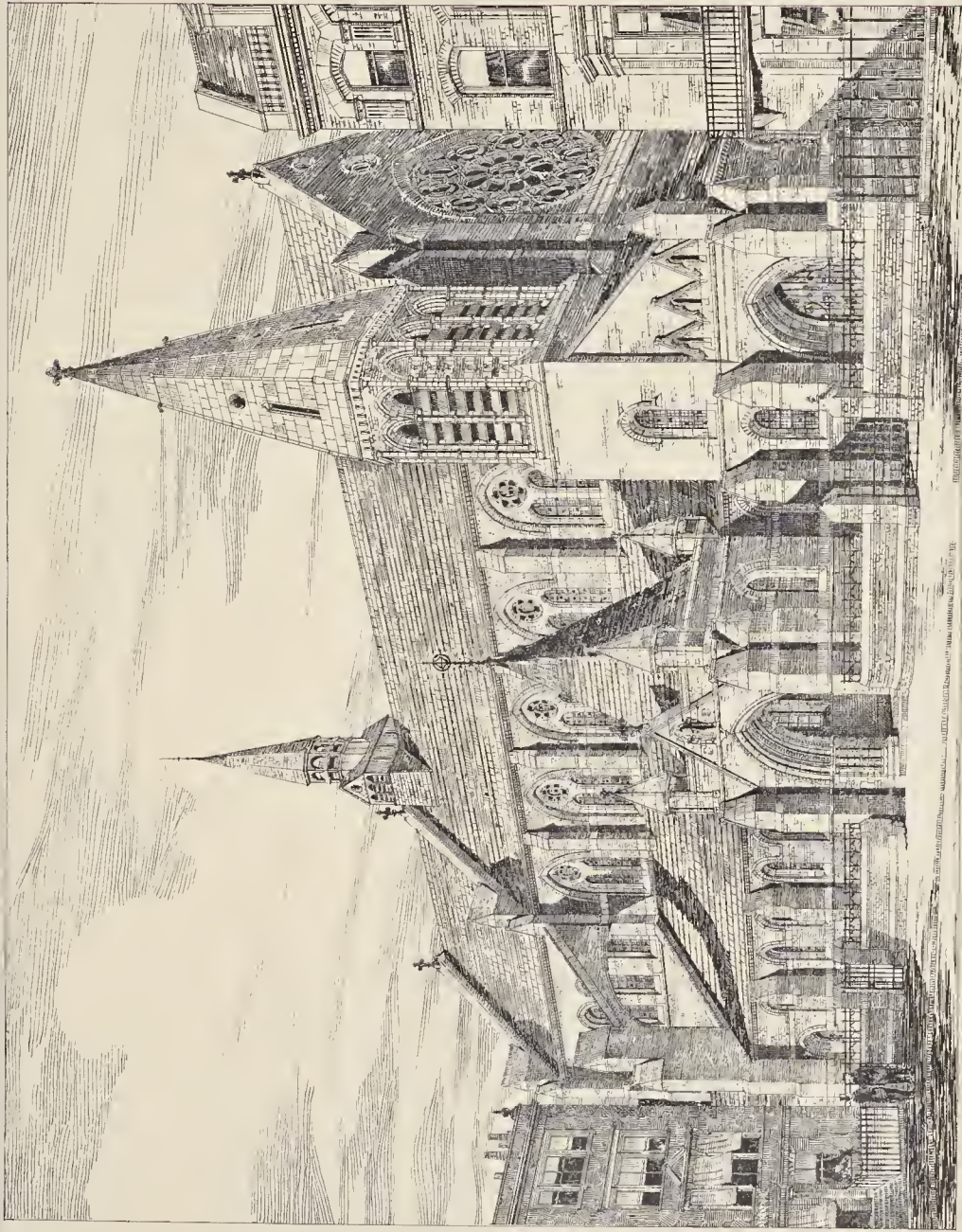
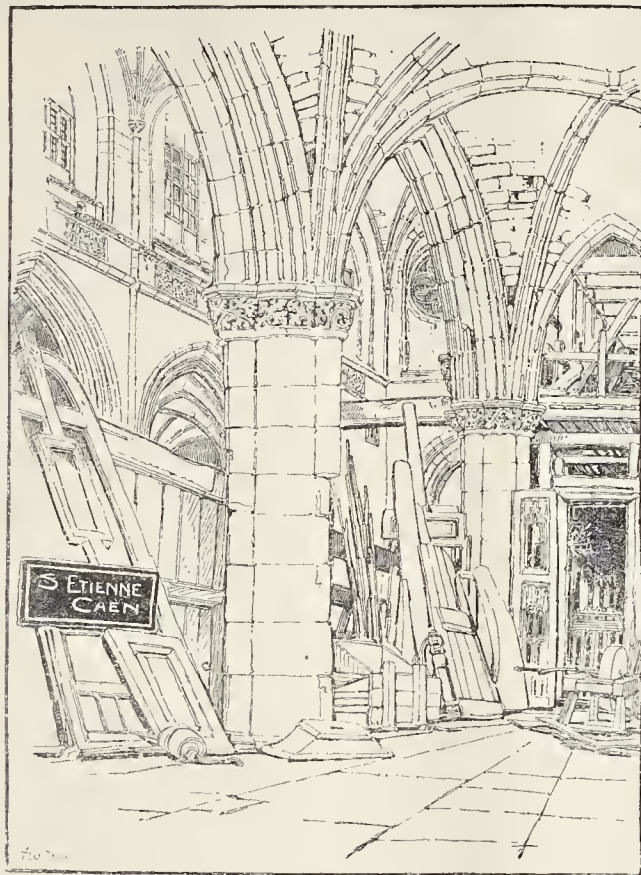


PHOTO LITHIC BRIDGE & CO., 22, MARTIN LANE, LONDON, E.

DESIGN FOR ST. PAUL'S CHURCH, KENSINGTON; BY MR. R. A. BRIGGS, ARCHITECT.





St. Etienne le Vieux, Caen.—Sketched by Mr. F. Williamson.

#### ST. ETIENNE LE VIEUX, CAEN.

The above sketch shows a view from the north aisle, looking across the nave. The church, which is a fine specimen of fifteenth-century Gothic, is now used as a storehouse for various municipal lumber.

#### WOOD CARVING.

A LECTURE was delivered on Thursday, the 17th inst., before the members of the Society for the Encouragement of the Fine Arts, No. 9, Conduit-street, by Mr. G. A. Rogers, on "Wood Carving." There was a good attendance of ladies and gentlemen.

Mr. George Godwin, F.R.S., presided, and in introducing the lecturer said that Mr. Rogers came of an artistic family. Probably some in that room remembered, as he did, his father, who came to be called "Grinling Gibbons Rogers," and who produced some very fine work. The lecturer's brother, Harry Rogers, was a very clever designer, and died too young. His sister, Miss Rogers, had shown her information and taste and talent in some works out art in Palestine.

Mr. Rogers, in the course of his lecture, the full title of which was "A Slight Outline of the History of Wood Carving," said that the art had, unfortunately, very little recorded history. It was not easy to account for this, for in all ages when wood-carving was mentioned at all it was mentioned with admiration. But however much the works themselves had been admired and appreciated, the names of the executors had not been handed down to posterity except in very rare instances. Carvers seemed never to have thought of signing works by carving their names or cyphers on them until

within the last two or three centuries. The earliest-known specimens of wood-carving were Egyptian, and were discovered in a sealed tomb beneath the Pyramids of Abousyr,—the ancient Basirus,—and were probably between five and six thousand years old. One of them was a grotesque little god, and the other was a very delicately-executed dog-headed ape, the anatomy of which was clear and distinct. These were in the lecturer's possession. The lecturer next referred to the wood-carvings of Solomon's Temple at Jerusalem, the commission for which was, according to the Biblical record, given to a man of Tyre, who was skilful to work in stone and wood, but whose name was not mentioned, although, curiously enough, we were carefully informed of the name, and even as to the parentage, of the brassworker employed. In the time of Pericles all the most celebrated sculptors in marble and bronze worked also in wood, choosing cedar, cypress, and ebony as their chief materials. All the Oriental countries, no doubt, had much work for the wood sculptors to do, but perhaps the Persians, who had always been renowned for the decorative arts, were amongst the most advanced. With the spread of Christianity, and the consequent building of churches and cathedrals all over Europe, wood-carving received much encouragement, and itinerant bands of wood-carvers found much employment. They were very probably the designers of much of the work they executed. Having entered a protest against the denudation of our cathedrals and churches of their wood-carving,—evidence of which was afforded by the fine collection of wood-carvings of the late Mr. Cottingham, and by other collections,—Mr. Rogers remarked that much had been done by such men as Shaw, Carter, Wyatt, Twopenny, the Chairman (Mr. Godwin), and others, to

register, by drawings and descriptions, the old wood-carving extant in this country, but no society had organised a thorough investigation. The period of the Renaissance found many carvers of talent ready to carry out the designs and instructions of the new leaders of art. Amongst the most conspicuous for ability amongst the Italian wood-carvers was Barili. Donatello also worked in wood, though very rarely, but what he did was superb. In Germany the great name of Albert Dürer was supreme, not so much because of his own actual handiwork, as by reason of the influence he exerted over the carvers of his time. France, especially in the southern districts, produced a grand display of Renaissance work. Spain was a little later. The Elizabethan and Jacobean era constituted a strongly-marked period in English wood-carving, which culminated in the advent of Grinling Gibbons, who was born in Spru-alley, a little turning leading out of the Strand (and now improved into Craven-street) in the year 1648. He was "discovered" by Evelyn in 1671. There were many critics who, while admiring the wonderful handicraftsmanship of Gibbons, considered his taste in design almost vulgar, and his large groups, and pendants and garlands of fruit and flowers, in questionable taste. But it should be remembered that the taste of the period was for rather pronounced decoration, probably brought about by Rubens and his contemporary artists, in whose paintings we saw heavy bunches and garlands of flowers and not too ethereal angelettes. Gibbons was not free to work out his own fancies, but had to follow the fashion of the times. Every now and then, however, he reverted to what was perhaps his own particular taste in carving,—portraits in medallion in half-relief, carved in boxwood or pear-tree-wood, or copies from paintings or engravings. These were the works he executed when he wished to make a present to some valued friend or patron. In conventional scroll-work he effected a material change and a vast improvement, infusing into it a little of the Italian spirit, but still keeping the stalks thick enough to support the conventional leafage, which the Italians did not. He introduced some of this scroll-work into nearly everything he did. Gibbons died at his house in Bow-street in 1721. Having mentioned and briefly described some of the principal works of this master, and condemned the way in which some of the finest of them had had their finer lines choked up by the house-painter (under the mistaken notion that paint prevented the ravages of insects, instead of merely hiding them), the lecturer went on to refer to the works of Chippendale and his coadjutors, who were, however, more of cabinet-makers than wood-carvers. He then glanced at the works of wood-carvers on the Continent co-reval with the work of Gibbons and his successors, and passed on to mention the work of his father, Mr. William Gibbs Rogers, who was born in Dover in 1792, and for whom it was claimed that he had probably done more than any one else to foster the art of wood-carving in this country during the present century. In conclusion, the lecturer offered some suggestions for the encouragement of wood-carving in England. He denied that the art had died out in this country, contending that much good work, never seen by the critics, was produced every year. What he considered was wanted was a Hall of Wood-carving, in a central position in London, where carvers could send for exhibition the works they had executed, if only for a few days. If such a hall or place of exhibition were established it would be many months before erroneous impressions as to the capabilities of modern carvers would be removed. Such a hall he should like to see managed by the wood-carvers of the metropolis. There was already in existence a small society, with a library and a small collection of specimens. That might form the nucleus of the proposed new institution, which, as it would show what could be done by English carvers, would prevent work from going out of the country. Mr. Rogers said he intended to move further in this matter later on, when he had seen how his proposals were received.

We may add that the lecture was an exceedingly interesting one, and we regret that the great pressure on our space just now has obliged us to give only a brief summary of it.

In opening the discussion,

The Chairman said he was sure they must all feel very much obliged to Mr. Rogers for the inte-

resting sketch that he had given them of the history of wood-carving. He believed, however, that Mr. Rogers must be wrong in thinking that Grinling Gibbons carried on wood-carving for his own amusement, having some other means of living. Considering the enormous amount of his work in England, he must have given, not a portion, but the whole of his time, if only to the direction of it. He did not know whether any of them had seen an interesting collection of his work in St. James's Church, Piccadilly, restored some years ago. There was also a figure of King James at the back of Parliament-street, said to be by Gibbons. He did not know whether this was quite certain, but it had been stated positively to be his. As to the exhibition of modern work,—the "Hall of Carving" would be a very interesting thing if it could be carried out, but he was afraid no great difficulty would be found in the way, viz. that the carvers themselves would not send their works. In truth, a great deal of work was done under one name which was executed by other persons. He had found, on many occasions, that the masters would not give the names of those who executed the work. They gave a very good reason for that, which was, that these men would be marked, and that they would lose them. And that, he thought, would be one of the great difficulties in the way of the proposed exhibition. However, he, for one, would be very glad to do anything in the direction Mr. Rogers had pointed out. He was afraid there was, at present, very little encouragement for wood-carvers, and he did not find, from the many inquiries he had made that week, in view of the fact that he should have to appear before the meeting that evening, that there were many good wood-carvers to be had. He found that if any work was wanted in a hurry, and good men to do it, there was great difficulty in obtaining them. Moreover, there were few designers. Now, in another direction,—by a public institution in which he was interested, some very handsome premiums were offered for designs to commemorate this Jubilee Year. Nothing had yet been decided upon, but he was sorry to say the result was very unsatisfactory. The specimens were anything but good, and the number small,—only a dozen. The fact was, it took a long time to make a carver, and the public were not willing to pay the price for work of that description; they were not willing to pay a price that would encourage men to devote themselves to it. He was one of the earliest and one of the staunchest friends of the system introduced at South Kensington, but seeing what he did every week, knowing that more than 600 schools and classes of art were at work all over the country, that the Government paid 26,000*l.* a year towards Schools of Art alone, that there were from thirty to forty thousand students in those schools, one was forced to ask whether the result of that teaching had been what they had a right to expect (applause). What was the cause of it? He had no doubt the teaching apparatus there was perfect, and that good men were employed, but surely by this time there should have been a genius or two manufactured (applause). Most certainly it was not so, and he found in every direction the impression that there was a want of designers. He would not occupy their time or take off from their memory what Mr. Rogers had said to them, but he hoped some good would follow from the lecture. There was a great deal of wasted writing power and talking power in this country. These lectures went on and people said: "Yes, very interesting; we hope to see such and such a state of things," but so effort was made. The daily press were too much occupied with other matters; the lectures were reported in the technical journals, which the outside public took care not to read (laughter); and so things went on year after year and nothing was done. He hoped some little interest would spring out of that meeting, and that those who had the time might do something to aid the progress of wood-carving in England (applause).

Mr. W. Cave Thomas remarked that he did not know that there was much encouragement given to wood-carvers in this country. If they went into foreign churches, they would see there figures in an artistic sense which could only have been produced by wood-carvers who had been educated as artists. The wood-carving they saw was developed in ancient times, when the art was encouraged by the noble and the rich. Now they began at the bottom end, by

schools for wood-carving. They must begin at the top, by the demand, and by demand they would get the supply.

Mr. G. C. Haité said that students at schools of art, or "students of art" as they delighted to call themselves, having learned drawing, all wanted to become artists; that was to say, they all wanted to paint pictures, as if that were the only form of art. He objected to wood-carving being termed a minor art; it was applied art.

Mr. Loftus Brock said that the British Archaeological Association would gladly receive and carefully examine at their meetings any articles of antique art, and if Mr. Rogers or any of his friends would be kind enough to send a series of wood-carvings, they would be inspected with pleasure, and he and many of his friends would be happy to do all they could to further the progress of this noble art. Referring to the wood-carving in some London churches, he observed that those who examined it must have been struck with the way in which the stiff, formal lines of the architecture were relieved by the graceful execution of the wood-carving.

The lecturer, replying to a remark made by the chairman, said he had not intended to convey the impression that Grinling Gibbons was an amateur, and not a professional carver. It was only up to the time when he was discovered by Evelyn at Deptford that he spoke of him as an amateur.

Votes of thanks were then passed to the lecturer and the chairman, and the proceedings terminated.

#### MR. WATERHOUSE'S REPORT ON THE EDINBURGH COMPETITION.

This following is the text of the report of Mr. Waterhouse, R.A., on the designs submitted in the competition for the proposed Municipal Buildings:—

"No. 20, New Cavendish-street, Portland-place, W. 14th February, 1887.  
To the Hon. the Lord Provost of Edinburgh.

My Lord,—The task with which you have honoured me of acting as the professional adviser of the Corporation in the matter of your Municipal Buildings competition, I have found to be one of no ordinary difficulty.

In the first place, the majority of the designs sent in are of greater merit than I could in such cases, so as to somewhat perplex me by the choice at my disposal. There are some ten or twelve sets of drawings out of the fifty-six, any of which would, I believe, if realised in stone, be a credit to their authors, and a conspicuous ornament even among the many which already contribute to the beauty of your city.

Secondly, the fact of the competitors themselves being left to form their own idea of the amount of money which might be expended on the building has led many of them to indulge in dreams of magnificence which, had you fixed a limit, would doubtless not have been hazarded. As no limit was assigned, I have not thought myself at liberty to exclude any design on the question of cost, though, in making this report, I have, of course, taken it, *certis paribus*, into due consideration.

I may here say that, speaking generally, it will be necessary not to place too much reliance on the authors' estimates of their designs; for whereas one may think his work can be executed for an average of 5*l.* per cubic foot, the surveyors of another competitor for very much the same class of work, value his design at 1*s.* 9*d.* per cubic foot.

The total estimates vary from 66,000*l.* to 250,000*l.*, and the number of cubic feet where given (which is not always the case) from 1,747,588 to 3,776,486, proving, I think, that a different system of measurement has been adopted in different cases.

Thirdly, the absence of perspective views has made it difficult, even to a professional eye, to judge accurately of the effect of a building on the distribution of whose masses so much depends. I am aware that the admission of perspective views in competition has been much abused; but drawings in outline only, from a given point, would have materially assisted in the solution of this problem. Generally, the absence of perspective views has made it difficult, even to a professional eye, to judge accurately of the effect of a building on the distribution of whose masses so much depends. I am aware that the admission of perspective views in competition has been much abused; but drawings in outline only, from a given point, would have materially assisted in the solution of this problem.

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The greater number of designs show one or more towers or domes, some of the former rising to a very considerable elevation. Though, no doubt, in the majority of cases, these features add materially to the beauty of the building in itself, it becomes a question whether, on this particular site, it is desirable to introduce what would render the very beautiful view of your cathedral, as seen from Princess-street, an insignificant object.

The intrinsic beauty of those features in them-

selves may, in one or two cases, overbalance this fear; but it appears to me worthy of grave consideration. The site is no ordinary one, and the building has to be considered with reference to its historical and picturesque surroundings.

By far the greater number of designs have followed broadly the main features of the present buildings as to plan,—that is to say, placing in the centre a large quadrangle. Some of the surrounding sites in this quadrangle with buildings on all sides, whilst others open it out to the south, with merely a screen, as at present, between the courtyard and the street. The plans which have followed this general scheme may also be subdivided into those which have their east and west rooms well lighted by looking into the wide quadrangle, and those which make them face the surrounding close on the opposite sides, of which there is no security against the buildings being raised even higher than they are at present.

Some competitors, though putting their rooms looking outwards,—an arrangement which has, of course, the advantage of materially shortening the length of their corridors of communication,—have taken the precaution to set back their east and west frontages to a greater or less extent, so as to permanently secure a hotter supply of light and air to their rooms looking outwards in those directions.

The one most marked exception to the foregoing general arrangement is supplied by the design numbered 11, under motto "Light and Air." This is enclosed in a close, slightly recessed from High-street, and has two wings connected with the main building by covered bridges, under which Warriston-close and Allan's-close are carried towards High-street, somewhat diverted from their present courses. The authors certainly justify, in a very remarkable degree, the motto they have adopted. Every room has the maximum amount of light and air, while the corridors and staircases are exceptionally well lighted, and there would also be, I think, quite an exceptional elegance about their colonnaded central area and staircases. Though bare of ornament and monotonous in its fenestration, the exterior maintains the same horizontal lines in every part, and is not without dignity, while the colonnades, which are carried to the ends, which would otherwise would be too severe. The disposition of the plan would produce fine masses of light and shade among the blocks of building when seen in perspective. No towers rise above the roofs to compete with that of St. Giles's, and the treatment of the steps of Warriston-close, sweeping round with their high retaining walls, give a very striking and noble effect, and considerably to the general effect. In point of cost, the design is without a rival considering its excellences, and I have reason to believe its author's estimate of 75,866*l.* is not likely to be much exceeded; while their scheme admits of the retention of the block of buildings at the north-west corner of the site. These and other considerations would influence me to give the merit and Air the highest place.

I regret, however, to have to point out that the south-west wing is so placed as not merely to divert the close from its present line (that might possibly have been allowed), but also to close up some of the windows and doors at present existing on the west side of Warriston-close. I feel, therefore, in justice to the merit and Air, cannot, on this account, recommend their design for one of the prizes.

After mature deliberation, therefore, I have come to the conclusion to recommend:—

No. 5, "Edina Classica," for the first prize.

No. 7, "Nineteenth Century," for the second prize; and

No. 40, "In my Defence" (with heraldic device), for the third prize.

No. 5, principally from its very admirable plan and elevation towards Cockburn-street (the execution of the design is beyond all praise, but that does not influence my choice); No. 7, principally from the beauty of its details, and its elevations generally, especially that towards Cockburn-street; and No. 40, principally from its general excellence of plan, refinement of details, and moderate cost.

In recommending these designs for the awards, I am painfully aware how nearly several others, some of whose merits I have had the pleasure of pointing out, have been passed over (though it was probably unnecessary to have done so), equal these in general excellence, and, if they were, are their superiors in some isolated respects; but, so far as I can judge, after a lengthy consideration, the balance is in favour of the three designs I have mentioned.

I cannot quite pass over in silence another design, No. 29 (mentioned in a sheet), which I have attempted to make your present building give you the greater part of the scheduled accommodation by adding a new north-west wing and additions to the east and west of the quadrangle; while some amelioration is given to the bareness of the north front by high-pitched roofs and well-designed chimneys. This scheme leaves some of the existing buildings on the site untouched. I do not think that the fact of its retaining so much of the present municipal offices puts No. 29 entirely out of the competition; but the omission of the Clydesdale Bank from his scheme, I think, does do so, though it is true that the author leaves unoccupied space on which it could be erected. Having alluded to this design, I ought to point out that, having kept the old building, it obliges the author to assign

to some of the principal officers apartments which would only be from 9 ft. to 10 ft. high.—I am, my Lord, your faithful servant,

ALFRED WATERHOUSE."

PROVIDENT INSTITUTION OF BUILDERS' FOREMEN AND CLERKS OF WORKS.

ANNUAL DINNER.

THE annual dinner of this excellent and old-established, but not sufficiently well-known, Institution, was held in the Venetian Saloon of the Holborn Restaurant on Saturday evening last, under the presidency of Mr. Ex-Sheriff George Burt, J.P. (late of the firm of Mowlem, Burt, & Freeman), who was supported by a large number of the members and others interested in the well-being of the Institution. The usual loyal and patriotic toasts having been disposed of (Mr. George Burt, jun., responding on behalf of the "Army, Navy, and Volunteers,"

The Chairman (Mr. Ex-Sheriff Burt) proposed the toast of the evening, "Success to the Provident Institution of Builders' Foremen and Clerks of Works." He expressed his satisfaction at presiding over such a large gathering, from which he hoped that much good would accrue to what was a very noble Institution; for it was one which not only promoted self-help amongst its members, but it afforded help to those who could not help themselves. But he thought it was very desirable to impress upon the members the need of getting others to join them, because in these days of competition every man, in the building trades especially, had to stand upright in his own shoes, and, while doing the honest best for himself, he ought to endeavour to make some provision for his own old age or for those whom he might leave behind him. Such provision he would be enabled to make by joining the Provident Institution of Builders' Foremen and Clerks of Works. He should like to see a great increase in the number of members, for of late there had been some falling off in that respect. Founded in 1842, the Institution had now been in existence for forty-five years, and it still possessed considerable funded property, so that its benefits might, with mutual advantage, be extended over a much larger number of members than it at present had on its roll. Since its establishment it had, he found, paid upwards of 6,000*l.* in pensions and funeral grants; and during the last year the amount disbursed was 258*l.* 10*s.* In short, the Institution was one well worthy of the support of the building trade, and of builders' foremen and clerks of works in particular. He regretted the absence, through indisposition, of the respected Governor of the Institution (Mr. George Plucknett), and Mr. Howard Collis had written expressing regret at inability to be present, but enclosing a subscription. In conclusion, the Chairman, after remarking that the Institution seemed to include in its ranks the *élite* of the classes for whom it was intended, the Chairman gave the toast, coupled with the name of Mr. J. W. H. Bedford, the Corresponding Secretary.

The toast was very heartily received, and Mr. Bedford, in responding, referred to the account of the work done by the Institution, as set forth in the last annual report.

Mr. J. Merrifield, the Financial Secretary, proposed "The Health of the Governor of the Institution, George Plucknett, Esq.," and expressed his great regret, which he knew was shared by all present, at Mr. Plucknett's absence. He had rendered very valuable services to the Institution, and they all wished him long life and happiness.

Mr. G. Groome, in an entertaining speech, proposed "The Donors and Honorary Subscribers," coupled with the name of Mr. Thomas Stirling, who briefly replied.

Mr. W. Horwood proposed "The Trustees" (Mr. G. Plucknett, F.S.A., Mr. P. C. Hardwick, F.S.A., Mr. W. Scrivener, and Mr. F. J. Dove), coupled with the name of Mr. Scrivener, who replied, urging the members to make renewed efforts to extend the good work of the Institution.

The Chairman, in felicitous terms, proposed "The Architects,"—for whom, unfortunately, there was no one present to reply.

The other toasts were "The Builders," proposed by Mr. Ben. Turner, and replied to by Mr. George Burt, jun.; "The Visitors," proposed by Mr. Stapleton and replied to by Mr. Scott Moncrieff, C.E.; "The Press," proposed by Mr. Thomas Stirling and coupled with the name of our representative; "The Directors and Officers of the Institution," proposed by the Chairman and coupled with the name of Mr. Groome; and "The Chairman."

During the evening subscriptions and donations to the funds of the Institution amounting to upwards of sixty guineas (including twenty-one guineas from the Chairman and fifteen guineas from Messrs. John Mowlem & Co.) were announced, although no appeal was made for funds.

It may be added that the offices of the Institution are at No. 9, Conduit-street, Regent-street, where meetings are held on the first and third Wednesdays in every month at 8:30 p.m. Inquiries on those evenings, or letters addressed to the Corresponding Secretary, Mr. Bedford, will elicit further particulars as to the working of the Institution.

THE LIVERPOOL CATHEDRAL COMPETITION.

SIR,—In order to correct the misapprehension which appears to exist as to the motives for exhibiting the Liverpool Cathedral designs in London, it can hardly be wrong to inform you that Mr. Christian, in a letter to Mr. J. O. Scott, has written that he has "no objection whatever to the exhibition of the drawings in London provided only my report is with them." He does not, of course, agree to the memorial asking for it after the resolution of the Council of the R.I.B.A. last week, yet it is obvious he does not flinch from the ordeal; and why, then, should the Institute, if it be considered that he has made any judgment at all? And if none other than that of his summary, viz.,—"There is a further and larger question that must be faced, and that is whether in any of the designs can be found the church of the future most suitable for the Cathedral of Liverpool," *à fortiori* there can be no objection to the exhibition proposed, whatever may be the private opinions of the promoters, or by whomsoever the original suggestion of it may have been made.

JOHN P. SEDDON.

1, Queen Anne's Gate, Feb. 24.

\* \* \* We insert the foregoing as a matter of personal explanation, but we regret to find that there continues to be any inclination to doubt the finality of Mr. Christian's report.

A JUDGE'S RULING AS TO PAYMENT FOR QUANTITIES.

SIR,—Will you kindly allow us to ask, through the medium of your valuable journal, the advice and, as far as possible, the co-operation of our brother architects and quantity surveyors, in defending a principle in which we believe all who supply quantities are interested?

Our case is this. We have been summoned in the Swansea County-court by a builder who has carried out some work under us, for the return of 50*l.*, being monies paid us by him some time since for quantities, together with other items for lithography, &c., charged for at the rate of 2*s.* per cent., he contending that he was not liable to pay, and ought not to have paid for such quantities. His reasons for this are immaterial, as the judge ruled that he was liable to pay for the quantities, which had been prepared with the knowledge and approval of the Building Committee of the work in question, and who were aware of the charges, which were specified in the quantities in the usual way.

The Judge, however, added that he considered the charges made for quantities were too high, and that he thought 20*l.* sufficient payment for the whole. His verdict was, therefore, that we should repay the plaintiff the sum of 30*l.*, together with all costs.

We believe your readers will at once see the effect this decision will have upon the profession; as, if such is the law,—and such it is until the verdict is upset by a Superior Court,—architects and surveyors cannot demand a greater payment for quantities than about three-quarters per cent., while they are at the mercy of any dissatisfied holder who may during the last six years have paid them for quantities at a higher rate than this, and who may choose, from spite or any other cause, to demand the return of the money.

The amount awarded, together with costs, has been paid into Court, and notice of appeal given.

This course will probably involve us in a very considerable outlay, trouble, and anxiety, and we should not have taken it, but have put up with the loss, however hard we may have considered it, had we not felt the principle involved was of so much importance. We trust such of your readers as are of the same opinion will help us to carry on the fight, and that they will, as, once, as the matter is pressing, communicate with us.

The architects of Swansea sympathise with us, and promise us their active co-operation.

BUCKNALL & JENNINGS.

Worcester-place, Swansea, February 22nd, 1887.

"MASONS' WAGES."

SIR,—I trust you will kindly allow me a small space in your next issue to reply to some of the remarks of your correspondent, "A Quarry Owner" [p. 302, ante].

It is not my intention on this occasion to say a word relative to what he said about Society men, except that I do not think anyone could form an idea from my previous letter [p. 266 ante] whether I believe in London Society Masons or not.

I do not deny that stone can be worked cheaper at the quarries; but the cause of the cheapness is not far to seek, to a practical man. A quarry owner uses fresh quarry stuff, which is of course soft and unseasoned. It is obvious that he if lime stone, grit stone, or free stone, it should be well seasoned

before being wrought; if it is not so it cannot be expected to resist the London atmosphere.

Then, again, there is the fixing of this quarry-worked stuff. Who can know better than the fixer whether it is properly worked or not? My experience is that the cost of fixing is twice what it should be, and the cleaning down much more.

Now, there is another important question connected with this subject. I have seen large quantities of worked stone delivered to the railway station, carted from there to a sub-contracting mason's yard, unloaded, kept there for some time, then reloaded and sent to the job.

Surely, if this system of sub-contracting and re-sub-letting is a genuine business, it would be better to pay the journeyman mason at the quarries a higher rate of wages and waste less in needless cartage, &c.

February 22nd, 1887. G. C. W.

SIR,—Permit me to say a few words in reply to "Quarry Owner" [p. 302, ante], or, rather, to ask if architects are not justified in having what many experienced architects specify; that is, to have the stone prepared on the job or in London. For various reasons, too numerous to mention, the proper place to work the stone is under the immediate supervision of a practical clerk of works, certainly not at the quarries. Again, stone is generally specified to be "selected." Not much chance of this when it is worked at the quarries, and the job standing for stone. It does not require a very lynx-eyed clerk of works to see at a glance if the stone is sub-let. How is it that many clerks of works appear to wince at this system of sub-letting? This is the great evil of slovenly work in any one trade, and a mere get-over work at the price paid. I think architects and clerks of works would be doing a great justice to all trades and clients to help stop this system of sub-letting work.

G. R. J.

\* \* \* On this subject we have also received a long letter, signed "Working Mason," but our space being filled before it came to hand, we cannot find room for it. The writer condemns the practice of working stone at the quarries, characterises piece-work and overtime as the "two great degenerators of the working-class," and denounces the practicability of a sliding-scale of wages for masons.

PERSHORE ABBEY LANTERN TOWER.

SIR,—May I point out the similarity between the details of Pershore tower (so cleverly shown in the elevation and section you give in the *Builder* for this date) and those of Salisbury Cathedral tower? Those curious oblong quatrefoils are exactly the same in both. The pillar buttresses between the upper windows finish with weatherings on the north side, and are much more effective than as shown in the elevation you reproduce (I quote from measured details taken some eighteen years ago) with Mr. Hawley Lloyd of Birmingham). Mr. Lloyd was of opinion that the restoration of the pinnacles was injudicious, and I agree with him that they were undoubtedly intended to finish somewhat like the turrets at Leverington, or Stamford, or Chichester, without any spires. Their outline as restored is of too early a feeling, and their height appears to dwarf the tower. Pershore men call them "table legs." When I first knew the church a part of one of the Norman arches peeped out over the lean-to roof of the fragment of the north transept; the effect was very happy, and lent additional height to the tower; it was unfortunately covered up by a higher roof, for no sufficient reason.

A few miles from Pershore is a noble tower that I had a hand in spoiling—Worcester. Behind the upper canopies were gable-looking openings, locally called "the oven mouths." They threw up the canopies boldly; we left them out, and weakened the effect.

At Malvern, those "oven mouths" may be seen in the same position; though they are smaller, the effect is good. The great turrets at Worcester were damaged by widening the bases of the spires, thus swallowing up the charming little cluster of pinnacles and flying buttresses round them.

In restoration, it is unsafe to indulge in improvements. The old Goths knew what they were about. We copyists do not, always.

W. LUNS.

Southsea, Feb. 19.

"WASH-OUT" VERSUS VALVE CLOSETS.

SIR,—In reading your report of the eighth meeting of the Architectural Association [p. 198, ante], and the discussion which followed thereon [p. 264, ante], I was much struck at the prejudice shown against wash-out water-closets. In fact, to my mind, it appeared that those who spoke in favour of the valve-closet could not have had experience of the "wash-out." I fitted up in a proper manner with a syphon cistern giving a full flush, such as are in common use here in Southsea.

The advantages of the wash-out over the valve closet are that it can be procured in glazed earthenware, trap and all; there is no action beneath the seat to corrode or get out of order, and the bottom of the pan will not corrode (as stated by Mr. Smoother), if only ordinary cleanliness is used, the same as is necessary with any other apparatus.

For my part, as owner of large property fitted up

with "wash-outs," I emphatically pronounce them to have proved perfect sanitary closets, and as a practical builder and plumber am certain that I am competent to judge. A. G. GERMAN.  
Southsea, Feb. 12th, 1887.

WASTE WATER FOR FLUSHING WATER CLOSETS.

SIR,—In reply to your correspondent [p. 302, *ante*], in reference to the above, permit me to say that there are apparatus in this town for flushing water closets by using waste-water from slop-stones, sinks, lavatories, down-spouts, surface-water, &c., and which are actuated in a similar manner to the ordinary water-closets generally in use. It may, however, be worked by the foot, the seat, or the door. A much better flush is obtained, which is caused by the large volume of water which may be used each time, and the impetus given to it; the result having a most salutary effect. A saving of forty per cent. on the present mode of construction is obtained.

By the use of this system 2,737l. 10s. per annum is saved in the cost of 73,000,000 gallons of town's water, which would be used by every 10,000 closets on the ordinary principle.

Three hundred pounds a year is also saved in reducing the volume of sewage to be treated at the sewage works by 73,000,000 gallons, making a total saving yearly, per 10,000 closets, of 3,037l. 10s., exclusive of the saving of forty per cent. on the original cost of closets.

I may also add, for the information of "Health" that any ordinary water-closet can be altered to the system under notice, where the water-rate and other charges would be saved.

The inconvenience caused by the freezing of the water-closet cast-iron, and the consequent inoperative condition of the water-closet, rendering it unfit for use,—otherwise than to cause a nuisance,—is obviated.

The nuisance referred to as being caused by using the closet when frozen has resulted, in a prolonged frost, in very serious consequences to health. In conclusion, I may say that the system is causing much interest in this neighbourhood, on account of its simplicity and effectiveness, and in my opinion, it will soon be generally adopted.

I shall be pleased to furnish any further information on the subject, either to your correspondent "Health," or any of your readers.

JAMES T. PEARSON.  
Borough Engineer's Office, Bursley, Feb. 23.

WILLESDEN PUBLIC OFFICES COMPETITION.

SIR,—In your criticism of the plans submitted for the Willesden Local Board Offices [p. 301, *ante*], you state that the design "Bona Fide" has the Surveyor's office to the south. Permit me to explain that I proposed, as an alteration, to face the building to Dunster-gardens, which would then give the Surveyor his north light, and admit of the front building being seen from the main road. But a similar position would be maintained if it faced the Dyne-road by simply reversing the plan. This is clearly shown on the block plan, which escaped your notice.

THE AUTHOR OF THE DESIGN "BONA FIDE."  
Feb. 21st.

AUSTRALIAN INTERCOLONIAL RAILWAY COMMUNICATION.

SIR,—Your sanguine anticipation [see "Notes," p. 276, *ante*] of the time when it will be possible to run a through train from Perth to Brisbane through the capitals of the Australian Colonies will unfortunately not be realised yet awhile, if ever, as the several Governments have taken careful precautions to thwart such an arrangement by providing each colony with a different gauge (with one important exception from its neighbours). They are as follows, in geographical order:—Western Australia, 3 ft. 6 in.; South Australia, 3 ft. 6 in. and 5 ft. 3 in.; Victoria, 5 ft. 3 in.; New South Wales, 4 ft. 8 in.; Queensland, 3 ft. 6 in. The exception is of importance, since through South Australia luxuriating in two gauges, and the chief lines round Adelaide being on the 5 ft. 3 in. gauge, the main line connecting Adelaide with the Victorian railways agrees with them as to gauge, and through trains in this one case will be able to run through between Adelaide and Melbourne. This line is just finished, if it be not already opened, and will be used for conveying the English mails to Victoria and New South Wales, and will lessen the present time considerably.

That most stupid of engineering blunders a break of gauge has already become a serious nuisance on the through line between Melbourne and Sydney, and it is, perhaps, not too much to hope that the powers that be in Victoria and New South Wales may before long see their way to reforming it, either by reducing the Victorian gauge or widening the New South Welsh. The latter would be the better, as it would cost a little less, and would provide a larger cylinder-space in future engines, which will

be found of great value as goods traffic develops. Whether, however, the Queensland gauge question could be tackled at the same time is more doubtful, but it will have to be done some day, and the sooner the cheaper. Western Australia is perhaps too poor to venture on anything more expensive than the lightest 3 ft. 6 in. lines. H. C. S.  
Feb. 19th.

The Student's Column.

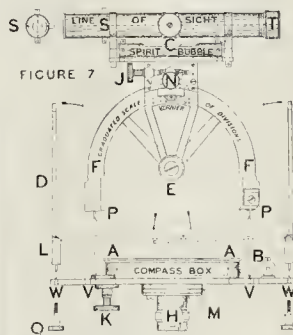
FIELD WORK AND INSTRUMENTS.—IX.

Surveying Instruments.

VIII.—THE CIRCUMFERENTOR (continued).

THE efficiency of instruments to be used as circumferentors has of late years been improved in many ways. In Lean's miners' dial, illustrated by fig. 7, it will be observed, in the first place, that the gimballing action which was seen to be attached to the compass-box in figs. 1 to 5 of our last article is here omitted, and that the two side arms which carry the folding sight-vanes are permanently fixed parallel to the compass dial. The sight-vanes, D, can be removed and the direction ranged by a telescope, which traverses a vertical arc, marked F, above the compass-box, by which arrangement all vertical angles are measured. The vertical arc consists of a flat metal ring about 1 1/2 in. wide, 3/8 in. thick, with pieces radial to its centre marked E, to which is attached a saddle body-piece carrying the telescope. Upon each face of the arc a scale of divisions is engraved,—one scale shows vertical angles in degrees from zero to 90°, marked from about the centre outwards, the subdivisions being recorded by a vernier upon which an index-arrow registers the angle to be read. The vernier-plate is attached to the traversing body-piece of the telescope. By means of an index arrow marked upon a plate fixed at the back of this vernier-plate, and which points to a scale upon the other face of the arc, the horizontal equivalent of any measurement taken along an inclined plane can be arrived at; the scale giving the difference between the hypotenuse and the base of a right-angled triangle in terms of the number of links to be deducted from one chain's length of 100 links, when measuring up or down a plane inclined to the vertical at the angle indicated by the scale of degrees marked upon the face of the arc first described. The difference arrived at by calculation would amount to 154 links in 100 links for an angle of 10°, 644 links in 100 for 20°, 1544 in 100 for 30°, 3055 in 100 for 40°, and 4144 in 100 for 45°. The arc upon which the scales are marked gives the nominal size of the instrument. If the circle of divisions has a diameter of 6 in., this instrument would be called a Lean's 6-in.

LEANS DIAL



miner's dial. Both the sight-vanes, D, and the vertical arc, F, are each secured as required to the side arms of the compass-box by the set-screws marked Q, the sight-vanes being attached at the holes marked W, and the vertical arc at the holes marked V. The telescope can be clamped to the arc by means of the milled-headed screw marked N, the tangent screw, marked J, being intended for slow motion in final adjustment when the screw, N, is tightened. When the index attached to the sliding vernier stands at zero, the line of sight in the telescope (which joins the centre of the diaphragm, marked S, with the optical centre of

the object-glass, T) should be parallel to the dial in the compass-box, and when the telescope is so clamped the compass-box can be set level by means of the long spirit bubble, marked C, which is fixed under the telescope, and the transverse or short bubble, marked B, upon the projecting arm of the compass-box. The needle is set free by withdrawing the lever stop-piece, M, and having set the N or 360° marked upon the compass-dial so as to coincide with the north point of the magnetic needle when at rest, as described in our last article, the compass-box with the arms carrying the sight-vanes, or arc and telescope may be made to turn round the dial by means of the milled head, K, of the pinion working the revolving gear.

In Hedley's dial, which is so well known among mining engineers, by a special arrangement of the plates the vernier is often placed on the outside circumference instead of inside the compass-box. The necessity of reading from above the dial face is thus obviated. The concentric action of the dial plates in this instrument may be tested by setting the needle and vernier to 360°, and then revolving the plates by means of the vernier screw and reading off the four quarters.

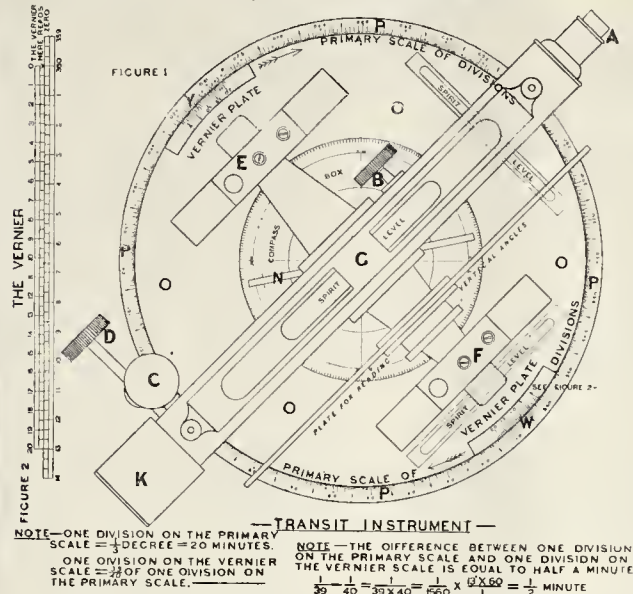
In the more expensive forms of circumferentors to which a telescope is attached we find parallel plates sometimes substituted for the ball-and-socket head. These plates clamp the body of the instrument and are screwed on to the head of a tripod stand, the horizontal position of the compass-box being determined in setting up by means of one or more spirit levels so fixed as not to interfere with the action of the needle. The circumferentor under these circumstances so nearly resembles another instrument, that the further additions, made with a view to its improvement, will be best understood by proceeding to describe the theodolite.

IX.—THE THEODOLITE.

In mining operations all angles are measured from the magnetic meridian, and the attachment of a telescope and outside vernier to a circumferentor is often asserted to render the instrument capable of performing the same operations in surveying, as a theodolite. The superiority of a theodolite will be admitted, when it is remembered that the accuracy of observation in an ordinary dial entirely depends upon the fine performance of the needle, while the theodolite records angles between any two or more given directions independent of the magnetic meridian. Great care must be exercised in taking the bearings with a circumferentor. Any iron plates or rails near the instrument would exert an influence to disturb the needle. The ordinary magnetic needle when mounted so as to be free to move in any direction would come to rest in a position which would be not only so many degrees to the west or east of the astronomical or true north, but its north end would also dip. The mean magnetic dip at Greenwich is at present equal to an angle of about 67°. The needle in a compass-box is, however, so pivoted as to be constrained to move in a horizontal plane only, and by means of a sliding counterpoise, which is attached so as to be adjustable upon the needle itself, the tendency to dip is obviated. The compass-box attached to a circumferentor being usually of a large diameter, it is necessary to ascertain that the long needle which it contains is properly balanced to obviate the effects of dip.

Referring to fig. 1, which illustrates the plan of a theodolite, it will be seen that the eye-piece of the telescope is marked A, and the object-glass end, K, that the telescope is balanced upon an axis which is supported upon verticals marked E and F, which are attached to a top-plate carrying one or more verniers. Thus, the telescope can be reversed in its standards, both at the eye and object-glass ends. In fig. 1 two verniers are shown in positions marked W and Y, and the plate marked O, which carries them, slides over another plate marked P, the outer edge of which is bevelled to the figure of the frustrum of a cone, and contains the primary scale of divisions graduated to read continuously round it with the sun, to 360 degrees. The faces of the verniers are continuations of the same conical surfaces, and are graduated to read to the required sub-divisions. The vernier shown in fig. 1 reads to 30 seconds. An arm projecting from the vernier-plate marked O carries the screw

THE THEODOLITE



C for clamping the verniers, after the telescope has been ranged, when viewing an object in a manner about to be described; and the tangent screw D is for moving the vernier-plate a small amount, in order to accurately set it to any required angle, or to set the line of sight in the telescope truly in the correct direction. The object viewed is focussed in the telescope by means of the milled-head marked B, which acts upon a rack and pinion inside the telescope, and moves an inner tube containing the object-glass backwards and forwards in a perfectly straight line within the outer tube, which holds the eye-piece. For convenience of reading the verniers they are placed in any suitable position upon the arc, but not under the line of the telescope. In fig. 1 they are shown in a line at right angles to the telescope. The lower plate, marked P, is made to revolve round the vertical axis of the instrument, and can be clamped in any required position, as will be explained in our next article. The diameter of the circle formed by the graduations of the primary scale of divisions gives the nominal size of the instrument.

4,603, Bench Plugs. J. Rawlings.  
The subject of this invention consists of two or more iron plugs dropped into holes in the bench made at suitable intervals, whereby the work is held fast while being operated upon. Rubber rings or washers may be used in conjunction with the plugs if required.

7,455, Automatically Latching Doors. J. Kaye.  
The principal object of this invention is to temporarily latch one of a pair of folding-doors. The principle on which it works is by employing a latch which is the segment of a circle mounted on a fulcrum, as in locks previously patented by the same manufacturer. A lever affixed is free when the second door is open, but on pressure being applied to the door held by the automatic latch, it will yield, thereby allowing the door to be opened. The automatic latch is also applicable to single doors, and may be used instead of a ball-latch.

12,333, Ventilators, &c. J. Weatherhead.  
The object of this invention is to make cow-heads of the ordinary funnel shape, in fewer parts and with less riveting than by the old methods. Two blocks are used, and these, with a series of springs, are fixed, and on hydraulic pressure being applied the cowl is bent to the required form.

2,707, Mounting Gutters. E. J. Hurley.  
For the support of the gutters, wrought-iron brackets are, according to this invention, constructed, so that in addition to the nail or screw support at the top and bottom, they may be further secured from the outer edge of the bracket encircling or supporting the gutter or trough, and by means of a long screw passing through this outer edge of the bracket over the gutter and into the fascia-board.

2,701, Improvements in Chandeliers. W. F. Stanley.  
This invention consists in rendering the chandeliers more slightly and compact by hiding the chain and weight arrangement, at the same time offering greater security from accidents and preventing the evaporation of water. A plated textile band is used in place of the chains and weights, slide in a double tube, which hides the action from sight. The arrangement can also be adapted to electroliers.

6,360, Burglar Alarm. National Manufacturing Company.  
The subject of this patent consists in an arrangement of bells and striking mechanism set in motion by the opening of door or window. An index-hand tells where an entrance is attempted.

6,337, Spirit Levels. W. W. Hulse.  
This patent relates to a spirit level with a graduated vertical limb, so that vertical lines and surfaces may be tested without the use of a square, and provision is also made for testing small deviations from vertical and horizontal positions by the marks on the separate limbs.

\* The principle of this invention was more fully described and illustrated in the *Builder* for October 9, 1886, p. 639.

6,444, Wedges or Keys. W. Strapp.  
In place of the wooden keys used in constructive work for sleepers, and the like hollow wedges of steel, iron, or phosphor bronze are, according to this invention, used.

6,474, Hoists and Lifts. John Barrett.  
To open and close the doors automatically, rack and pinion gearing is used which is actuated by cords or chains passing over grooved pulleys. The top doors on each floor being connected by a cord or chain to a barrel attached to the respective pulleys which actuate the doors below.

NEW APPLICATIONS FOR PATENTS.  
Feb. 4.—1,759, C. Ford, Surface Tiles for Walls, Ceilings, Floors, &c.—1,784, J. Griffin, Saw Sharpening, Setting, and Ranging.—1,789, J. Lockerie, Locks and Latches.—1,790, J. and E. Podmore, Rush Fasteners.—1,782, G. Harvey, Gutter Brackets.—1,811, W. Thompson, Warming and Ventilating Building.  
Feb. 5.—1,836, R. Cozens, Door Handle and Spindle.—1,889, R. Holmes and B. Suggen, Operating Bars for Doors or Hinged Windows for Excluding Cold, Rain, &c.

Feb. 7.—1,893, E. Allwright, Cowl or Wind Guard for Chimneys or Ventilators.—1,908, S. Kristensen and A. Jensen, Casement Fittings.—1,919, P. Cornish, Pavements and Curb Stones.—1,927, R. Scott, Decorating Detachable Wall and Ceiling Surfaces.  
Feb. 8.—1,943, H. Peach, Roof Glazing.—1,954, G. Smith, Door Fasteners and Locks.—1,960, G. Redfern, Constructing Harbours, Piers, Breakwaters, &c.—2,000, R. Rew and Others, Heating and Ventilating.  
Feb. 9.—2,008, G. Evans, Roof Tiles, Single Lap and Weathertight.—2,015, W. G. Winnett, Corrugated Iron or Metal Roofs.—2,029, P. John, Electric Bells.

Feb. 10.—2,112, J. Harris, Water-closets, and Ventilating Soil-pipes of same.—2,113, Walker and Bell, Raising, Lowering, and Securing Window Shades.  
Feb. 11.—2,148, W. Bruce, Covering of Walls, &c.—2,160, Middleton and Brown, Flushing Water-closets.—2,161, T. Higgins, Dentsils for Finishing Wood Mouldings.

Feb. 12.—2,217, W. Eaves, Window-sash Fasteners.—2,244, F. Taylor, Door Bolts, Latches, and Locks, and Attaching Knobs and Handles to Spindles.  
Feb. 14.—2,281, J. and T. McCallum, Ventilation of Saws and Drains.—2,290, Young and Moss, Fireplaces.—2,291, Young and Moss, Ventilating Apparatus.—2,300, R. Fyne, Window-sash, Casement, or Door Fastener.—2,305, Doulton and Parker, Ornamenting Pottery, Tiles, or Glass.—2,307, D. Doyen, Closing and Securing Doors.—2,315, H. Lake, Ventilating Apparatus.

Feb. 15.—2,323, J. Hookham, Fittings for Sliding Sashes, &c.—2,325, J. Morley, Flush-out Water-closets, Traps, Fittings, &c.—2,337, Taylor and Davis, Attaching Door and other Knobs to Spindles.—2,363, Arnold and Young, Cement.  
Feb. 16.—2,412, H. Hoole, Attachment of Fire-bars to Register and other Grates.—2,428, Sir G. Chubb and Others, Locks and Door Fastenings.

Feb. 17.—2,460, M. Cockburn, Cooking ranges.—2,482, W. Tuffe, Manufacture of Portland Cement, Bricks, Tiles, &c.—2,508, J. Sutherland, Mortising Machine.—2,513, Little and Hall, Construction of Timber Roofs.

PROVISIONAL SPECIFICATIONS ACCEPTED.  
15,904, R. Davison and W. Creed, Wood block flooring.—16,357, R. Warwick, Farquetry Work.—16,840, J. Reid, Rendering Doors, Windows, &c.—Draughtproof.—16,922, E. Clarke, Briquette.—11,116, E. Moore, Curing Dam Walls.—215, H. and A. Cunningham, Wood Screws.—315, G. Hardingham, Iron Cement.—577, P. Justice, Cement.—584, P. Barrett, Counterbalancing Sliding Sashes or Windows.—777, N. Leroy, Portable Wooden Houses.—811, G. Harcourt, Door Check.—1,167, A. Boul, Lighting Gas Burners by Electricity.—1,178, W. Sinclair, Spiral Staircases.—1,191, R. Walker and F. Mills, Securing Wood Flooring Blocks.—1,327, C. Williams, Covering Ironwork with Fireproof Encasements.—16,496, J. Myatt, Drain Chains or Rods.—797, Hussey and Clark, Roofing Tiles and Slates.—1,272, E. Gietart, Door Locks.—89, H. Owens, Opening and Closing Fanlights, Skylights, Ventilators, &c.—609, Bradie & Prior, Fire Grates.—642, F. Hadlow, Artificial Stone or Cement.—1,414, W. Barnes and Others, Paint Brushes, &c.—1,448, J. Bidder, Chimney Cowl or Ventilator.—1,567, J. Guest, Ladders and Steps.—14,071, W. Ellis, Spring-bolt for Securing Doors and Windows.—16,094, J. Seymour, Window Fastenings.—16,847, F. Gilling, Bolts for Doors, &c.—17,019, C. Hensley, Building Hollow Walls.—296, Francis & Carey, Combined Latch and Bolt for Doors.—325, A. Boul, Adjusting Saw Blades in Saw-mills.—388, A. Beauvais, jun., Automatic Bolt for Double Doors.—1,188 and 1,190, E. Ellington, Hydraulic Lifts.—1,463, B. Bancroft, Automatically Closing Doors.—1,636, M. Stansfield, Counterbalancing Sliding Windows or Sashes.—1,688, D. Sorfleet, Automatic Draught-Preventer for the Bottom of Doors.—1,730, Gibson & Clazier, Closing the Space Underneath Doors when Shut.—1,733, W.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.  
3,290, Drawing-boards, &c. B. K. Wehber.  
In order that the T-square and drawing-board may be used with greater accuracy and facility, and to protect the same from damage, the inventor makes a groove parallel to the edge of the board, and at right angles to the top and bottom. The head of the T-square is then fitted in the groove, or a fillet is fitted so that the blade of the square is at a perfect angle. By an arrangement of thumb-screws the blade of the T-square may be moved to any desired angle, while the head of the square is kept true to the groove in the board.

3,318, Bending or Shaping Timber. J. A. Dover.  
This invention refers to an arrangement for curving timber, and consists of a series of bolts fixed on a platform, to which a flexible bar is bent to curves which are adjusted by means of screws. The timber to be bent is steamed and then laid along the bent bar, and clamped to it until it assumes its shape.

3,549, Dovetailing. S. Warburton.  
This invention relates to a combination of saws and cutters fixed in a socket to form a chisel that can be used in an ordinary mortising machine. The saws are taper, and a chisel is fixed between the two saws, so that a feather-edge is cut when this combination tool is used. The wood is placed also at an angle, and the saws used without the chisel, and this produces a groove for the dovetail. A slight modification also insures a "blind"; that is, where the dovetails do not show through.

Reynolds, Substitute for Stained Glass.—1,740, J. Geta, Forming Water-tight Joints for Doors or Windows.—1,754, Purdon & Walters, Door Closer.—1,811, W. Thompson, Warming and Ventilating Buildings. &c.

COMPLETE SPECIFICATIONS ACCEPTED. Open to Opposition for Two Months.

1,816, W. Joy, Charing Cement Kilns.—3,028, R. Beattie, Air-light Inspection Chamber for Drains.—3,013, G. Buffham, Ventilators.—4,784, T. Walrod, Connecting Drains to Main Drain or Sewer, &c.—4,765, J. Kaye, Locks for Sliding Doors, &c.—4,803, C. Bellamy, Fire Grates.—4,824, B. Verity, Ventilating and Warming Buildings.—4,921, C. Taylor and A. Ross, Coupling Piece for Gas and Water Pipes and Fittings.—6,103, E. Flint and W. Knowles, Hinges.—16,983, W. Thompson, Planing and Dressing Slates.—17,008, W. Sonnet, Portland Cement.—4,235, Stoffert and Dykes, Girders and Timber and Fireproof Floors.—4,887, Giles and Petrie, Decorating Lincrusta Walton, &c. for Walls.—3,547, Brodie & Prior, Fire-grates.—3,790, Brodie & Prior, Stuffing-mounting Glass and applying it to the covering of Walls, Ceilings, &c.—5,237, T. Fawcett, Brick-making Machinery.—5,241, W. Cheal, Attaching Soil-Pipes to the Earthenware Water-closets, Drains, &c.—5,371, J. Macmillan, Inlet Ventilators.—643, J. Cropper, Window Sashes and Frames.—2,566, P. Bowden, Brick and Tile Making Machinery.—3,303, J. Denny, Embossed and Geometrical Tiles, Mosses, &c.—5,351, R. Bradshaw, Carrying-off Table for Brick and Tile Machines.—9,778, A. Black, Up-Current Ventilator.—12,277, J. Goodwin, Window Sash-Fastener.—781, H. McDonnell and Others, Ornamental Coverings for Walls, Ceilings, &c.—788, A. Boul, Water-closets.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

Table with columns for date (e.g., FEBRUARY 14, FEBRUARY 15), property description, and price. Includes entries like 'St. Pancras—19, Hastings-street, 19 years, ground-rent 6l. 5s.' and 'Walworth—18 to 24 even, York-street, freehold...'

MEETINGS.

SATURDAY, FEBRUARY 26. Architectural Association.—Visit to St. George's Cathedral Schools. 2.30 p.m. (See advertisement this week.) Civil and Mechanical Engineers' Society.—Visit to the new drainage works at the Houses of Parliament. 2 p.m. Edinburgh Architectural Association.—Visit to Catholic Apostolic Church and College of Physicians. MONDAY, FEBRUARY 28. Royal Institute of British Architects.—Mr. Josiah Conder on "Domestic, Civil, and Palatial Buildings in Japan." 8 p.m. Royal Academy of Arts (Lectures in Architecture).—Mr. G. Aitchison, A.R.A., on "Doorways." 8 p.m. Society of Arts (Lectures).—Mr. W. Y. Dent on "Building Materials." III. 8 p.m. Clerks of Works Association.—Fourth Annual Dinner. Professor T. Roger-Smith in the Chair (Holborn Restaurant, 7 p.m.). TUESDAY, MARCH 1. Institution of Civil Engineers.—Mr. John James Webster on "Dredging Operations and Appliances." 8 p.m. Society of Arts (Foreign and Colonial Section).—Mr. Edward Cunliffe-Owen on "The Colonial and Indian Exhibition." 8 p.m. Society of Biblical Archaeology.—Miss Gornio on "The Casils, and the Mosque of Mecca." 8 p.m. Birmingham Architectural Association.—Mr. J. W. Tonks on "Heraldry in Modern Art." 7.30 p.m. WEDNESDAY, MARCH 2. Carpenters' Hall, London Wall (Free Lectures to Building Artisans).—Mr. Banister Fletcher on "English Carpenters and Foreign Competition." 8 p.m. British Archaeological Association.—(1) Dr. Woodhouse on "Inscriptions in Fulham Churchyard." (2) M. Ch. Roesler on "Discoveries at Trepert." (3) Rev. Dr. Hooppell on "Excavations at Vinovia." 8 p.m. Civil and Mechanical Engineers' Society.—Mr. B. Houghton on "Ware Percussion." 7 p.m. Society of Arts.—8 p.m. St. Paul's Ecological Society.—Mr. W. Bolton on "Some Little Known Churches near London." 7 p.m. Builders' Foremen and Clerks of Works' Institution.—8.30 p.m. THURSDAY, MARCH 3. Royal Academy of Arts (Lectures in Architecture).—Mr. G. Aitchison, A.R.A., on "Windows." 8 p.m. Royal Archaeological Institute of Great Britain.—(1) The Rev. Preceptor Venables on "The Recent Discovery of the Foundations of St. Hugh's Ape at Lincoln Minster." (2) Mr. H. S. Dale on "Glastonbury Abbey." 4 p.m. Edinburgh Architectural Association.—Mr. D. MacGibbon on "Architecture in the South of France." 8 p.m. FRIDAY, MARCH 4. Architectural Association.—Mr. A. Baker on "Welsh Churches." 7.30 p.m. Society of Arts (Indian Section).—Major-General Sir F. J. Goldsmid on "Our Trade Routes to the East." 8 p.m. Institution of Civil Engineers (Students' Meeting).—Mr. Sidney H. Wells on "Propelling-Machinery of Modern War-ships." 7.30 p.m. SATURDAY, MARCH 5. Association of Public Sanitary Inspectors.—Mr. J. A. Davenport, C.E., on "Rural Sanitation." 6.30 p.m. Architectural Association.—Visit to the Church of Corpus Christi, Brixton-rise, and St. Mary's Church, Clapham. 3 p.m. (See advertisement.)

MISCELLANEA.

"Charing Cross-road, W.C."—At the meeting of the Metropolitan Board of Works on the 18th inst., on the recommendation of the Works and General Purposes Committee it was resolved that the name "Charing Cross-road, W.C." be applied to the new thoroughfare just formed by the Board between Charing-cross and Tottenham Court-road. We think the name a very cumbersome and awkward one, and adhere to the opinion expressed by us last week (p. 276, ante), that "Nelson-avenue" as proposed by us, would have been both distinctive and appropriate, as commemorating a great personage in English history, whose name is not associated with any important street in London. A correspondent writes suggesting the name "Alexandra-avenue," in compliment to H.R.H. the Princess of Wales. The new street is to be opened this Saturday, the 26th inst., by H.R.H. the Duke of Cambridge.

The Proposed Imperial Institute Competition.—It is announced that the following are the names of the architects who have been selected to prepare competitive plans for the Imperial Institute:—Dr. R. Rowand Anderson (Edinburgh), Mr. Arthur W. Blomfield, Mr. Thomas E. Colcutt, Messrs. T. N. Deane & Son (Dublin), Mr. Thomas G. Jackson, and Messrs. Aston Webb & E. Ingress Bell. The committee of selection consists of Lord Herschell, the Earl of Carnarvon, Sir Frederic Leighton, P.R.A.; Sir Frederick Abel, C.B., D.C.L., F.R.S.; and Mr. Alfred Waterhouse, R.A.

Clerks of Works' Association of Great Britain.—Prof. T. Roger Smith, F.R.I.B.A., will preside at the fourth annual dinner of this Association, which will take place at the Holborn Restaurant on Monday evening next.

New Colonial Warehouses in Wapping. A large block of warehouses and offices has just been erected in High-street, Wapping, by the Colonial Warehouses Company. The buildings have their main frontage to High-street, 95 ft. in length, and are carried to a mean depth in Crown-street of 144 ft. They are 40 ft. in height from the street level, and contain eight floors, in addition to a basement of the structure in depth, the entire floorage of the structure being thus close upon 11,000 ft. The principal frontage in High-street, and also the return elevation in Crown-street, are faced with stock brick and blue Staffordshire brick, all the windows to the several floors having segment heads and iron sashes. A massive cornice, 6 ft. in depth, in Portland stone, surmounts the two frontages, above which is a very good flat roof, surfaced with Claridge's asphalt. All the floors rest on iron columns, varying from 9 in. to 15 in. in diameter, the whole of the columns to the several floors being 200 in number. The basement and ground floors, like the roof, are laid with Claridge's asphalt. Iron doors to the several floors shut off from each other the different compartments, these, with the internal dividing walls, being a preventive of communication in case of fire. These doors and other ironwork in the building, have been supplied by Messrs. Jewiss & Son, of Gainsford-street, Bermondsey. A lift in the basement, worked by steam-power, connects the different floors from the ground to the top of the building. A bridge, crossing High-street, at the level of the second floor, connects the warehouses with those of the company on the wharf on the margin of the river. In carrying out the works, the sanitary arrangements of the structure have received special attention. These, including the lavatories, closets, and urinals, have been furnished by Messrs. Jennings, of Stangate, Lambeth. The architect is Mr. Horace Alexander, of Cannon-street, E.C., and the contractor is Mr. B. Nightingale, of the Albert Works, Lambeth. Mr. Place is clerk of the works, and Mr. J. W. Read the general foreman. The asphalt portion of the works has been admirably carried out under the superintendence of Mr. West, manager to Claridge's Company. The estimated cost of the buildings is from 20,000l. to 25,000l.

Building Operatives at Toynbee Hall.—In response to an invitation of the Warden and residents of Toynbee Hall, Whitechapel, about fifty of the workmen employed by Messrs. Lathey Brothers, of Battersea, in building Toynbee Hall and Library, met the residents there on Thursday evening, the 17th inst., where they were warmly welcomed by the Rev. T. G. Gardner on behalf of the Warden (the Rev. S. A. Barnett), who was unavoidably absent. After an excellent supper, the Chairman spoke thanking the company for their attendance and complimenting them on the satisfactory manner in which the works have been carried out, and concluded by proposing the prosperity of the firm of Lathey Brothers. This was responded to by Mr. Edwin Lathey. The party then adjourned to the drawing-room, where a most enjoyable evening was spent, readings, recitations, and singing forming part of the programme. A hearty vote of thanks, proposed by Mr. E. H. Middleton and seconded by Mr. Lathey, was carried unanimously.

The Laws of God in Relation to Health.—This was the subject of an interesting and suggestive address by Professor Atfield, delivered last week by him as President of the Hertfordshire Natural History Society. The address dealt with "the food we eat," "the fluids we drink," and "the clothing we wear," in a manner which might be expected from a professor of chemistry and analyst, and it included much good counsel. We are not a little doubtful, however, of the wisdom of all that the lecturer said about the carriers of effete matters. If considerations of space permit we may return to the subject next week.

"Wrought Iron."—This was the title of a paper read by Mr. J. Starkie Gardner, F.G.S., before the Applied Art Section of the Society of Arts on Tuesday evening. We will return to the subject next week.

Lifts.—The new branch of the Bank of England, adjoining the Royal Courts of Justice, will be fitted with three hydraulic lifts, to be constructed by Messrs. Clark, Bunnett, & Co.



**British Archaeological Association.**—At the meeting of this Association on Wednesday, the 16th inst., Mr. C. H. Compton in the chair, the progress of the arrangements for holding the Congress at Liverpool was reported. Mr. Roach Smith, F.S.A., referred to various Roman interments found in Kent in relation to the leaden sarcophagus which has recently been found at Plumstead. The sarcophagus was found of cast metal, the lid being bent over the sides, and a cross salivire was scratched upon it. The interment was that of a young female. No articles whatever were found. It is more than probable that the site is that of a Roman cemetery, since urns with bones have since been found. The Rev. Mr. Lewis read a description of some curious fourteenth-century glass in the Church of St. Edmund, Kingsdown, Kent,—a building which is found to possess a Saxon tower, while the cores of the walls of the church most probably also belong to the same early period. Mr. Earle Way produced several fine fragments found in Southwark, and Mr. Loftus Brock, F.S.A., some examples of Castor ware found in the Eastern Counties. The Rev. S. Surtees described the little-known Frith Stool, in Sproughton Church, Yorkshire, and referred to the boundary crosses in the locality which marked the extent of the ancient sanctuary. The bases of several of these he had discovered. They appear to be of Saxon date, the same early period being claimed for the Stool, which is of stone, carved with figures. A paper was then read on the Communion-plate in Peterborough Cathedral, by Mr. J. T. Irvine. The great bulk of the articles are of comparatively modern date. A second paper was then read, prepared by the Rev. L. H. Ward, on some parochial records preserved at Wing Church, Bucks, transcripts of which were read by Mr. W. De Grey Birch, F.S.A., in the absence of the author.

**Sale of Suburban Building Land.**—Last week Messrs. Baker & Sons submitted for sale at the Auction Mart, several plots of building land in Chelsea, Baling, Harrow, Finchley, and Teddington. For the plots in Chelsea, on the "New King's-road Estate" of the National Land Company, there was only a limited demand, but those at Baling, on the "Ealing Park Estate"; at Harrow, on the "Metropolitan Estate"; at Finchley, on the "Older's Hill Estate"; and at Teddington, on the "Teddington Weir Estate," were all sold. The Ealing plots, each containing frontages of 16 ft. and a depth of 110 ft., were sold for 25l. each. Those at Harrow, containing 18 ft. frontage and a depth of 140 ft., realised from 34l. to 42l. each; the Finchley plots, 35 ft. frontage and 140 ft. in depth, were sold for 91l. and 92l. each; and the Teddington plots, 25 ft. frontage and 140 ft. in depth, realised from 51l. to 53l. each. The total proceeds of the sale amounted to about 1,800l.

**The New Offices of the "Yorkshire Post," Leeds.**—Mr. J. C. Edwards, of Ruben, writes to say with regard to this building, illustrated and described by us last week, that the "red Ruben bricks" and the terra-cotta were manufactured at his works.

**TIMBER (continued).**

|                                   | £. s. d. | £. s. d. |
|-----------------------------------|----------|----------|
| Cedar, Cuba .....foot             | 0 0 3    | 0 0 3    |
| Honduras, &c. ....                | 0 0 2    | 0 0 3    |
| Balsa .....foot                   | 0 0 2    | 0 0 3    |
| Mahogany, Cuba .....              | 0 0 4    | 0 0 6    |
| St. Domingo, cargo average .....  | 0 0 4    | 0 0 6    |
| Mahogany, Mexican, cargo av. .... | 0 0 3    | 0 0 4    |
| Tobago ..... " .....              | 0 0 4    | 0 0 6    |
| Honduras " .....                  | 0 0 4    | 0 0 6    |
| Maple, Bird's-eye ..... " .....   | 0 0 6    | 0 0 8    |
| Rose, Rio ..... ton               | 7 0 0    | 10 0 0   |
| Balsa ..... " .....               | 0 0 2    | 0 0 3    |
| Box, Turkey ..... ton             | 5 0 0    | 15 0 0   |
| Satin, St. Domingo .....foot      | 0 0 6    | 0 0 10   |
| Porto Rico ..... " .....          | 0 0 6    | 0 0 10   |
| Walnut, Italian ..... " .....     | 0 0 4    | 0 0 5    |

**METALS.**

|                                       | £. s. d. | £. s. d. |
|---------------------------------------|----------|----------|
| Iron—Bar, Welsh, in London, ton       | 4 7 6    | 4 15 0   |
| "    "    "    Wales .....            | 4 2 6    | 4 7 6    |
| "    "    "    Stafford, London ..... | 5 10 0   | 6 0 0    |
| Sheets, single, in London .....       | 6 15 0   | 6 10 0   |
| Hoops .....                           | 6 0 0    | 7 0 0    |
| Nail-roads .....                      | 5 15 0   | 6 10 0   |

**COFFEE.**

|                                   | £. s. d. | £. s. d. |
|-----------------------------------|----------|----------|
| British, cake and ingot ..... ton | 42 10 0  | 43 10 0  |
| Best selected .....               | 43 10 0  | 44 10 0  |
| Sheets, strong .....              | 50 0 0   | 51 0 0   |
| Chili, bars .....                 | 39 2 6   | 39 12 6  |

**METALS (continued).**

|                              | £. s. d. | £. s. d. |
|------------------------------|----------|----------|
| YELLOW METAL .....lb.        | 0 0 4    | 0 0 4    |
| <b>LEAD—</b>                 |          |          |
| Australian .....             | 12 13 9  | 0 0 0    |
| Esp. Spanish .....           | 12 17 6  | 0 0 0    |
| English, common brands ..... | 13 16 3  | 14 0 0   |
| Sheet, English .....         | 14 7 6   | 14 10 0  |
| <b>SPELTER.</b>              |          |          |
| Silesian, special .....      | 14 5 0   | 14 7 6   |
| Ordinary brands .....        | 14 5 0   | 14 7 6   |
| <b>TIN—</b>                  |          |          |
| Strait, .....                | 101 5 0  | 101 15 0 |
| Australian .....             | 101 7 6  | 102 0 0  |
| English ingots .....         | 105 0 0  | 0 0 0    |

**OILS.**

|                              | £. s. d. | £. s. d. |
|------------------------------|----------|----------|
| Linseed ..... ton            | 20 10 0  | 20 12 6  |
| Cocconut, Cochín .....       | 35 10 0  | 37 0 0   |
| Ceylon .....                 | 26 0 0   | 28 5 0   |
| Palm, Lagos .....            | 22 10 0  | 0 0 0    |
| Rapeseed, English pale ..... | 23 5 0   | 0 0 0    |
| "    "    "    brown .....   | 21 15 0  | 0 0 0    |
| Cottonseed, refined .....    | 18 10 0  | 20 5 0   |
| Tallow and Oleine .....      | 25 0 0   | 45 0 0   |
| Lubricating, U.S. .....      | 5 0 0    | 8 10 0   |
| "    "    "    refined ..... | 5 0 0    | 12 0 0   |

**TURPENTINE—**

|                          | £. s. d. | £. s. d. |
|--------------------------|----------|----------|
| American, in casks ..... | 1 8 0    | 0 0 0    |
| <b>TAR—</b>              |          |          |
| Stockholm .....barrel    | 0 15 0   | 0 16 6   |
| Archangel .....          | 0 12 6   | 0 0 0    |

**COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.**

*Epitome of Advertisements in this Number.*

**COMPETITIONS.**

| Nature of Work.                   | By whom required.        | Premium.         | Designs to be delivered. | Page. |
|-----------------------------------|--------------------------|------------------|--------------------------|-------|
| New School Premises .....         | Bristol School Board ... | Not stated ..... | Not stated .....         | ii.   |
| Cottage Hospital, Ashburton ..... | The Committee .....      | do. ....         | do. ....                 | ii.   |

**CONTRACTS.**

| Nature of Work, or Materials.                    | By whom required.          | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|--------------------------------------------------|----------------------------|-----------------------------------|--------------------------|-------|
| Sewering, Levelling, Paving, &c., Works .....    | Hendon Local Board ..      | S. S. Grimley .....               | Feb. 29th ..             | ii.   |
| Materials and Work .....                         | Surbiton Insp. Com. ...    | Official .....                    | do. ....                 | xii.  |
| Main Drainage Works .....                        | Finchley Local Board ..    | Official .....                    | do. ....                 | ii.   |
| Making-up Road .....                             | Wandsworth Bd. of Wks ..   | Official .....                    | March 1st ..             | xii.  |
| Works and Materials .....                        | Hammermith Vestry ...      | do. ....                          | March 2nd ..             | xii.  |
| Stone Paving .....                               | Lincoln U. R. S. ...       | F. H. Goddard .....               | March 7th ..             | xii.  |
| Sewerage Works and Annual Contracts .....        | Hornsey Local Board ..     | T. De Courcy Meade ..             | do. ....                 | ii.   |
| Annual Contracts .....                           | St. Giles's Brd. of Wks .. | G. Wallace .....                  | do. ....                 | ii.   |
| Reservoir, &c. ....                              | Clitheroe Cor. ....        | McLandsborough & Preston .....    | March 8th ..             | ii.   |
| New Sewers .....                                 | Com. of Sewers .....       | Official .....                    | do. ....                 | ii.   |
| Cast-iron Pipes, Castings, and laying of same .. | Southampton Cor. ....      | W. Matthews .....                 | do. ....                 | xii.  |
| Erection of Cottages, Monmouthshire .....        | Great Western Ry. Co. ..   | Official .....                    | do. ....                 | xii.  |
| Stone Paving .....                               | Com. of Sewers .....       | do. ....                          | do. ....                 | ii.   |
| Asphalte and Tar Paving .....                    | St. Mary, Islington .....  | do. ....                          | do. ....                 | xii.  |
| Water Van and Carts .....                        | Vestry .....               | do. ....                          | do. ....                 | xii.  |
| Works and Materials .....                        | Rotherhithe Vestry ...     | do. ....                          | do. ....                 | xii.  |
| Alterations and Enlargement of Workhouses ..     | Prestwich Union .....      | Worthington & Elgood ..           | March 10th ..            | ii.   |
| Supply of Stone, Gravel, &c. ....                | Hendon Local Board ..      | S. S. Grimley .....               | March 10th ..            | ii.   |
| Paving Works .....                               | Met. Board of Works ..     | Official .....                    | March 15th ..            | ii.   |
| Painting Rochester Bridge .....                  | Wandsworth &c. ....        | do. ....                          | March 31st ..            | xii.  |
| Vulcanised Rubber Squeezes .....                 | Schl. Board for London ..  | do. ....                          | Not stated ..            | ii.   |
| Enlargement of Board School .....                | do. ....                   | do. ....                          | do. ....                 | ii.   |

**PUBLIC APPOINTMENTS.**

| Nature of Appointment.                       | By whom Advertised.      | Salary.                   | Applications to be in. | Page. |
|----------------------------------------------|--------------------------|---------------------------|------------------------|-------|
| Surveyor and Engineer .....                  | Walthamstow Local Bd ..  | 300l. ....                | March 4th ..           | xvi.  |
| Surgeon Inspector .....                      | Borough of Stockton ...  | Not stated ..             | March 7th ..           | xvi.  |
| Assistant Inspector of Nuisances .....       | Wandsworth Bd. of Wks .. | 2l. 2s. per week, &c. ... | do. ....               | xvi.  |
| Assistant in Borough Surveyor's Office ..... | Stockton Corporation ..  | 110l. ....                | do. ....               | xvi.  |

**TENDERS.**

**ABERYSTWYTH.**—For the restoration of this University College of Wales. Messrs. J. P. Seddon and J. C. Carter, architects:

|                                      |             |
|--------------------------------------|-------------|
| E. Davies & Son, Newtown, Mont. .... | £25,405 0 0 |
| A. Beakley & Son, Birkenhead .....   | 20,500 0 0  |
| S. & W. Pattinson, Sleaford .....    | 20,500 0 0  |
| W. Thornton & Sons, Liverpool .....  | 20,100 0 0  |
| G. Griffiths, Criccieth, Card. ....  | 18,950 0 0  |
| C. G. Hill, Coventry .....           | 18,950 0 0  |
| Treasure & Son, Shrewsbury .....     | 18,950 0 0  |
| Dove Bros., Islington .....          | 18,255 0 0  |
| P. Horsman & Co., Wolverhampton ..   | 18,945 0 0  |
| J. Parrnell & Son, Rugby .....       | 18,878 0 0  |
| C. Burton, Cardiff .....             | 18,347 0 0  |
| S. Bellman & Co., Buckingham ..      | 17,900 0 0  |
| Paisce-road (accepted) .....         | 17,900 0 0  |

**BRISTOL.**—For enlargement of stable, coach-house, &c., for Mr. John Curtis, 3, Colman-park. Mr. Herbert J. Jones, architect:

|                    |          |
|--------------------|----------|
| W. Church .....    | £161 0 0 |
| G. Humphreys ..... | 147 0 0  |
| H. Johnson .....   | 145 0 0  |
| B. Vowler .....    | 133 0 0  |
| T. R. Lewis .....  | 133 0 0  |
| J. Perrott .....   | 114 0 0  |

**BRISTOL.**—For alterations at No. 34, Thomas-street, for Mr. Jacob Dove. Mr. Herbert J. Jones, architect:

|                        |          |
|------------------------|----------|
| E. Gar .....           | £340 0 0 |
| G. Humphreys .....     | 317 15 0 |
| Estabrook & Sons ..... | 311 0 0  |
| C. A. Hayes .....      | 307 17 0 |
| J. Perrott .....       | 303 0 0  |
| T. R. Lewis .....      | 300 0 0  |
| E. T. Hatherley .....  | 297 0 0  |
| P. H. Turner .....     | 269 10 0 |

**BRISTOL.**—For alterations at Nos. 1 and 2, Bridewell-street, for Messrs. Chard Bros. Mr. Herbert J. Jones, architect:

*First Contract.*

|                        |          |
|------------------------|----------|
| S. Turner .....        | £133 0 0 |
| W. Church .....        | 215 0 0  |
| Cowlin & Son .....     | 209 0 0  |
| J. Perrott .....       | 208 0 0  |
| R. J. Searle .....     | 205 0 0  |
| J. E. Davis .....      | 197 0 0  |
| Eastbrook & Sons ..... | 194 0 0  |
| G. Humphreys .....     | 194 0 0  |
| T. R. Lewis .....      | 181 0 0  |

*Second Contract.—Additions.*

|                   |         |
|-------------------|---------|
| T. R. Lewis ..... | 230 0 0 |
|-------------------|---------|

**BRISTOL.**—For extension of machine room, &c., Caxton Works, for Messrs. Mardon, Son, & Hall. Mr. Herbert J. Jones, architect:

|                        |           |
|------------------------|-----------|
| Stacey & Son .....     | £37 3 0   |
| J. Wilkins & Son ..... | 389 0 0   |
| W. Harris .....        | 378 0 0   |
| H. A. Horse .....      | 352 15 11 |
| J. Hastow .....        | 349 0 0   |
| A. J. Bearan .....     | 313 0 0   |
| W. Church .....        | 292 13 3  |
| G. Humphreys .....     | 288 0 0   |
| R. Wilkins & Son ..... | 288 0 0   |
| J. Perrott .....       | 280 0 0   |
| T. R. Lewis .....      | 279 14 1  |
| G. T. Hatherley .....  | 267 0 0   |
| Cowlin & Son .....     | 258 0 0   |
| Eastbrook & Son .....  | 240 0 0   |

**BROMLEY.**—For additions to the Greyhound, Bromley, for Messrs. H. A. Nicholl, Mr. Albert J. Guy, architect, Lewisham:

|                           |        |
|---------------------------|--------|
| D. Payne (accepted) ..... | £245 0 |
|---------------------------|--------|

**PRICES CURRENT OF MATERIALS.**

**TIMBER.**

|                                          | £. s. d. | £. s. d. |
|------------------------------------------|----------|----------|
| Greenheart, B.G. .... ton                | 6 10 0   | 7 10 0   |
| Teak, E.I. .... load                     | 8 0 0    | 14 0 0   |
| Sequoia, U.S. .... foot cube             | 0 2 3    | 0 3 0    |
| Ash, Canada .....                        | 3 0 0    | 4 10 0   |
| Birch .....                              | 2 5 0    | 3 10 0   |
| Elm .....                                | 3 10 0   | 4 0 0    |
| Fir, Dantsic, &c. ....                   | 1 10 0   | 4 0 0    |
| Oak .....                                | 2 10 0   | 4 10 0   |
| Canada .....                             | 3 0 0    | 6 0 0    |
| White Pine, 1st .....                    | 2 0 0    | 3 10 0   |
| "    "    "    yellow .....              | 2 5 0    | 4 0 0    |
| Lath, Dantsic .....                      | 3 0 0    | 5 0 0    |
| St. Petersburg .....                     | 4 0 0    | 5 10 0   |
| Watson, Biga .....                       | 2 15 0   | 4 0 0    |
| "    "    "    Odessa, crown .....       | 3 5 0    | 3 7 6    |
| Deals, Finland, 2nd and 1st, std. 100 .. | 7 0 0    | 8 0 0    |
| "    "    "    4th and 3rd .....         | 5 10 0   | 6 10 0   |
| Riga .....                               | 6 10 0   | 8 0 0    |
| St. Petersburg, 1st yellow .....         | 8 10 0   | 14 0 0   |
| "    "    "    2nd .....                 | 7 0 0    | 8 0 0    |
| "    "    "    white .....               | 6 0 0    | 8 0 0    |
| Swedish .....                            | 0 0 0    | 15 0 0   |
| White Sea .....                          | 7 0 0    | 10 10 0  |
| Canada, Pine, 1st .....                  | 17 0 0   | 27 0 0   |
| "    "    "    2nd .....                 | 11 0 0   | 16 0 0   |
| "    "    "    3rd, &c. ....             | 6 10 0   | 8 0 0    |
| "    "    "    Spruce, .....             | 8 0 0    | 10 0 0   |
| "    "    "    3rd and 2nd .....         | 6 0 0    | 7 0 0    |
| New Brunswick, &c. ....                  | 5 0 0    | 7 0 0    |
| Battens, all kinds .....                 | 4 0 0    | 12 0 0   |

**Flooring Boards, sq. 1 in., per 100.**

|                                      |       |        |
|--------------------------------------|-------|--------|
| "    "    "    First .....           | 0 8 0 | 0 11 6 |
| "    "    "    Second .....          | 0 6 0 | 0 7 6  |
| "    "    "    Other qualities ..... | 0 5 0 | 0 6 0  |

**CLIFTON.**—For additional story, &c., to 24, Regent-street, for Capt. A. F. Adams, Mr. Herbert J. Jones, architect:—  
 Cowlin & Son..... £725 0 0  
 J. Bantow ..... 811 0 0  
 G. Humphreys ..... 597 0 0  
 E. Estabrook & Sons ..... 565 0 0  
 W. Church ..... 497 0 0  
 T. H. Lewis ..... 485 0 0  
 J. Ferrott ..... 485 0 0

**GREENWICH.**—For alterations and additions to the Crown, East Greenwich, for Messrs. H. & V. Nicholl. Mr. Albert L. Guy, architect, Lewisham:—  
 H. L. Holloway ..... £417 0 0  
 T. Knight (accepted) ..... 369 0 0  
 G. W. Slig (withdrawn) ..... 345 0 0

**HAMPSTEAD.**—For artisans' dwellings, Hampstead, Mr. Henry S. Legg, Christ's Hospital, architect:—  
 Extra. Red Glazed  
 For the Brick Brick Club-Building, Facings Staircase Room.  
 Barford & Son ..... £12,326 .. £185 .. £423 .. £804  
 Dove Bros. .... 11,225 .. 185 .. 603 .. 645  
 G. S. S. Williams & Son ..... 11,153 .. 148 .. 590 .. 615  
 Perry & Co. .... 10,989 .. 111 .. 189 .. 214  
 Hall, Boddall, & Co. .... 10,973 .. 142 .. 165 .. 234  
 Patman & Fotheringham ..... 10,833 .. 129 .. 420 .. 499  
 Harris & Wardrop ..... 10,694 .. 74 .. 400 .. 495  
 Allen & Son ..... 10,688 .. 222 .. 338 .. 481  
 Gould & Brand ..... 10,575 .. 97 .. 530 .. 629  
 Brass & Son ..... 10,489 .. 81 .. 515 .. 494  
 S. J. Jerrard ..... 10,375 .. 111 .. 615 .. 476  
 Howell & Son ..... 10,297 .. 129 .. 395 .. 469

**LEWISHAM.**—For bar fittings at the White Hart, Lewisham, for Mr. A. Winbush. Mr. Albert L. Guy, architect, Lewisham:—  
 W. Bennett ..... £275 0 0  
 J. Davidson ..... 258 10 0  
 J. W. Taylor ..... 245 0 0  
 F. Sage & Co. .... 243 0 0  
 H. L. Holloway (accepted) ..... 227 0 0  
 W. Helling ..... 189 0 0

*Peeters' Work.*  
 J. Davidson ..... 63 10 0  
 W. Helling ..... 53 0 0  
 B. R. Bunk ..... 51 15 0  
 J. McPherson, jun. .... 51 15 0  
 Sanders & Son ..... 51 13 0  
 F. Matthews ..... 46 1 8  
 R. F. Lane\* (amended) ..... 49 0 0  
 \* Accepted.

**LEWISHAM.**—For new laundry, bath-house, Lewisham, for Miss Mold. Mr. Albert L. Guy, architect:—  
 H. L. Holloway (accepted) ..... £140 0 0

**LONDON.**—For the erection of a factory in Finston-road, for Messrs. Cullard & Bower. Quantities by Messrs. Goodchild & Son. Mr. George Wymouth, architect:—  
 Philp & Bissiker ..... £2,639 0 0  
 T. Taylor ..... 2,639 0 0  
 Abby Bros. .... 2,512 0 0  
 Davis Bros. .... 2,475 0 0  
 Outhwaite & Son ..... 2,443 0 0  
 Richardson Bros. .... 2,390 0 0  
 Allen & Son ..... 2,385 0 0  
 F. & F. H. Higgs ..... 2,214 0 0

**LONDON.**—For rebuilding Messrs. Hyman's warehouse, in Brittain-street, Gray's Inn-road, Messrs. Isaac & Florence, architects. Quantities supplied by Mr. L. C. Riddett:—  
 Yardley & Son ..... £3,147 0 0  
 Kirk & Randall ..... 2,940 0 0  
 Mills ..... 2,679 0 0  
 Counsel Bros. .... 2,678 0 0  
 Rhodes ..... 2,540 0 0  
 Nightingale ..... 2,529 0 0  
 Lawrence & Sons ..... 2,469 0 0  
 Patman & Fotheringham ..... 2,343 0 0  
 J. G. Richardson ..... 2,127 0 0

**LONDON.**—For new building in Cannon Street-road, Mile-end. Mr. Lewis Solomon, architect:—  
 Downs ..... £1,063 0 0  
 Palmer ..... 949 0 0  
 Roberts ..... 937 0 0  
 Elkington (accepted) ..... 795 0 0

**LONDON.**—For new building, in Duke-street, Aldgate. Mr. Lewis Solomon, architect. No quantities supplied:—  
 Partman & Fotheringham ..... £1,943 0 0  
 Colley ..... 1,775 0 0  
 Roberts ..... 1,579 0 0  
 Downs (accepted) ..... 1,568 0 0

**LONDON.**—For alterations, sanitary improvements and painting, &c., to house and stables, 147, Harley-street. Messrs. Eales & Son, architects and surveyors:—  
 O. Shaw ..... £176 10 0  
 F. Martin ..... 141 0 0  
 Clarke & Mannoch (accepted) ..... 122 9 0

**LONDON.**—For rebuilding part, altering, and decorating No. 13, Great Castle-street, W. Mr. W. Miller, architect:—  
 R. Perkins ..... £968 0 0  
 Watson Bros. .... 661 0 0  
 Clarke & Mannoch (accepted) ..... 657 0 0

**LONDON.**—For pulling down and rebuilding four houses, New Nicholl-street, Bethnal Green-road, for Mr. T. S. Lock, Messrs. J. A. & W. Sharpe, architects and surveyors:—  
 Kelly & Gayford ..... £1,620 0 0  
 Steele Bros. .... 1,495 0 0  
 Higgs ..... 1,397 0 0  
 Taylor ..... 1,369 0 0  
 Coulson Bros. .... 1,360 0 0  
 Pritchard & Son ..... 1,357 0 0  
 Wire ..... 1,350 0 0  
 Rayne ..... 1,347 0 0  
 Jackson & Todd ..... 1,329 0 0  
 Butler & Lee ..... 1,259 0 0  
 Mower ..... 1,101 0 0

**LONDON.**—For repairs to warehouse, at New Nicholl-street, Bethnal Green-road, for Mr. T. S. Locks. Messrs. J. A. & W. Sharpe, architects:—  
 Steele Bros. .... £524 0 0  
 Kelly & Gayford ..... 446 0 0  
 Taylor ..... 297 0 0  
 Mower ..... 293 0 0  
 Jackson & Todd ..... 279 0 0  
 Pritchard & Son ..... 282 0 0  
 Rayne ..... 253 0 0  
 Higgs ..... 225 0 0  
 Coulson Bros. .... 210 0 0  
 Butler & Lee ..... 209 10 0  
 Wire ..... 175 0 0

**LONDON.**—For oak panelling at the Church of St. Mary Aldermary. Mr. Charles Innes, architect:—  
 Colls & Son ..... £538 0 0  
 A. Robinson ..... 395 0 0  
 J. M. Maney & Sons ..... 365 0 0  
 Prestige & Co. .... 365 0 0

**LONDON.**—For the erection of front building for the United Radical Club, Kay-street, Hackney-road. Mr. C. R. Winter, architect:—  
 Bartram ..... £1,650 0 0  
 Row & Silvester ..... 1,695 0 0  
 Steel Bros. .... 1,375 0 0  
 Taylor ..... 1,199 0 0  
 C. Dearing & Son ..... 1,045 0 0

**LONDON.**—For repairs to 151, Curtain-road, Shore-ditch, for Messrs. W. Wallace & Co.:—  
 Langler & Pinkham ..... £117 10 0  
 W. Groom, Dulwich (accepted) ..... 114 0 0

**STROOD (Kent).**—For new Wesleyan Jubilee Chapel, at Strood, Kent. Mr. J. W. Nash, architect, Rochester. Quantities by the architect:—  
 Boundary Walls.  
 Vanghan, Maidstone ..... £4,797 .. £130  
 Taylor & Rochester ..... 3,979 .. 149  
 Culland & Son, Rochester ..... 3,963 .. 141  
 C. E. Skinner, Chatham ..... 3,670 .. 140  
 \* Accepted.

**SURBITON (Surrey).**—For the completion of a residence, Southborough Park, Surbiton, for Mr. W. E. Lloyd Jones. Mr. George Frederick Haines, architect, Wimbleson:—  
 Adkins Bros, Surbiton ..... £658 0 0  
 H. Scow & Son, Surbiton ..... 595 0 0  
 F. Alderton, Surbiton ..... 510 0 0  
 D. Judd, Kingston (accepted) ..... 485 0 0

**SMETHWICK.**—For the erection of new schools, Caneshill, Smethwick, for the Harborne School Board. Mr. George H. Cox, architect, 29, Temple-street, Birmingham:—  
 Inwood, Malvern ..... £7,591 0 0  
 Bates, Birmingham ..... 6,953 0 0  
 Bussett & Sons, Sheffield ..... 6,950 0 0  
 Bradley & Co., Wolverhampton ..... 6,821 0 0  
 Hughes, Handsworth ..... 6,759 0 0  
 Greenwood, Mansfield ..... 6,420 0 0  
 W. & J. Webb, Birmingham ..... 6,690 0 0  
 Dorse & Son, Cradley ..... 6,678 0 0  
 Roberson, Birmingham ..... 6,676 0 0  
 T. Guest, Smethwick ..... 6,420 0 0  
 T. Loud, Selly Oak ..... 6,600 0 0  
 W. Robinson, Birmingham ..... 6,473 0 0  
 G. F. Smith, Milverton ..... 6,273 0 0  
 Walton Bros., Smethwick ..... 6,240 0 0  
 Marshall, Smethwick ..... 6,165 0 0  
 Gill, Birmingham ..... 6,060 0 0  
 Horsley Bros., Birmingham ..... 6,397 0 0  
 T. Rowbotham, Birmingham ..... 5,893 0 0  
 Barker & Sons, Handsworth ..... 5,886 0 0  
 Jones & Son, Sedgeley ..... 5,735 0 0  
 Harley & Son, Smethwick (accepted) ..... 5,790 0 0

**SWANSEA.**—For the erection of two shops, High-street, Swansea. Mr. J. Buckley Wilson, architect, Swansea. Quantities by Mr. W. H. Sandry, Swansea:—  
 H. Billing, Swansea ..... £1,078 10 0  
 H. Hilton & Sons, Swansea ..... 880 10 0  
 T. Watkins & Jenkins, Swansea ..... 888 0 0  
 J. Gwyn, Sketty (accepted) ..... 778 0 0  
 Loveday & Evans, Swansea ..... 695 0 0

**SWANSEA.**—For alterations to the Swansea Bank, High-street, Swansea. Mr. J. Buckley Wilson, architect:—  
 T. Watkins & Jenkins, Swansea ..... £320 0 0  
 J. Davies, Swansea ..... 305 0 0  
 J. Gwyn, Sketty ..... 303 0 0  
 H. Billing, Swansea (accepted) ..... 303 0 0  
 Brown & Morgans, Swansea ..... 261 10 0  
 Loveday & Evans, Swansea ..... 127 10 0

**SWANSEA.**—For shop-front, Goat-street, Swansea. Mr. J. Buckley Wilson, architect:—  
 H. Billing, Swansea ..... £125 0 0  
 J. Goodridge ..... 114 5 0  
 J. Davies ..... 117 12 0  
 C. Walters ..... 105 15 0  
 J. Gwyn ..... 97 3 0  
 T. Richards ..... 89 7 0  
 Loveday & Evans (accepted) ..... 80 0 0  
 [All of Swansea.]

**TAUNTON (Somerset).**—For alterations and additions to Mr. R. Woodman's house, Cheddou-road, Taunton. Mr. W. H. Cresse, architect:—  
 Verrier & Son ..... £348 10 0  
 G. Fox ..... 231 0 0  
 C. Goodhand ..... 213 0 0  
 A. J. Spiller (accepted) ..... 210 0 0

**TUNBRIDGE WELLS.**—For new hall, oak staircase, and sundry alterations at Heathfield. Mr. J. Nixon Horsfield, architect, Ditton-bill, Sarisbury:—  
 Holroy Bros. .... £1,200 0 0  
 J. Chapman ..... 1,197 0 0  
 W. Oakley ..... 1,168 0 0  
 F. & H. Higgs ..... 1,149 0 0  
 Turtle & Appleton (accepted) ..... 105 15 0  
 D. Judd ..... 950 0 0

**YARMOUTH.**—For a new hospital at Great Yarmouth. Messrs. Bottle & Olley, architects, Great Yarmouth:—  
 J. G. Leggett ..... £10,635 0 0  
 G. H. Springall ..... 9,320 14 0  
 E. Howes ..... 8,888 0 0  
 Cork & Beech ..... 8,863 0 0  
 J. Bray ..... 8,697 0 0  
 R. H. H. ..... 8,173 0 0  
 J. S. Cooper ..... 8,354 10 0  
 Read & Cooper ..... 8,100 0 0  
 J. Leggett (accepted) ..... 8,066 0 0  
 [All of Yarmouth.]  
 [Architects' estimates, 9,300L.]

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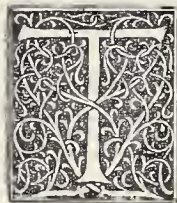
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### Exeter.



THE second of the series of volumes on the Historical Towns and Cities of our Country is now before us.\* Its appearance will be welcomed by, we hope, a large number of readers, not only on account of the im-

portance of the city whose history it relates, but from the circumstance that it is written by the Regius Professor of Modern History at Oxford in his happiest and most fluent style. The interest never flags, and in the narration of the beginnings of the city in the unrecorded dim ages of the past, equally with that of its modern growth, the attention of the reader is sustained, and both subjects, diverse as they are, are set forth graphically in well-chosen words.

While it has always been the head town of its district, Exeter is happily described as having kept its name essentially the same through all changes, and its being and its position unbroken throughout all ages. It is the one great city of the Roman and of the Briton which did not pass into "English" hands "till the strife of races had ceased to be a strife of creeds, till 'English' conquest had come to mean simply conquest, and no longer meant havoc and extermination. It is the one city of the present England in which we can see within recorded times the Briton and the Englishman living side by side. It is the one city in which we can feel sure that human inhabitation and city life have never ceased from the days of the early *Cæsars* to our own." It is satisfactory to think that in the case of Exeter so much can be said by the Regius Professor. It is to be hoped that further research will show the same of some others of our English cities, and that we shall learn in time to believe that the various hordes, the mixed races who made happy hunting-grounds of the land of the Romano Briton, were not guilty, as so many of us have been too long taught, of the utter extermination of the race well advanced in most of the arts, then occupying the soil.

Reference is made to the good reasons for supposing that the site of Exeter was occupied by the ancient Britons. Its site is very similar to what was chosen elsewhere by that people for an *oppidum*. It stands, as so many of us well know, on an elevated table-land

rather than a hill, there being a valley west and east, and the broad river of the Exe on the south, the approach being by a narrow ridge of land on the north-east. Such a position seems to have been formed by nature as the site for human habitation, and accordingly there is evidence that early inhabitants occupied it, not only in its name, *Penholt Keyre*, a singular mixture of Welsh and English, by which it is called in some dim traditions of very doubtful authenticity, but by a few discoveries of relics which can be classed as ancient British, or better still, as prehistoric. It is also called *Caer Wise*, this being the earliest form of its present name, "the City on the Exe."

Geographers, like Ptolemy, bear witness of its existence, and there can be but little doubt but that Exeter actually stands on the site of the Roman city *Isca Damnoniorum*; for although some attempts have been made to assign the position of the city so called to another site, yet none has yet been found on the banks of the Exe, which so completely fulfils all the conditions which we should expect to find on the site of a Roman city. It was walled at an early period, and indeed several writers have endeavoured to show that portions of the walls still standing are of Roman workmanship. Dr. Freeman is, however, content to think that the Roman-looking masonry which remains has been re-used on some rebuilding. The Icknield-street is to be traced up to and across the city. Roman coins of early date, bronze penates of great beauty, pottery, a very few traces of tessellated pavement, and other relics of the Roman race have been discovered, but no inscribed stones have been found within the area of the walls. Still, it is the name which the city has borne unchanged through so many ages that tells us of its continuance. Thus the *Isca* of the Roman becomes the *Exanceaster* of the Saxon, which like the *Caer Wise* of the olden time, can but mean, like the Exeter of to-day, the City on the Exe. Dr. Freeman passes over entirely some recent discussions relative to the position of Exeter in Roman times, but to us the continuance of the name to the present site seems at once to refute these, and the more so since no such continuance of name can be shown in relation to the other sites spoken of.

The hook before us gives a few notices of discoveries made, but still it must be matter of comment that Exeter has yielded so very few evidences of its early history during any of the recent excavations that may have been made during drainage works or the rebuilding of houses. This is a subject which we would commend to the attention of local antiquaries, in the belief that many discoveries have to be

made within the area of the walls, which must of necessity throw light on the early history of the city. Those few who doubt the position of *Isca* readily assent that modern Exeter actually stands on a Roman site.

"And now comes in the great distinction of all between the history of *Isca*, or of any other city of Britain, and the history of almost any city of Gaul. It comes to this, that there is no history of *Isca*. We have no record to tell us either when the peninsula hill came under the power of the Roman, or when it passed away from his power." Even the plan of the modern city, which presents an arrangement of two main roads crossing one another at right angles, with gates of entrance through the walls fairly well in the centres of their principal faces, which would agree with the cardinal points, were the city quite east and west, which it is not, is shown to have grown to its present form in recorded times. This relates, however, only to the roadway from the east. There is fair evidence that the present line supersedes another more to the south, which would have connected the two gates in a fairly direct line, the steep nature of the descent of the bank of the river Exe having to be taken into account. Allowance being made for this, it must be acknowledged that the modern plan of Exeter shows its streets laid out with so much system, at right angles to one another, as to render a fair reason for belief that they run fairly close to the plan of the Roman city. It is almost superfluous to say that the arrangement of laying out a city, in Roman times, by streets at right-angles to one another, is now proved by their actual discovery at Silchester, Verulamium, and many other places, while the tradition of such arrangement exists in several other cities of Medieval date, such as Oxford, which has no evidence of Roman origin.

The fate of the Roman city is unrecorded, and our author's belief that it did not pass into the hands of the Saxon invader until the days when the latter had embraced Christianity is founded on the slenderest of inferences,—at any rate, so far as regards the temporary occupation of the city. It agrees fairly well with what is known, and that is not much, of the progress of Saxon conquest westward. The failure of evidence relating to the early history is certainly a curious feature for comment in the annals of the city; and this is as true of the early Saxon period as of Roman or British times.

Our author feels himself on surer ground when he speaks of the state of parties in the reign of King Athelstan. In 926 it is apparent that a certain number of the inhabitants were British, for in that year, the king being on the point of proceeding against the Britons

\* Historic Towns, Exeter. By Edward A. Freeman, D.C.L. London: Longmans, Green, & Co. 1887.

further to the west of Exeter and in Cornwall, took the prudent but forcible precaution of removing the Britons from the city, considering that it was not safe to leave a probable enemy behind him in his progress. This statement shows us that for previous years the two races,—the original possessors and their conquerors,—lived together in the same city. The existence of the vanquished race is accounted for from the belief that the Saxon conquerors were Christian, and that this prevented the extermination which would have befallen them, had the victory been of earlier date. May it not rather be that all the tales of the extermination of Briton by Saxon are exaggerations? That terrible slaughters and burnings did occur no one can question; but that this amounted to the annihilation of the entire race, as some suppose, seems hard of belief. Here, at Exeter, at any rate, is agreeable evidence, almost as soon as direct history comes to render its testimony on matters relating to the city, of the two races living side by side.

Dr. Freeman suggests that the lines of demarcation were so exactly defined that one portion of the town was the Englishry, the other the Welshry, with its distinctive churches dedicated to British saints, such as Sts. Kerian, Petrock, &c. St. Sidwell's, the church of the local saint, was, however, outside the walls.

It is in the century before the date just named that the earliest historical event is recorded. This is the Danish occupation of the city in 876, up to which time it was undoubtedly in Saxon possession. It was recaptured by Alfred under circumstances which show us that it was then a place of strength, and there is occasion for fair inference that the burh, or castle, was erected at this time. The position of the castle is at the north corner of the city. The line of the city walls encloses it, there is no external break or projection, its area being wholly within the city, like the donjon of a Norman castle, in relation to the walls of the outer ballium. Its age is, doubtless, open to much speculation, for the steep scarp sides of the hill have many features in common with British works, while the lines of the city wall show that when the Romans drew around the city their ramparts of stone, they so carefully brought them around the castle hill as to enclose it wholly within the inhabited area.

The walls are recorded by so good an authority as William of Malmesbury to have been built by Athelstan, with towers and with squared stones. This work was probably only a substantial repair of the older masonry, and it is of interest as being one of the very few records of military works stated to have been executed in stone in Saxon times. Although the Saxons appear from recorded history to have been such great builders of churches and castles, yet in the majority of cases we are forced to believe that the works executed were of timber and not of stone, so far as the churches were concerned; and of earth and stockades to the castles. The non-existence of Saxon works of importance must ever be matter of surprise and regret. The almost universal overthrow of their works points to the supposition that a general want of durability must have characterised them. On no other supposition can we account for the almost complete disappearance of the Saxon churches, all their castles, except the mounds, and all their other constructive works. When a piece of walling is met with in some of the churches, of only moderate size, which alone remain, it is of poor, or at least, not good masonry, particularly in the earliest examples. Some few of perhaps the latest in date we are ready to admit are equal to or better than the earliest Norman work. It is, of course, something akin to heresy to breathe any word of disrespect of anything Saxon to our author. In these pages, too, as in all his other works, the mixed hordes of Saxon invaders who harried the land before they settled upon it, appear only to be known to him as "English." This little conceit of his must be not a little confusing to general readers, who will be loth to believe in the existence of "English" until Briton and Saxon, Dane and Norman, and

their associated tribes, had all grown together so as to form our present race.

The Danish invasion brought more than one attack upon Exeter, and in the last, in 1003, the city was taken by Swegen and plundered. On this occasion a large portion of the wall was broken down. The ecclesiastical history of the city must have had its beginnings in early times, but, like the civil history, it is unrecorded. The earliest authentic record that has come down to us is of the time of Ethelstan, when there is evidence of the foundation of a monastery by him, this being afterwards augmented or altered in some manner that is not clearly indicated by King Edgar in 968. But the great change of all in the ecclesiastical history was when the city became, but only at a comparatively late period, the site of the united bishopric of the West. In the reign of Edward the Confessor two or more bishoprics were sometimes united under a single bishop, and thus we find the adjoining Sees of Devonshire, Cornwall, and the distant See of Worcester all held by Lyfing, the seat of the first of these then being at the town of Crediton, which, apparently, must always have been a smaller place than Exeter. Lyfing's successor, Leofric, however, in 1050 effected a change which has for ever since associated the bishoprics with Exeter. While he united the two Sees of Cornwall and Devonshire together, a work which has only been undone within the last few years, he removed the seat of the bishopric from the smaller to the more important city, a change which has been attended with happy results. The history of the cathedral church is well told by our author, and his clear outline of its rise and progress will be read with interest. The aim of this volume and of the others of the series, is not to produce a mere guide-book of the city or town described, and for several reasons this is undesirable. Still, the architectural history of the cathedral being given as it is makes us regret that some more space was not given to a description of the fabrics of the parish churches or of the remains of the monastic establishments. We may here make a digression from the arrangement of the book before us and refer to the curious group of parish churches which is shown to have existed in Exeter in early times. As in the case of the majority of the churches of London, there is no record of their foundation.

Indeed, except in regard to two of the churches, from the evidence before us, the earliest general record of their existence appears to be in the reigns of Richard and John, when their number, with chapels, was over thirty. If any of our readers will turn to a map of Exeter and consider the comparatively small size of the city within the walls, they must, while making due allowance for a certain amount of suburbs, be surprised at the state of society which should have called forth the foundation of this remarkable number of churches. It is apparent that later times, following the reigns of the kings named above, did nothing for increasing the number of these parochial churches. It was left entirely for modern days to meet the needs of increase of population. On the contrary, it is apparent that subsequent years witnessed the destruction of many of them. A settlement of the number of parishes is spoken of under the date of 1222, when they were reduced to nineteen only. What became of the suppressed churches does not appear. This number was reduced to four by Act of Parliament, 1656, when the cathedral was formed into two separate churches, in addition to the four referred to, by a wall being built to divide the nave from the east end. The two portions were then used by two congregations.

The names of the saints to whom these churches were dedicated show not only a strong Celtic, but also a Saxon element. Many of the names also are curious from their suffixes to indicate position or difference, such as St. Mary More, St. Mary Steps, St. Mary Arches, Allhallows-on-the-Walls; while several are unusual dedications, such as to SS. Sidwell, Cuthbert, Pancras, and Keryans. The name of the British St. Petrock occurs, as does also that of the British St. David.

St. Martin's Church was dedicated in 1065, and St. Olaf's is mentioned a little earlier, but none of the others appear to be referred to until the period already named.

Not a little curious is the record of the foundation of the monastic houses of Exeter, which here, as in so many other places sprang up in different quarters of the city, and at their beginnings at least "the bishop and clergy looked with no friendly eye on the new comers." The hospitals were numerous, and the evidences of the long continuance of leprosy are not a little curious.

We have already referred to the probable foundation and continuance of Exeter Castle in early times. Its history during the Norman period is more clearly indicated. The Norman William, whose easy capture of the rebellious city, and breaking up of the Western opposition, is graphically told, entrusted the erection of the castle to Baldwin. As was usual in almost all our early fortresses, it had its separate chapel within the enclosure of its walls, and this, like Dover, Hastings, Windsor, and many other places, was collegiate. It was dedicated to the Virgin Mary. The castle appears to have been strong enough not only to hold the city in check, but to have been built so quickly as to enable the attack made by the sons of Harold in 1069, to be easily beaten off. The history of the Temporal Lords of Exeter is no less interesting than that of the Spiritual, but that of the third governing power, the municipality, now demands our notice.

One of the most interesting features which the volume before us reveals is the municipal record. We find mention of the Portreeve early in the eleventh century, when he acted on behalf of Queen Emma. We find him, again defending the city against William the Conqueror; but we then find some other authority in addition. "In the narrative of the Conqueror's sieges we have seen two classes of men, and seemingly two assemblies in which they met and acted." "Were the men who disowned the submission a popular assembly, reversing the decision of its magistrates, or a patriotic army throwing off the authority of heart-hearted officers?" Be this as it may, it is curious to note that the more ancient portreeve or provost lived on by the side of the mayor, in the shape of two or four bailiffs, seneschals, or stewards." Here, at least, the portreeve did not merge into the mayor. His court was called the *prætorium*. The name is as old as 1254. The name "is most likely connected with the belief that a Romanesque building in Waterbury-street, which survived till the present century, and which we would fain believe was the Guildhall of William Hoel, the portreeve, was the Roman *prætorium*."

We find the mayors of the charters which were granted in succession to the city by kings and lords, assisted by various officers and a council, sometimes of twelve, sometimes a double jury, and even of thirty-six. "It is hard, indeed, to grasp the details, but it is easy to trace the main outlines of the constitutional history of Exeter. An oligarchy grew up which displaced an older and freer system." "It was not hereditary." "It came of self-election."

The guilds, trading and religious, or a mixture of both, are heard of at an early period; but here, as is the case so frequently elsewhere, there is nothing whatever to show how they began. Our author tells us that he has not examined the archives in the Guildhall, or which, let us say, ought to be in the Guildhall. This is to be regretted; for, since the earliest history is so meagre, and the beginnings of things so completely unrecorded, it is highly desirable that any information to be derived from either the municipal or the ecclesiastical records should be carefully sought for. The documents relating to the early bishopric are not numerous, and they have been of late years critically examined by more than one student of our early history. May what can be derived from similar examination of the treasures of the Guildhall be speedily set before us! The record of documents, and the record of what may be learned from the investigation of whatever relics may be met

with in excavations: to these two sources may we hope for further evidences of the history of the city.

The work contains interesting chapters on the relation of Exeter to the kingdom of England, 1225 to 1688; others on municipal and ecclesiastical Exeter; while the concluding chapter treats of the modern period from 1688 to 1886. In the latter, the demolition of the old city gates, the removal of Bedford House, the destruction of many of the buildings of the ancient castle, and of the old Collegiate Chapel, are referred to. In recent years the rebuilding of the Church of St. Mary Major has been effected "with a spire of Northamptonshire fashion, which has oddly changed the look of that part of the close." Why this old church should have been swept away must be matter of regret to more than the Exeter folk, and the more so since it occurred such a short time ago, in days when the antiquarian and art value of our old buildings had been recognised throughout the country.

Passing reference might have been made with advantage to another Exeter loss, since it is one which was intimately connected with the early history of the town. St. Sidwell is reported by tradition to have been beheaded near a well, and Hedwylmed, at St. Sidwell's, was pointed to as the site. The progress of the railway works here in 1855 revealed the well, with masonry of so ancient an appearance as to lead to the supposition that it was in part of Roman date. A coin of Nero was also found, together with a number of pipes by which water had been laid on to the city, and the precinct in Medieval times. The whole of the remains were destroyed as soon as found, although it is matter for congratulation that an appreciative observer was at hand, whereby we have some record of what otherwise would have been lost to history.

Exeter, which is happily described as "the city which, as not becoming English till Christian times, has lived the most uninterrupted life, Roman, British, and English, while it has largely shared with York the character of an abiding capital." "The city which has sat on its hill as a dwelling-place of men, with an unbroken life of more than eighteen hundred years,—the city by the side of which most of the capitals of Europe are things of yesterday,—can hardly sink, like some of its fellows, to be a forsaken ruin or a common market-town. Still, Exeter," says our author, "is emphatically a city of the past." We venture to think that the increase of the city and its surroundings is more hopeful for the future. We know of new streets and avenues laid out, new buildings erected. We see evidences of life and progress on every side.

The volume is illustrated with two interesting reproductions of old engravings, the frontispiece being a bird's-eye view of the city from Brown and Hohenberg's "Civitates Orbis Terrarum," 1618, which agrees extremely well with Isaac's map of the seventeenth century. There is also an imaginary plan of the city in the eleventh century, and a good map of Exeter of to-day.

We have said enough to show the nature of this interesting volume. In conclusion, we can but express the hope that its varied contents and its moderate price will cause it to be in the hands of a great many of our readers.

#### NOTES.

**T**HE Government Railway and Canal Traffic Bill was introduced into the House of Lords on Monday, by Lord Stanley of Preston, but no statement has yet been made regarding it, this being reserved for the occasion of the second reading. We intend to review the provisions of the Bill in an early number, but may now remark that, while very much on the lines of Mr. Mundell's abandoned measure, there are striking points of difference—chiefly relating to the constitution of the Railway Commission, and the attention given to the subject of canals. We have recently alluded to the inadequate nature of the proposals affecting this latter point in previous legisla-

tion, and are pleased to find that the Government are now dealing with it in a vigorous manner. The unauthorised application of a railway company's funds to the acquiring of canal property is absolutely prohibited, the clauses dealing with this subject being definite and drastic; and they serve to show more clearly than ever the way in which mischief might have been prevented had such prohibitions existed in time past. A great deal of responsibility rests upon the Board of Trade, as before, in respect of deciding as to rates and charges, and opposition on the part of the railway companies to this part of the measure may be regarded as certain. They have also views of their own upon preferential rates, which are shared by very high authorities, but this is a large question, and must be deferred for the present.

**I**T is to be regretted that the Labour Statistical Bureau, which was inaugurated a few months ago with the concurrence of Parliament, should be in difficulties almost at the very outset of its career, having broken down on the point which is generally fatal to these inquiries, viz., that of wages. When any private attempt has been made to examine this subject, it has almost always collapsed when this question is asked; for, although the inquirer may occasionally have been successful, he has usually found that employers have the greatest repugnance to stating how much they pay their "hands." One would have thought that a circular under Government supervision would be more fortunate in obtaining information; but it appears that the Board of Trade has formulated its inquiries with so little discretion, and with such an air of dictation, that it has excited the greatest indignation amongst some of our largest trades, such as those connected with engineering and iron-working, and many of them decline to answer. Those who are at the head of the movement ought to have kept themselves better advised as to the extreme jealousy that prevails in many trades on the subject of wages. Many a valuable point of information would doubtless have been forthcoming, if the inquiry had been made as a matter of courtesy rather than in the shape of a demand. We fear that we are still a long way distant from the excellent statistical information which the American Government furnishes to the public.

**T**HE National Memorial to the late Professor Fawcett, M.P., executed for the subscribers by Mr. Albert Gilbert, A.R.A., and lately fixed in Westminster Abbey, is a very happy departure from the conventional form of monument, in that it emphasises rather the man himself than his mere outward form and appearance. The memorial is of bronze, and fills the trefoiled head of an arch in the wall-arcading under the south-west tower, rather too much above the level of the eye to be examined with ease or comfort. The upper lobe of the trefoil is occupied by a medallion portrait of the face, half-turned to the spectator, and a little upwards, expressive of the blindness,—which is frankly acknowledged, and which turns to pathos the gentle resignation of the strong and intellectual features. The lower and larger part of the monument is filled up by a series of seven small figures expressive of Fortitude, Justice, Sympathy, Zeal, Industry, and Brotherhood, against an architectural background, which has, unfortunately, been made too poor—probably in the endeavour to give it due subordination, and which sadly wants, as it stands, some definite terminations or enclosing lines. The figures are beautifully modelled, and full of intellectual interest. Fortitude, which occupies the centre of the group, and whose head towers above the rest, is represented by a knight in armour, holding his lance, and resting one hand on his shield. It is a very fine and expressive figure. Justice is blindfolded, and holds the conventional sword and scales. Sympathy is expressed by a nude and dejected-looking damsel, to whom a hramble is closely clinging. Industry holds a beehive, and Brotherhood is represented by seated figures of an English labourer and a half-clad savage, who occupy the end arches

of the series. The bronze is brightened, and the prominent parts of the work emphasised with gilding, and a few bright-blue stones sparkle in the background.

**R**AILWAY COMPANIES are, as a rule, far from particular as to the sanitary arrangements and condition of the buildings which they erect under the powers of their respective Acts. They are disposed to think that, under cover of their Acts, they are not amenable to the by-laws of the Local Board or authority, whatever the character or purpose of the buildings which they erect. The London Railway Companies are in the habit of building cottages for their men on their own land, generally near some suburban station; and there are numerous instances where those companies have never deposited plans with the Local Board, and where they have in other important respects completely ignored the requirements of the building by-laws in force in the district. They are, no doubt, exempted from these requirements in the case of "buildings used for the purposes of the railway," such as stations, offices, and sheds; but it cannot be fairly said that rows of workmen's cottages, though built on railway land, are "for the purposes of the railway," and therefore exempt from supervision under the local by-laws. Mr. Bridge, the magistrate, gave what appears to be a sensible decision on this point in a case which occurred some time ago at Hammersmith. He held that such cottages as those indicated were not exempted buildings under the railway company's Act, and that the by-laws in force in the district must be complied with. The Acton Local Board have, we notice, raised the same question against the London and South-Western Railway Company, which has erected some workmen's dwellings on its own land in the parish of Acton, without depositing plans with the Local Board. The latter is, therefore, officially ignorant of the mode in which these cottages are built or drained. The principle involved is a most important one, because it should not be in the power of individuals or companies to entirely exempt themselves from the provisions of the local by-laws, sanctioned by the ruling authority under the Public Health Act, 1875, viz., the Local Government Board.

**T**HE movement for the construction of new waterways is already beginning to bear fruit, and it will not be very long, probably, before the Midland and other Railway Companies begin to find it out. An extensive coalition has been formed amongst the mercantile communities of some of the most important West Midland towns, with the object of placing Birmingham in direct communication with the sea. To this end the proprietors of the Gloucester and Sharpness and of the Birmingham and Worcester Canals, have joined forces with the municipal corporations of Gloucester, Birmingham, Wolverhampton, Kidderminster, Stourbridge, Worcester, &c., and there can be no doubt but that this formidable array will carry everything before it in the way of opposition. The present Sharpness Ship Canal is to be extended, so to speak, by carrying it to a mouth five miles lower down the Channel, the effect of which will be that vessels of 2,000 tons will be able to enter at any tide, and go direct to Gloucester. Great alteration and improvement will also be made in the canal from Gloucester to Birmingham, so that probably a considerable portion of traffic may be taken into the heart of the Midlands direct. The expenditure on the whole scheme is estimated at a million and a quarter.

**O**N the recommendation of their Law and City Courts' Committee, the Corporation of London have established a fund wherewith to maintain the open space at Kilburn which has lately passed into their charge. This fund is derived from a residuary bequest to them of the late Mr. William Ward, of The Lawn, Brixton Hill. Mr. Ward, in his will, provides for the benefit of "the poorer classes." The civic scheme formed the subject of a Chancery suit, wherein Mr. Justice Chitty

overruled the Attorney-General's objections that it did not strictly apply to those whose advantage the testator specifically intended to promote. The scheme, as sanctioned by the Court, is at present limited to the land at Kilburn, but powers are given for the framing of a subsidiary project to extend to the Highgate Woods, as lately taken over by the Corporation, in the event of the income proving to be more than is requisite for keeping up the Kilburn property. The Mercers' Company have undertaken to subscribe 150 guineas to the Bishop of St. Alban's scheme, if accomplished, for the purchase of the Pavilion Gardens at North Woolwich as a place of recreation for the inhabitants of West Ham and Silvertown. The Gardens, extending over 12 acres, have a frontage of 1,000 ft. along the riverside, and are set out in the first sheet of the Surveyors' District Map which we issued to our subscribers in January last.

UNTIL 1805 an ancient timber-built house, having stone chimneys on the ground-floor, and massive beams of oak and chestnut wood, stood in Gresham-place, a mean court opening out of Sweedland's-passage (corruptly known as Sweeting's or Sweedon's passage, and Sweed's-court), that joined Moor-lane with Grub-street. Remarkable for a prominently projecting staircase, that quaint structure, together with its neighbours, Prince Rupert's Palace in Beech-street, and General Monk's house in Hanover-court, supplied a favourite subject to illustrators of a past style of domestic architecture; as witness the drawings of J. T. Smith (1791), T. H. Shepherd (1800), and others. Whilst scarcely old enough, in itself, to justify the tradition that would claim it as a home of Whittington, this house may very well have been, as the story goes, a relic of that which was occupied some 150 years afterwards by Sir Thomas Gresham, *temp.* Queen Elizabeth. At that time, by the way, Grub-street lay on the outskirts of the town. A stone set in the face of one of the three now dismantled tenements which arose on the site is thus inscribed, in defiance of all chronology:—

GRESHAM HOUSE  
Once the Residence of  
SIR RICHD. WHITTINGTON  
LORD MAYOR 1314  
Rebuilt 1805.

"1314," *sic*, on the stone. In London guide-books and catalogues, &c., the date is commonly misquoted as "1406." Our *Flos Mercatorum*, however, was mayor in the years 1397, 1406, and 1419. But since the rebuilding of 1805, the quondam home of Foxe, Speed, and Dr. Johnson's friend, John Hoole,—the quarter which Marvell was the first to stigmatise,—has changed its name for Milton-street, albeit not so, he it noted, in memory of the poet, who died in what was formerly Artillery-walk, hard by. Sweedland's-passage and Butler's-alley have lately given place to Butler-street, and the three small houses we indicate are now being demolished to make way for yet more of the large business premises that arise all round. Still, there remain in Milton-street, on its western side, two plaster-fronted houses which were coeval with the sorry times when Pope identified authorship with misery, squalor, and gin.

SOME very interesting facts and figures were stated at the last meeting of the Mansion House Committee of the Imperial Institute, as to the great value of sites in the metropolis. The Governor of the Bank of England said that, in their hunt after a site for the Institute they had found that the land for the new Admiralty would cost 160,000*l.* per acre, the Charles-street site is estimated at 250,000*l.*, an acre at Charing-cross at 224,000*l.*, the site at the Embankment (Blackfriars) 400,000*l.*, and the Christ's Hospital site at 600,000*l.* These are stupendous figures, and bring before one more forcibly than anything else the greatness of London. It is allowed that 300,000*l.* would buy the best site in London for the Institute, and although

this is of course a large sum, it is as nothing compared with the magnitude and importance of the scheme, or with the riches of London. Moreover, the Lord Mayor, while accepting the South Kensington site, acknowledges that there must be a supplementary commercial museum or museums in the City, thereby unconsciously showing that the Institute cannot be fulfilling its proper destiny if located at South Kensington. An exhaustive museum is half the scheme, and even that will have to be established at great cost in the city. There either appears to be a failure to realise the possible grandeur of the whole thing as Imperial, or else the financial glamour of the various exhibitions is permitted to exercise undue sway.

THE Chapel of St. Mary Magdalen, at the Brompton Oratory, has just been decorated, under the direction of Mr. J. Cosgreave, who has designed much of the decorative work in the church. Gilding has been used with that lavishness which usually produces the extreme either of vulgar gaudiness or of rich beauty, and the effect in this instance is decidedly good, assisted as it is by some beautiful plaster work by Messrs. Jackson. Some of the Italian marble work in the walls is very rich and effective, but the architraves and pediments of the doorways, which looked well in wainscot, are poor and cold copied in grey marble.

MR. AXEL H. HAIG'S new etching of Limburg-on-the-Lahn, now being exhibited at Mr. Dunthorne's gallery, if not quite superior to all his other works, has all the old charm for those who believe in the capabilities of architecture for becoming the theme of a picture. The picturesque cathedral of St. George stands in the full sunlight on the edge of the cliff overlooking the river, and is contrasted with the dark mass of the buildings on the hill in the shadow to the left; in front is the river, and a mill, also in strong light; on the right are some dark trees; the glimpse obtained between these of the bridge and the country beyond is one of the best bits in the whole composition. The figures in the foreground are pretty, but a little too conventional.

THE *Illustrated London News*, in its column devoted to "Art and Archeology" last week, referred to the sacrifice of many historical and art associations which the making of the new street from Charing Cross to Tottenham-court-road, has involved,—associations some of which, by the way, were descanted upon in the *Builder* for June 26, 1886, p. 955. After mentioning the names of Hogarth, Sir James Thorahill, Burke, Reynolds, Johnson, Sir Thomas Lawrence, and others, our contemporary says:—

"We most cordially associate ourselves with more than one of our contemporaries in entering a protest against the name proposed to be given to the new thoroughfare. If from amongst the names already cited (not one of which, we believe, is in any way connected with any of our streets or squares) it is not thought expedient to select one to keep alive the memories of the past, then the title of Nelson-avenue seems to us a singularly effective and proper appellation for the new street. It is strange that, although there are two Trafalgar-squares in Western London, Nelson's own name is only connected with a somewhat dingy square and noisy street in Southwark,—as if Englishmen had been eager to profit by his successes, but were unwilling to recognise the man who achieved them. There seems, too, something which touches our sense of fitness to place beside Shaftesbury-avenue a public thoroughfare which recalls that, not only in war but in peace, England expects each man to do his duty, and honours him for having done it."

As the proposal to name the new street "Nelson-avenue" first appeared in our columns we are very glad to find that we are not alone in the view we took, and still hold, that the name "Charing Cross-road" is not a good one, and we hope to see it altered, in spite of the fact that, as all the newspapers inform us, the new street was last Saturday formally "dedicated to the public for ever by the name of 'Charing Cross-road.'" The Metropolitan Board of Works is not always happy in deciding on questions of street nomenclature, as we have had to point out on several occasions, notably when they proposed to

call the new street from Bloomsbury to Piccadilly-circus by the absurd name of "Piccadilly-road." We protested against the unsuitability of such an appellation at the time, and suggested the name "Shaftesbury-avenue." We had the satisfaction of seeing our protest and suggestion re-echoed by the press, and ultimately, though not without much discussion, the Board abandoned the name "Piccadilly-road" in favour of "Shaftesbury-avenue." The appellation "Charing Cross-road" for the thoroughfare opened last Saturday will be attended with many inconveniences.

#### LETTER FROM PARIS.

WE have been much occupied with a new fight about the Eiffel tower. A number of artists and literary men well known to the public, and nearly all members of the Institut, have made a collective protest against "Podieuse colonne de tôle bouillonnée," which quite represents the general feeling on the subject, but which has unfortunately come too late; and though the protesting party are entirely in the right, they conched their remonstrances in a tone somewhat too solemn for the occasion, and which has excited the railway of M. Lockroy, the Minister of Commerce, who replied to it in a satiric style, amusing enough in itself, though not quite in keeping with the dignity and responsibility of his office. M. Garnier, one of the signers of the protest, has replied on his part with equal energy and irony; but things remain as they were. M. Garnier has consented to remain consulting architect for the Exhibition, and the protesting party, in spite of their well-turned sentences, have to await in resignation the arising of this new tower of Babel, from its foundations to the ordained height of 300 mètres, whence, like a morning star, it is to shed

"Des torrents de lumière  
Sur ses obscurs blasphémateurs."

For the moment, work is in full activity. For each one of the four piers of the tower a quadrangular excavation, 31 mètres square, and 4½ mètres in depth, has to be made; which lays bare the gravel stratum on which the *béton* will be run. Two hundred men are at work on these excavations, which will probably be terminated by the end of the month. On the neighbouring site of the Ecole Militaire, where the machinery gallery is to be erected, 410 pits of 3 to 8 mètres deep have been sunk, 300 of which are already filled with concrete. Lastly, in the midst of the Champ de Mars, there extends a huge cutting intended to receive 4,000 square mètres of masonry footings. The important question of the lighting of the exhibition is at present under consideration. According to the scheme of M. Georges Berger, the lighting of the Champ de Mars enclosure will be carried out by a kind of syndicate of all the French and foreign electricians, and he is contemplating an illuminating power for this area, equal to about five times the whole of the Paris gaslighting power. The "Exposition des Eaux et Forêts," which was of such interest in 1878, will be arranged on the left slope of the Trocadéro Gardens, while the right slope will be set aside for the Ministry of Public Works, which proposes among other things to erect a great lighthouse. The rest of the Trocadéro Gardens will be for the exhibition of the National and Central Horticultural Society of France. We may just note here, proposing to describe them more in detail afterwards, that various novel projects are spoken of, such as "trottoirs roulants," flying bridges, electric and rope railways, &c.

But though industrial Paris looks with hope to the exhibition as a promoter of work, artistic Paris is deeply concerned at the loss of its annual central place of exhibition in the Palais d'Industrie, which piece of State property, long lent for the annual *Salons*, must now be utilised for the purposes of the Exhibition, and the artists will have the enjoyment of it no more after 1888, after which they must look out for some other locality, which it will be very difficult to find.

Meantime, various exhibitions are being organised on this site, which the "Société des Femmes Peintres et Sculpteurs" is now occupying with its creditable mediocrities. On August 15th will be opened there the second exhibition of decorative art, which will last till November 25th. In regard to the Musée des

Arts Décoratifs," an important step has been taken since our last letter. Thanks to M. Antonin Proust, Parliament has been occupying itself with the matter, and the Musée is to become, after a lapse of thirty years, the property of the State, in exchange for the giving up of the ancient Cour des Comptes. This arrangement, hardly the best in regard to economy or to the real interests of industrial art, will, at least, cause the disappearance of those ruins of the Communist war which have given such a sad aspect to one portion of modern Paris.

Of Government work now in progress, besides the Musée Guimet (of which we have already spoken, and the sculptural decoration of which is commenced), the "Direction des Bâtimens Civils" is occupied with the completion of the portion of the Bibliothèque Nationale which faces the Rue Richelieu. A monumental gate of bronze, executed from the designs of M. Pascal, architect, will shortly give access to the principal court, the decorative treatment of which is carried out on the lines of the old Hôtel de Nevers. It is to be hoped that funds will be forthcoming for commencing at last the projected buildings facing the Rue Vivienne, which will complete the great quadrangle of the national French library. The new arrangements at the Louvre are still in progress, and the gallery of Egyptian antiquities will be shortly opened, as well as the "Gallery of the Colonnade," as it is called.

The Government is now apparently occupying itself seriously about the monument commemorative of the Revolution, which has been the subject of so much discussion for the last two years. The new Ministry of Fine Arts is about to nominate a special committee to consider the project and to bring it before Parliament as soon as possible. The project will give rise to a public competition in sculptural and architectural design. There is, however, many a slip between cup and lip in these matters, and it may be observed that the monument proposed to be erected at Versailles, in honour of the National Assembly, has never gone any further since the jury awarded the premiums for the best designs seven or eight years ago. The State, in fact, shows much less zeal in artistic matters than the Municipality, which, besides, has the well-earned reputation of paying much more generously than the State; and thus we have an almost unbroken record, from month to month, of new artistic efforts on the part of the City of Paris, which are highly appreciated by artists.

This month the second stage of the competition for decorating the Mairie of Pantin, of which we have already spoken, has been decided. In the first competition three artists, M. François Lafon, M. Henri Lévy, and M. Schommer, had been selected to compete with cartoons the size of the work to be executed. M. Schommer has been successful. His composition, intended for the ceiling of the grand staircase, represents Alsace, under the guise of a young woman clad in the costume of the country, the standard of France unfurled at her feet. Above her is a winged figure symbolising France. M. Henri Lévy, whose high talent has been often proved, especially in his work at the Pantheon, has been unsuccessful here, and his rather tame and colourless allegory has had to yield place to M. Lafon's commonplace idyll, an Arcadian country scene, quite out of place in prosaic Pantin. The result of the matter is that M. Schommer will decorate the grand staircase and the Salle des Fêtes of the Mairie, at a cost of 36,000 francs. M. Lafon will have the Salle des Mariages, M. Lévy the Council Chamber, and the two latter artists will receive a sum of 8,000 francs each, in addition to the premiums awarded. The Municipality is also about to undertake the decoration of the new Salle des Fêtes constructed by M. Ginain for the Mairie of the Sixth Arrondissement, and several mairies in suburban districts will be the objects of similar projects.

Whether we shall now have the question of the decoration of the Hôtel de Ville settled is a matter of speculation. The Council must do something about it before they separate in May; and there is a difference of opinion as to whether there should be a public competition or direct commissions to selected artists. The Fine Arts Committee of the Council leans towards the latter course, which we are disposed to think is the best in order to obtain designs entirely in harmony with

the building. The committee proposes to select for treatment subjects connected with the history of Paris, the freedom of the Communes, the life of Étienne Marcel, and sundry great events of the Revolution. No objection can be made to this; such subjects will certainly offer more of interest than the usual cycle of mythological allegories. As to where the commencement of the work is to be made, nothing is yet decided, although some important inaugural celebrations are already under consideration, and for the first hall at the end of March, for which 5,000 invitations will be sent out, it will be necessary to mask the want of decoration by tapestries and other temporary expedients, which will necessitate an immense expense.

The statue to Louis Blanc was inaugurated on February 24, the anniversary of the revolution of 1848. As politics do not enter into our *métier*, we may pass over in silence the more or less anarchist manifestations which saluted the work of the sculptor Delhomme, of which we have before spoken. By the time this letter is published there will also have been inaugurated at Père-la-Chaise cemetery the new crematorium, built from the plans of M. Formigé, and which is provisionally to be used at present for the destruction of hospital *débris*.

Another novelty to be shortly opened is the new panorama of the battle of Rézonville, by M. Détaillé, which succeeds to that of Champsigny, painted by the same artist in collaboration with the late M. de Nenville.

One of the municipal schemes that may be mentioned is the reconstruction of the Temple of the Sibyl in the Park des Buttes Chaumont. The work, which has presented a good many difficulties, is just completed, and the fine promenade adjoining the temple is again open to the public.

M. Tony Noël, whose fine decorative sculpture for the Mairie of Neuilly has been illustrated in the *Builder*, has been appointed a member of the Senior Committee of Instruction at the Ecole des Beaux Arts, in place of M. Delaplanche, who has been nominated a professor in the same institution.

The competition in the section of architecture at the Ecole has now been decided. The subject given was "a hippodrome." From among forty-four designs submitted, the jury gave the first medals to MM. Comier and Chédanne, pupils of M. André; the second to M. Astruc, pupil of M. André, and to MM. Desnos and Malgras, pupils of M. Ginain. Eighteen designs have received honourable mention. In the sketch design competition (subject, the ceiling of a gallery), the first medal has not been awarded. M. Gérard, pupil of MM. Daumet and Girault, and M. Schaltenbrand, pupil of M. Guadet, have received second medals; and M. Eustache, pupil of M. Ginain, has obtained honourable mention.

At the Institut, M. Chaplain, the eminent medallist to whom we owe the splendid medal commemorative of the Hôtel de Ville, has been chosen President of the Académie des Beaux Arts for 1887. M. Chaplain has also been appointed by his colleagues to go to Brussels to model the portrait of the Duc d'Annam, whose profile is to figure on the medal to be struck in memory of his generous gift of the domain of Chantilly.

The exhibition of the artistic club called "the Mirlitons" contains a sufficient number of interesting works executed by genuine artists, pretty well drowned in a sea of amateur works. Of these latter we will say nothing, confining ourselves to the mention of two fine portraits by M. Carolus Duran, and two others by M. Elié Delamury. The Water-Colour Artists' Exhibition, in the Rue de Sézes, is of a very different order; and here the public at least obtain, as the phrase goes, something for their money. The only complaint one can make against the Society is that of not having been firm enough in adhering to their principles, and having the last year or two opened their doors to rather too large a number of works. Nevertheless, there is always a sufficient number of works of the highest class to attract and interest the discreet visitor. The success of the exhibition, as usual, belongs of right to the remarkable works exhibited by MM. François, Détaillé, Vibert, Harpignies, Maurice Leloir, François Flameng, John Lewis Brown, and, lastly, by M. Eugène Lamy, that octogenarian who remains eternally young, and whose compositions show all the same brilliancy and vigour as those of forty years ago. Among the lady

exhibitors, the landscapes of Mme. Nathaniel de Rotbschild divide the honours with the flower and fruit paintings of Mme. Madeleine Lemaire.

M. Bosnard deserves a word of special mention for his exhibition, which contains above forty works, including a good many portraits finely studied and exquisite in colour. There are unfortunately some water-colours more remarkable for eccentricity than for real success; but the whole collection is the work of an artist of real genius whose eccentricities even are not without their interest.

#### MORE ABOUT THE EDINBURGH MUNICIPAL BUILDINGS COMPETITION DESIGNS.\*

WHETHER it be due merely to the local circumstance that Edinburgh is popularly known as "The Modern Athens," or whether it is to be accepted as further evidence of a general return to Classic architecture, certain it is that Gothic architecture has had but few exponents in the competition for the proposed new Municipal Buildings, and these, as a rule, do not approach the highest standard of excellence. To this statement, however, exception must be made in favour of the design under motto "Queen Sabe!" which is by far the best rendering of Gothic submitted in the competition, and a design in which the style is treated throughout in a manner peculiarly suited to modern civil requirements. The particular phase of the style selected is termed by the authors "The Scottish Palatial Gothic of the Fifteenth and Sixteenth Centuries, as exemplified in Falkland and Linlithgow Palaces, Stirling Castle, and other Scottish edifices." Its prototype, more fully developed in Spain, has in this design been drawn upon for a lighter character to the fabric, and greater variety of detail. The elevation to Cockburn-street is very imposing, and shows a large square central tower with two smaller ones at the corners, octagonal on plan. All three are finished with short spires whose surfaces are divided into panels enriched with pierced tracery. The High-street front is also well disposed; the treatment of the gables in the east and west elevations is particularly clever, and the interior of the quadrangle has some most excellent work. The windows throughout are very rich, with thick mullions and elaborately traceried heads. The plan has the buildings round the four sides of a quadrangle, with the Council suite on the first floor of the north wing. The arrangement of this part has not a little dignity, but there are some doubtfully-lighted corridors and other defects visible in the planning. The estimated cost is 151,000l.

Another Gothic design of considerable ability is that under motto, "For Queen and Country." A late phase of the style (fifteenth century) has been chosen; the masses are well disposed, and if carefully detailed would turn out well. The Cockburn-street front has a central gable, and two side gables, each divided by narrow buttresses into three bays. All three bays of the central gable have oriel windows carried through three stories, the side gables an oriel in the centre bay only. The High-street elevation is somewhat similar in disposition, steep-pitched gables divided into three bays terminating the east and west wings, while a higher gable, divided into three bays with oriels, and a square tower rising up behind, form the central feature of the courtyard. On plan, this courtyard is 90 ft. broad and 60 ft. deep, measured from the building line of High-street, with two small courtyards behind lighting staircase and corridors, somewhat akin to the arrangement of "Nineteenth Century." The City Chamberlain is placed on the ground-floor of the north wing, the Council Chambers on the first floor of the north wing, with the Town Clerk on the same level, in the west wing. The internal arrangement of the Council suite is lacking in dignity, but the plan has many good points. "Aihlius" is the motto of another Gothic design of some merit, but of earlier (thirteenth century) type, and more restrained treatment. The plan is irredeemably bad.

"Scotia."—The High-street front of this design has a charm quite its own, arising from the quaint disposition and treatment of its door and window openings, and the skilful combination of horizontal cornices and string-

\* See p. 311, *ante*.

courses with the vertical lines of pilastered buttresses and gables. While full of sympathy and harmony with its intended situation in the heart of Midlothian, the design is hardly important enough for the Municipal Offices of the Capital of Scotland. A central tower, not very happily managed, is flanked by buildings of two stories and attics, with niches and statues between the first-floor windows. The ends of the frontage are composed with triple gables, divided by pilastered buttresses. The other elevations are also of considerable merit, but the plan does not call for any special mention.

"Tannabill."—In this design the author says,—“No attempt has been made to imitate any special style, except so far as in the adoption of some details derived from Medieval Scottish architecture, but even those mostly with a good deal of modification.” The result is a design of marked originality, showing considerable thought and individuality, but which, with all its cleverness, looks much better in the excellent drawings by which it is illustrated than it would ever do in execution.

"Waverley."—The design (No. 1) submitted under this motto is deserving of notice, not only from the merit of its architecture and the quality of the drawings, but also from a striking peculiarity in its plan. The buildings are arranged round three sides of a courtyard, as so many others are, but in this instance the open end is to the north, not to the south, as in every other case. The south wing extends along the building line of High-street, and the east and west wings run northwards from this, their ends being occupied by semicircular staircases rising from the Cockburn-street level to the top floor of the building, with passenger lifts placed in the wells. The three wings or blocks being double, i.e., with rooms on each side of the corridors, the lighting of the corridors is at various places more than doubtful. The elevations are in the style of the French Renaissance. Towards Cockburn-street the wings are carried up to a considerable height, and are connected for some distance above their base by a screen of lower buildings. Behind and above these are seen the gables of the back of the High-street block, with a great central tower rising above all. The grouping of the masses from Princes-street would be most effective, while the sheet of details exhibits an intimate acquaintance on the part of the author with the style chosen.

"Edina" is the motto of another design in the same style, handled with much less skill. The plan is cumbersome and bewildering.

"St. Giles."—Either as the result of a curious coincidence, or as the product of the same author, two designs are submitted under this motto, in which a similar type of plan has been adopted and that different from any other yet referred to. The principal entrance from High-street gives access to a long covered court or hall running north and south, with galleries all round at the different floor levels, giving access to the surrounding apartments. The Classic design (No. 45) is both in plan and external treatment superior to its Gothic brother, No. 46, the three great gables with open arch and balustrade between in the Cockburn-street elevation of the former being a most effective feature, while the arrangement of the Town Clerk's and City Chamberlain's offices and of the Council Chambers is particularly good.

"Heart of Midlothian."—This is a design which might have been expected to appeal in a special manner to Mr. Waterhouse had that gentleman been influenced at all by elevations in making his selection, while the plan is not without a great deal of merit.

"Waverley" (with thistle within a circle).—The municipal buildings in this plan are confined to a rectangular space, 210 ft. from north to south, by 170 ft. from east to west, the Clydesdale Bank being entirely isolated in a separate building placed at the eastern extremity of the High-street frontage. The plan has been arranged with considerable dignity in the matter of entrance-halls, ante-halls, grand staircases, and corridors, but too much has been sacrificed for this, and the working departments are not arranged with a single eye to carrying on business in the most efficient manner. For example, there is a distance of fully 120 ft. between the door of the Town Clerk's own room, and that of the public office of his department, the communication between the two being by a corridor quite open to the public.

"Rob Roy" sets the main portion of the High-street block 25 ft. back from the east and

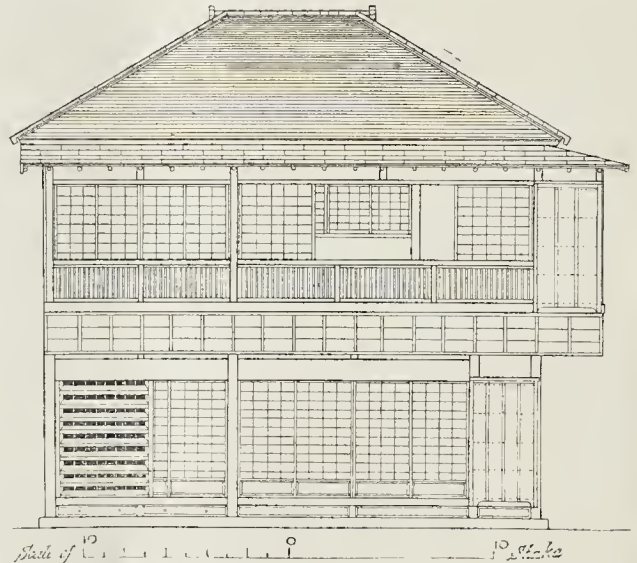
west wings, which project forward to the building line, and in this point improves upon other quadrangular plans, which keep the whole south block forward to the building line. The court in the centre of the site is of irregular shape, and gives light only to staircases, corridors, and lavatories, the offices being lighted to the outside of the square. The Council Chambers occupy the High-street block on the second-floor level,—a height to which few other competitors have cared to raise them. The official departments on the first floor, those of the Town Clerk, City Chamberlain, Burgh Engineer, Dean of Guild Court, &c., are well arranged in relation to each other and the work to be carried on within them. The elevations are somewhat commonplace, securing their effect rather by bulk than originality; but the large-scale drawing exhibits a correct knowledge of Classic detail.

Present upon Shield.—The design bearing this device is the only one submitted in competition which proposes to utilise the existing buildings, and on this account Mr. Waterhouse called attention to it in his report. It may be enough to say of it that it either goes too far

#### JAPANESE ARCHITECTURE.

At the meeting of the Royal Institute of British Architects on Monday evening last, Mr. Waterhouse, R.A., Vice-President, in the chair, Mr. Josiah Conder (as elsewhere mentioned) read a paper on "Domestic, Civil, and Palatial Buildings in Japan."

In describing the domestic architecture of Japan, the author should, he said, have occasionally allude to certain habits of life pertaining to the people of that country; some of them the natural results of climate, many of them closely associated with romantic tradition, but not a few belonging more to the passing than to the modern type of civilisation. In Japanese houses separate rooms are not set apart for distinct and particular household purposes, as is the case in European dwellings. The bedroom, as a distinct apartment, can hardly be said to exist in the ordinary dwellings. As a general rule, any room is converted into a bedchamber by spreading sleeping quilts and pillows upon the matted floor. During the daytime such bedding is secreted in spacious closets arranged between the walls of the



Front Elevation of a Japanese Theatre-Tea-house.

or not far enough. 50,000*l.* is too much to spend on patching up an old building without obtaining a satisfactory result, especially when designs are submitted in competition and recommended by the professional assessor for an entirely new building, arranged exactly as the requirements of official business dictate at a cost little more than double that sum.

Other designs of considerable pretension and more or less merit are "Finis coronat Opus," "Line upon Line," "Heriot," "St. Andrew," "In my Defence" (No. 12).

Taking a general survey of the drawings, after a careful examination of each individual set, one returns with satisfaction to the plans recommended by Mr. Waterhouse. For systematic setting out, convenient and dignified arrangement, and efficient lighting, they are not equalled in the room, while the elevations of "Nineteenth Century," "Ora et Labora," "Fortuna," "N. D. I. V.," and "Fiat" are welcome assurances that, with all the striving after novelty and cheap superficial effect which the spirit of the age tends so much to develop, there are some among us who still understand and value the breadth, solidity, and nobility of true Classic art. It is at the same time to be regretted that there have not been submitted, in conjunction with a first-class plan, elevations in which full advantage is taken of the grand possibilities of the French Renaissance, the style, above all others, pre-eminently suited for the proposed building, with its site and surroundings.

The Japanese make constant use of the hot bath, and all the best houses are provided with a bath-room. The usual time for taking the bath is the afternoon or evening, so that the morning ablutions are simple, and are conducted, not in the sleeping apartment, but in the lavatory, or in some cases, even at the well-side in the garden or kitchen court. Privies are provided at the end of the verandah passages, and just opposite to them, in the garden, is invariably an ornamental water-basin provided with a ladle. The mats called *tatami*, used to cover the floors of all living-rooms, are of the fixed size of 6 ft. by 3 ft., and rooms are described by the number of mats that they contain. Passages, verandahs, part of the kitchen, and the closets are boarded, such boarding quickly assuming a natural polish from the daily rubbing with wet cloths which it receives. Food is served to the different rooms upon small trays, one to each individual. In winter large metal-lined boxes, or bronze vases of live charcoal, are placed in a room when in use, and in summer smaller fire-boxes are provided for lighting the pipe at. The candlesticks or lamps used at night, one or two chests of drawers, small low tables for writing upon, boxes containing paper and ink, little shelves for the cups, and occasionally, in the most luxurious dwellings, a small lacquered cabinet and a screen or two, complete the furniture of an ordinary house. In every house, one room or more will be provided with an alcove or recess, called *tokonoma*, and a corresponding recess, occupied

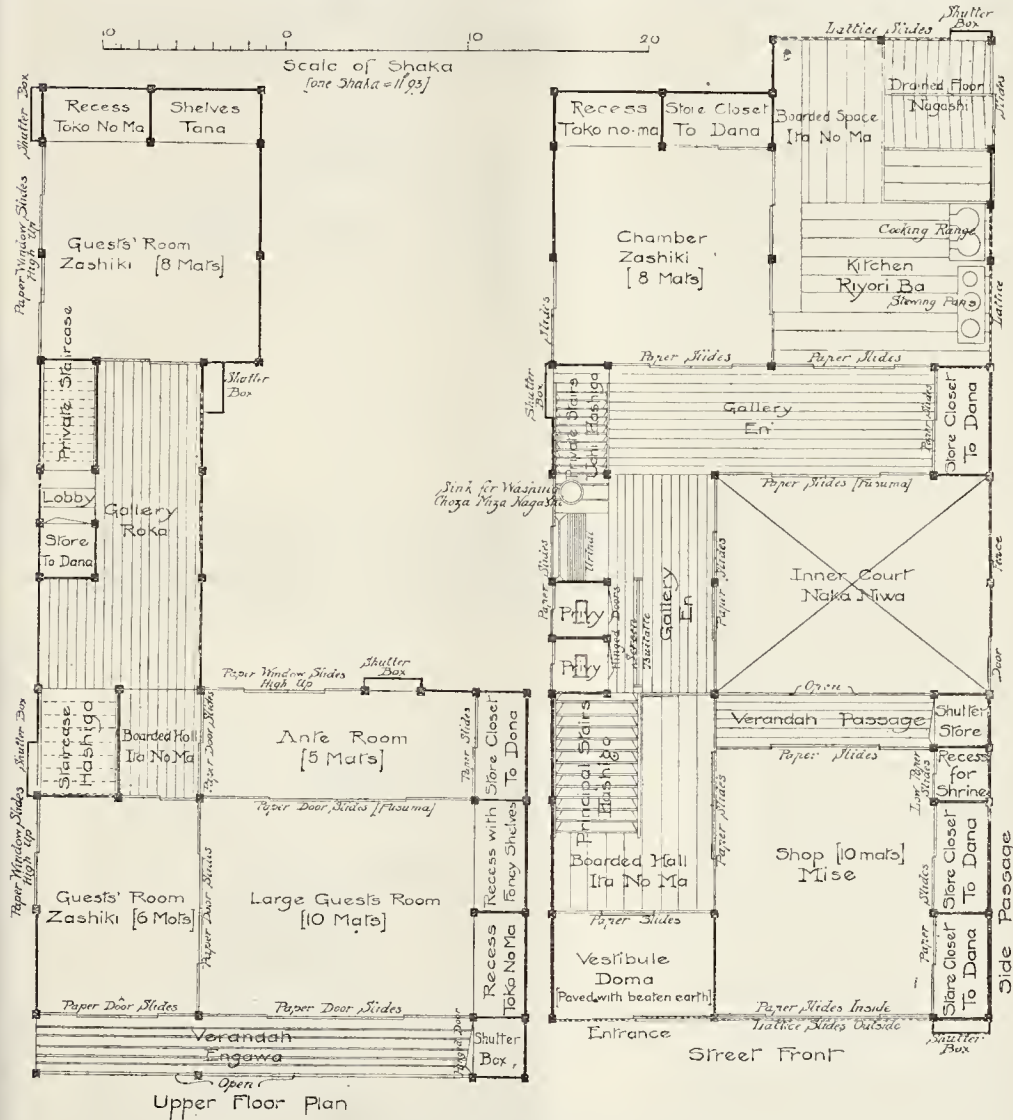


either by ornamental shelves, or by a closed store closet.

The general mode of living in a Japanese house being understood, it would be easier, the author said, to appreciate the different arrangements which the builders have produced for administering economically to such wants. He showed a drawing of a small middle-class house, and another of a somewhat larger one-story building, formerly occupied by a private gentleman of the upper class. The former contains a vestibule, a small three-mat ante-room, one large even-mat room, another room of six mats

wood, having some quiet pattern cut through, free or conventional. The other drawing shown was a good example of the best class of bonso, secondary only to the large summer pavilions of the nobles and their old feudal mansions. The approach is under a porchway, paved with cement, having a high wooden step leading to the enclosed matted hall, four mats in area. At the side of this hall is a three-mat room for domestics, with large and small closets. The hall opens into a small inner hall or lobby of two mats, communicating with one of the principal sitting-rooms of

four smaller rooms, one eight-mats, and the others six-mats in area; of this group one has a *tokonoma* and *todana*, or closet, and the others closets only. At the back of the whole residence is an oblong block containing a large store and two small rooms for female servants, with separate entrance. As is almost invariably the case in the best houses, the principal rooms form an internal angle or L-shape towards the garden, which is generally on the south side of the building. The whole of this side has a boarded verandah with a latrine at the end. Other conveniences are provided,



Plans of a Japanese Theatre-Tea-house.

with a *tokonoma*, a kitchen, closets, privy, and back entrance. Such a dwelling would be surrounded on two sides by a little garden containing a few shrubs, evergreens, stones of irregular shape, perhaps a stone garden-lantern, and a hill or two. A small miniature pond might also be introduced. The whole would be surrounded by a gardeu-fence, entered through a picturesquely-roofed wicket-gate. The internal constructional woodwork and the boarded ceilings of such a house would be carefully selected, and some pale neutral tint would be given to the plastering. The *ramma*, or frieze space, would be filled in with thin planks of clean

eight mats in area; and at the back with an inner gallery which surrounds a central court or garden. On the right of this garden is a wing containing kitchen, servants-hall, and bath-room; and this wing, towards the front, adjoins the room devoted to hall servants, though somewhat set back from the main frontage of the house. Beyond the eight-mat room mentioned is the principal room of the house, fifteen mats in area, and decorated at the further end with an ornamental recess (*tokonoma*), and decorative shelves (*tana*). Behind this room, and forming a group on the further or west side of the inner garden, are

one near the bath-room, and one at the back of the further block. A house such as this would be provided with an extensive garden on the south and west sides, and a small garden of different character in the internal court or area. The style of garden employed within would be what is called the *Hake-niwa*, a flat garden of beaten earth, kept slightly damp and cleanly swept, dotted with quaint paths of stepping stones, and rather thickly planted with low trees and shrubs. The outer garden would be of more free and open character belonging to what is called the *Sansui* type, a word implying mountain and water scenery; gardens in this

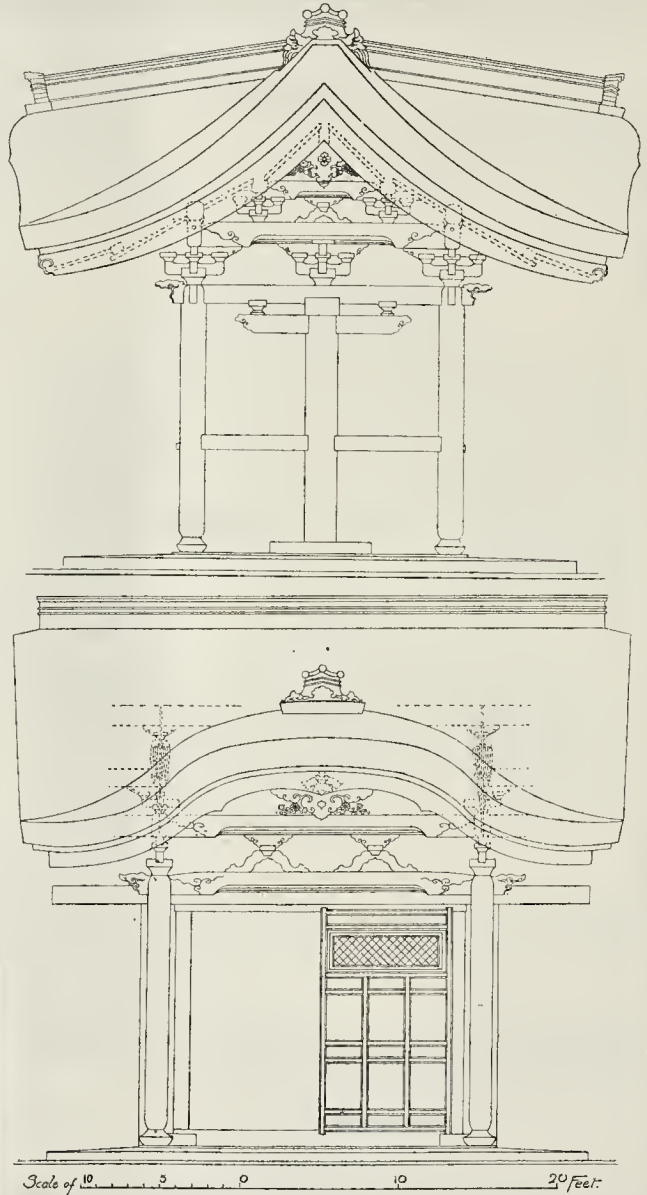
style being designed to suggest some natural landscape.

The refined Japanese gentleman of the old school will generally boast some acquaintance with the philosophy and ceremonial of tea-drinking, and will adorn his grounds with one of those curious little buildings, called *Chashitsu*, intended for the preparation and enjoyment of this refreshing beverage, amid the hospitable formalities with which the pastime is surrounded. The construction of these buildings is in keeping with the tinyness of the arrangements, and the most exquisite care and neatness are displayed. The author showed a plan of one of these buildings designed by the greatest professor of the *Cha-no-yu*, Sen-no-Rikiu, and described its arrangement and mode of construction in detail.

Numerous types of houses used by the upper classes might be given, but the one previously described was sufficiently characteristic. The time at the author's disposal did not admit of his describing these at length, nor of reading all that he had written on the subject of the *Yashiki*, or town residences of the territorial nobility; and of the castle-palaces. The latter consist of an extensive group of one-storied buildings, compactly arranged, and divided at intervals by inner courts or small gardens. The principal palace of the latest *Shogun*, or Military Regent, in the Castle of Yedo, which was years ago burned to the ground, covered an area of more than two acres. The military character of such buildings necessitated greater compactness in planning than was adopted in the Imperial palaces; and whereas the latter, as may be seen in Kyôto, consist of a number of almost detached blocks connected by long covered ways, the former were more under one roof, the succession of rooms was less broken, and the inner courts and gardens were introduced only where absolutely necessary for purposes of light and ventilation. In the matter of internal decoration, however, the castle-palaces are far more gorgeously embellished than those of the Imperial buildings. The *ramma* are elaborately coloured and gilt, the ceilings have painted silk panels and lacquered frames, and the only undecorated portions are the posts and lintels, which are invariably of plain white wood. The author said he had with some difficulty obtained a plan of this palace, and also of one formerly situated within the inner citadel of the same castle,—which he exhibited. The Imperial Palace still existing at Kyôto, the former Capital, was illustrated by a general plan and several drawings of some of the buildings. The palace consists of seven principal blocks of residential buildings, connected by covered corridors and arranged in an irregular manner, so as to present the best aspects to the wide gardens and courts surrounding them. At the back of these buildings are large groups of administrative offices, kitchens, ward-rooms, stores, and apartments for officials and domestics; and at various parts of the enclosure are fire-proof stores and outbuildings. A special block is arranged for worship, originally also intended as a repository for certain sacred treasures. The complete group of buildings is surrounded by an irregular oblong fence, constructed of clay and tiles set in heavy wooden framing and plastered between the frames. The fence is crowned by a wide and picturesque tiled roof with ridge ornaments. At certain points in the boundary are gates, each of some different design, and intended for special uses. The longer side of the enclosure measures about 2,400 ft., and the narrower side about 1,440 ft. Taking into account certain depressions, the whole boundary measures about 8,436 ft., or nearly 1½ English miles. The first building reached through the principal entrance gateway is the *Shishinden*, or ceremonial hall, which is used only on special occasions. This is a large hoarded hall, measuring about 100 ft. by 50 ft., with a wide corridor behind and recessed galleries at the sides. At the back it is connected with a passage leading to the Imperial chambers, and in front, towards the garden, has a broad flight of steps communicating with an exterior raised gallery. The court in front of this hall contains several storehouses for the Imperial cars, palanquin and other ancient utensils, and immediately before the threshold are two sacred trees, to which great antiquity is attributed. The next block reached is the *Seriden*, or Summer Palace, used only for special summer ceremonies, and not matted as all purely residential buildings are. The small

chambers at the sides, used as retiring-rooms, are named mostly according to their decoration; thus there are the Wisteria Chamber, *Lespedeza* Chamber, and the *Fiend* Chamber. On the opposite side of the court separating this building and the *Shishinden*, is the *Kogoshô*, or Small Palace, having its principal aspect towards a garden on the east side. The walls and slides are richly decorated in cream colour and gold, with paintings of landscapes and

by a wide passage, and an outer gallery thrown open in summer time to the breeze. On the south side is a suite of three rooms, the floor of each successive room being raised above that of the other. The author then described the decoration of the wall spaces, ceilings, panels, and slides of the room contained in this block. Many buildings, he said, destined for far less important uses, are to be seen in Japan with gorgeously decorated ceilings; but a neat sim-



A Japanese Gateway.

figures in pale colours, interrupted by cloud-shaped streaks of rich blue. The next block of rooms on the garden side is called the *Gakumonjo*, or Imperial study. A winding corridor leads from this block to the *O-Tsunegoten*, or Imperial residence proper, which is a large block of rooms, measuring about 60 ft. by 100 ft., and with a small corner block attached. It consists of fourteen rooms, arranged in an oblong block, and surrounded

by a wide passage, and an outer gallery thrown open in summer time to the breeze. On the south side is a suite of three rooms, the floor of each successive room being raised above that of the other. The author then described the decoration of the wall spaces, ceilings, panels, and slides of the room contained in this block. Many buildings, he said, destined for far less important uses, are to be seen in Japan with gorgeously decorated ceilings; but a neat sim-

construction these rooms are a true type of the Chasbitu, or tea clubs.

The whole of the Imperial buildings are, with- out exception, of one story only, and present very few striking architectural features on the outside. The roofs are of picturesque curve, though decidedly heavy looking, and are covered with thick layers of pine shingles. Terminals and ridges are executed in wood, covered with copper-plate, and with a little gilding in parts. The gables have bargeboards and carved pen- dants. The eaves, with the exception of those the Shishinden, have not the rich bracketted cornices generally found under them in temple buildings, but are much simpler.

The principal features of interest upon the exterior, are the elegant halustrades and hand- rails of the external galleries and staircases, and the wooden screen divisions which separate the verandahs into parts. The vista of interior rooms, always seen from the outside, attaches interest to an otherwise bare and monotonous elevation.

The author then referred to the summer pavilions used by the emperors and regents as temporary residences for retirement. They are of two or three stories in height, contain small painted chambers of great delicacy and beauty, and are surrounded by magnificent gardens. He then proceeded to describe some of the more important town buildings for the public use. Among the principal of these are the bath houses, tea houses, restaurants, inns, lodging- houses, theatres, lecture-rooms, and dancing- rooms, most of which were illustrated by draw- ings, showing plans and elevations. These and the other buildings described were also illus- trated by means of a numerous collection of photographs and paintings made by the author and by Japanese artists.

Mr. Octavius Hansard proposed a vote of thanks to Mr. Conder for his interesting paper. Mention had been made as to the general angle of the roofs of Japanese buildings being from 30 to 40 degrees, with large and extending eaves projecting from the main to the extreme extension. He believed the climate of Japan was often somewhat similar to that of England, and as the roofs were to a great extent covered with shingles or materials of a similar nature, how was it that a mass of snow was kept from weighing down the construction of such slight roofs? He would also like to know how in so changeable a climate the eaves or outside shutters were prevented from being blown to pieces? He also desired to know whether the Japanese had been able to use glass, without loss of picturesqueness, in connexion with their buildings?

The Chairman said that the meeting would willingly accord a sincere vote of thanks to Mr. Conder for his interesting paper. He had given many curious details relating to Japanese architecture and gardening. Mr. Conder had mentioned the Chinese style as being exhibited in some of the older buildings, and he (the speaker), therefore, imagined that Japanese architecture had been derived from China. Nothing had been said in the paper about the tenure of land in Japan, in regard to which he felt some interest. On one occasion he thought he would have something to do with a Japanese building, but it came to nothing. At the time, however, he was much puzzled as to how the building was to be designed on a site he had never seen, and as he knew nothing about the dimen- sions and levels. He was told, however, that there need be no difficulty, because in Japan the projector of a building could purchase any bit of land he wished. The owner of the land was bound to register his own valuation of the land, and at that value he was bound to sell it if a purchaser came forward to buy it. There was also little fear of too high a valuation being put upon the land, as the registered value formed the basis for levying income-tax.

The vote of thanks was then put, and was cordially received.

Mr. Conder suitably replied, and in answer to Mr. Hansard's queries, said that a slope of from 30 deg. to 40 deg. was rather a vague definition. No Japanese roof was of one con- tinuous slope, the slope being steeper towards the top of the ridge, with a flatter slope at the bottom, the two slopes combining with a slight parabolic curve. These roofs, especially when covered with snow, were of extreme weight, but in Japan the idea of carrying the whole weight of the roof on to the external walls by means of ties, posts, and so forth, was not

followed. The roof was supported from as many points in the interior of the building as possible, so that the weight was spread over a wide area. With regard to the running shutters, a Japanese house in a storm was rather a noisy place; the shutters rattled, and it was necessary to see that they were tightly fastened to prevent the risk of one or two being blown out. At the same time, as the whole build- ing could not boast of any great solidity, the shutters were as well-off as any other part. Since glass had been introduced it had become customary to use it. If the whole of the sides of the building were filled in with glass it would give a bleak and bare appearance to the rooms; but a sort of compromise could be effected by using a central pane of glass and leaving the remaining ones of paper. Referring to Mr. Waterhouse's remarks on the Chinese style, Mr. Conder said that, of course, Japan originally took her architecture, as well as her arts, from China. Many modifications had taken place in the style as introduced from China, while changes had also occurred in China, the result being that the present Chinese style was very different from the Japanese. It was, therefore, difficult to know how far the present Japanese style was like the old style which she first took from China. It was prob- able that in those days the Chinese style was also a wooden style, though now-a-days the Chinese used more solid materials. The pagodas in Japan were of wood, whilst those of China were coated with brick, and even porcelain. With regard to the question of land tenure in Japan, he could scarcely explain it without going into a long political history of the present con- dition of Japan. That country was not quite under what could be termed a free Government, but rather under an autocratic Government, which could do pretty much as it liked in matters of securing land, especially in the capital. Indeed, the greater part of the land belonged to the Government, and it was easy to obtain what was wanted by the use of a certain amount of diplomatic pressure and persuasion. Mr. Conder, in reply to a query, said that his brother had already gone into the question as to whether the Japanese specially constructed their buildings to escape destruc- tion by earthquake. He (the speaker) main- tained that there was nothing in the construc- tion of the buildings in Japan to make them in any way fitted to withstand earthquakes. They were extremely top-heavy, and were with- out tiers or braces of any sort. In the ordinary earthquake seasons in Japan the buildings swayed about in the most alarming manner, and no native builders or architects of the old style had ever laid claim to their buildings being earthquake-proof. The central post of the pagoda, too, had been merely put in to stiffen it against wind and render it more stable. The curious fact that certain of the posts did not touch the ground had already been scientifically explained.

We give plans and an elevation of one of the tea-houses referred to by Mr. Conder. The proprietors of these tea-houses, in accordance with ancient custom, make it a prominent feature of their business to take charge of would-be theatre-goers, whom they personally conduct to places of amusement, entertaining them before and after the performance at their own inn, and much to their own advantage. We also reproduce two drawings exhibited by Mr. Conder of one of the gateways, which are among the most characteristic features of the architecture of the country.

**Hydraulic Lift Service in the City.**—The Winchester House Company of Old Broad- street, City, have just started their third and largest hydraulic passenger lift. It is of excep- tional size, having a total travel of 90 ft., and a solid steel ram measuring 53 in. diameter by about 35 ft. in length. The two previous lifts about 80 ft. each. All are in constant use at a speed of 250 ft. per minute, and are yet under perfect control. In these three lifts the Winchester House Company possess a service unexcelled by any other building in the City. The type of lift selected for this important installation was Stevens & Major's hydraulic balance, and the work has been carried out by Messrs. Archibald Smith & Stevens, under the supervision of the architect for the building, Mr. F. Pilkington. The power is supplied by the London Hydraulic Power Company.

#### LECTURES AT THE ROYAL ACADEMY.

PROFESSOR MIDDLETON ON MEDIEVAL SCULPTURE.

The Slade Professor of Fine Art at Cam- bridge delivered his second lecture on this subject at the Royal Academy on the 25th ult. He commenced by pointing out that the chief existing plastic works which were produced during the Byzantine period were a number of large bronze doors for cathedrals and abbeys—churches. These belonged to the close of the early period, and were, so to speak, the first suggestions of the Renaissance which was soon to come. Though made for very different places,—Germany, Pisa, Southern Italy, and Sicily,—yet, in general design, in technical execution, and even in the style of their detail, they were very similar, and were striking examples of the widespread prevalence of one type of art. They were designed in two folds, with a number of square panels, each enriched with a relief of some saint, or, more usually, some Scriptural subject. In all the design was very simple, and of much decorative value, in spite of the very rude modelling of the figures. The framing of the doors was, in some cases, ornamented with reliefs of foliated pateras, magnificently designed, full of spirit in every curve, and finished with the minute detail of a piece of jewelry. These magnificent specimens of early bronze-work were produced during the greater part of two centuries,—the eleventh and twelfth. The earliest example, that at Hildes- heim Cathedral, was due to the skill of Bishop Bernward, a real precursor of the Renaissance, who, two centuries and a half before the Pisan Nicola, examined and appreciated the beauty of Classical art, and did his best to throw off the dull Byzantine formalism and to introduce some increase of artistic beauty into the mod- elling of the human form. This Bishop of Hildesheim, like St. Dunstan in England and St. Eligius in France, was himself a skilful worker in gold and silver, and also, on a larger scale, in bronze. He died in 1022, and for a while there was no successor to carry on the revival which he began, although his influence was traceable in the similar bronze doors at Augsburg (dating from the second half of the eleventh century) and in those at Gnesen. Most of the bronze doors in Italy, some of which were signed, appeared to be the work of Byzantine Greeks resident in Italy. Those at Pisa and Monreale, by the Pisan sculptor and architect Bonannus, were, in style, simply copies of those of the Byzantine sculptors. The Monreale example was dated 1186. Having mentioned other bronze doors existing at Rome, Monte Cassino, Amalfi, Ravello, Trani, and elsewhere, the lecturer said that one outside Rome, made for the Basilica of St. Paolo fuori le Mura, was of the eleventh century, and was signed as the work of a Greek named Staurachios, who also cast the doors at Amalfi in 1066. The doors made for the basilica referred to were richly decorated with niello-work, and though a good deal injured by the fire which destroyed the nave of the basilica in 1824, were not lost or destroyed, as many people believed, but were now kept in a great closet in the sacristy, and were not shown to visitors. Passing on, the lecturer said that another fine class of bronze-work of about the same date as these doors were the large bronze fonts in some German churches, such as Hildes- heim and Osnabruck. The reliefs on the out- side of the bowl usually represented Bible scenes of baptism in very high relief. One of these fonts was, for its date, one of the most remark- able works of art in the world. He alluded to the bronze font at Liège, the work of Lambert Patras of Dinant, early in the twelfth century. There was a cast of this work in the South Kensington Museum. Its figures, representing Christ being baptised by St. John, with attendant angels, were modelled with wonderful grace and refined beauty in expression and attitude, and in the simply-designed carving lines of the drapery. Professor Middleton said he knew of no other work of art so strikingly in advance of its time. Except for some slight stiff- ness of pose, the reliefs were worthy of the best sculptors of Florence three or four centuries later. In England, little sculp- ture of merit seemed to have been pro- duced till the great renaissance of art under Henry III. During the Saxon and Norman periods, the chief productions of the sculptor's art were apparently the reliefs and statuettes in gold and silver which were used in so lavish a way for retables of altars and for shrines to

contain the bodies of saints. These works, though magnificently decorative in effect, owed but little to any merit in the figure modelling. Large works in bronze were not produced in England, and the lead fonts of the eleventh and twelfth centuries were but feeble in their design and treatment as compared with the noble bronze fonts of Germany. Some very curious large stone reliefs\* now in Chichester Cathedral exhibited a very degraded state of the sculptor's art in the eleventh century. They represented two scenes from the Raising of Lazarus; the figures were stiff, the pose very clumsy, and the drapery of an exaggerated Byzantine character, with long stiff folds. The hair was treated like a bundle of ropes, and the hard ugliness of the faces was accentuated by the insertion of bits of glass or enamel in the eyes. In the twelfth century the Norman churches of England were often very richly decorated with sculpture, which though in itself rudely modelled and badly proportioned, was yet always very skilfully designed to suit its special position, and was usually of very great decorative value. But in the main, the stone sculptor in England till the thirteenth century was not an artist of a high class, but simply a mason with a strong feeling for decorative design. At that time the goldsmith was the artist-sculptor, and hence we found that in the time of Henry III. the old goldsmiths' family of the Fitz-Othos came to the front when sculpture of a high class was needed. England had always been remarkable for skill in the working of gold and silver, and the training which so many of the Mediæval sculptors went through in the manipulation of the precious metals had an important effect on their larger works in the shape of bronze statues or reliefs. It taught them to aim at minute delicacy of detail and perfection of surface, qualities which did much to increase the beauty of bronze work. The lecturer, after referring to the traces of this influence as seen in the works of Donatello, in the two bronze effigies by William Torrell, in Westminster Abbey, and in the works of Ghiberti, passed on to speak of the sculpture of the thirteenth century in England,—one of the most remarkable periods in the history of the development of art that the world had ever seen. At the beginning of the thirteenth century, in the reign of John, all the arts seemed paralysed by the troubled state of the country; and yet, by the end of the century, England had reached the climax of her artistic splendour, and was, on the whole, the foremost art-producing country in Europe. In all the chief branches of the arts, in painting, sculpture, illuminated MSS., embroidery, and work in the precious metals, England was alike surpassed by no other nation. In one only of the lesser arts, that of pattern-weaving, was England surpassed, the best work of that kind then produced being done by the Moslem silk-weavers of Palermo, and by the carpet-weavers of the East. As an example of the remarkable power and skill of the English sculptor of the second half of the thirteenth century, the lecturer referred to the wonderful series of statues and reliefs which covered the west front of Wells Cathedral,—works which, he said, for their special purpose had never been surpassed in more recent times. There were more than six hundred figures in the round or in relief, arranged in tiers one above another, and covering the whole front with one mass of sculptural splendour. The tympanum of each doorway was filled with a relief, and above were rows of colossal statues of kings and queens, knights and prelates, prophets and saints, forming a wonderfully comprehensive scheme of theology and history. Many of the heads of these figures were full of soft beauty and delicate grace, with the hair flowing in wavy tresses or drapery thrown like a hood over the head. All the figures were remarkable for extreme dignity of pose, and the simply-designed lines of the draperies were all most thoughtfully arranged to suit the main lines of the building which formed the background and frame to the figures,—a fact from which the lecturer concluded that the sculptor was also the architect. Indeed, the perfect decorative value for which so much of the English and French sculpture of the thirteenth century was remarkable, was due to the fact that the architect and the sculptor were one man. The work of this period was characterised by reserve and

restraint on the part of the sculptors. In conclusion, the lecturer mentioned the number of different materials used by the Mediæval sculptors, and described the processes and limitations attaching to each. The sculptors of old with a true sense of what was of value in art, despised no material, but they felt that beauty and dignity of form ennobled any material.

MR. G. AITCHISON, A.R.A., ON DOORWAYS.

On Monday evening last Mr. Aitchison delivered the first of a series of three lectures on architectural subjects. In this lecture he treated of doorways. He observed that the poet found language, human joys, sufferings, and passions ready to his hand. These he had to observe and describe in words that evoked corresponding emotion in his hearers, and he had to set the whole to a tune. He captivated his hearers if he could coin a striking phrase; he was called great if he could picture to us higher joys or deeper sufferings than those of our own days, if he could portray the grander passions of a more vigorous age, or enlist our sympathy with a nobler enthusiasm or higher aspirations. The painter and the sculptor had their models always before them in the shape of Nature's works, but they had to choose those graceful lines and that happy combination of colours that were mostly momentary and evanescent, and fix them for ever for our admiration. We called the painters and sculptors great if they could perfect the types suggested by eliminating those defects which were due to accidental or untoward circumstances. But architecture, like music, could only gather slight hints from Nature, and must elaborate on those until she could please, move, or entrance man. Unhappily, at the present moment he was "like the deaf adder that stoppeth her ear; which will not hearken to the voice of charmers, charming never so wisely." Hence there was no architectural language, and each architect tried some paraphrase of some bygone architectural harmony which once entranced mankind, and hoped he might captivate the multitude. It was not difficult to say, "Plan conveniently and with ingenuity, and, when occasion offered, strikingly"; nor to say, "Construct soundly and daringly," and to more or less point out how these things should be accomplished. It was equally easy to say, "Design beautifully," but when one was asked what sort of beauty now pleased, one could only reply, "You have to find that out." The sublimity and perfectness of Greek architecture, the magnificence of Roman, the luxuriance of Byzantine, the savage grandeur of Romanoesque, the gorgeousness of Saracenic, the mystery and wondrousness of Gothic, or the ornate subtlety of Renaissance, produced neither delight nor admiration. The lecturer was consequently driven to seek some of the necessities of structures, and to make those forms that once pleased pass before his audience like the procession of kings before Macheth. He had chosen "Doors," "Windows," and "Balustrades," and he would begin with doors. The first point to be noted was that where mankind began to build with stone, the theoretical doorway would be a triangle formed by corbelling over each course of stone on each side until the two touched at the top. He took Early Greek work for his illustration, and showed that the doorways at Misalonghi were of that triangular form, only the projecting corners of each corbelled stone were worked off to the line of the triangle. Openings of the form of a pointed arch were next made, to get more headway, and eventually the bottom part only of the opening was thus built, and a stone lintel thrown across the top. The inward sloping of the jambs narrowed the opening for the lintel, which was an advantage, for in early times there was difficulty in getting long stones, and much labour had to be expended in getting them to the spot and in forming earth slopes on which to haul them up to the height at which they were to be placed. The inward inclination of the sides of doorways was eventually made in straight lines, and this was continued even when stone uprights were used as jambs. The Lion Gateway at Mycenæ was instanced as one of the earliest examples of this. The lintel was allowed to project on both sides beyond the jamb, to increase its strength, and these sloping sides and the projecting lintel were continued in civilised times, on account of the whole doorway forming an æsthetic balance. When the jambs and lintel were moulded on the outer

edge, the projecting ends of the lintels formed the "knees" to the architrave. Vitruvius handed down the tradition of forming "knees" on the architraves of doorways, so that the form was common in Roman times for several centuries, and after its abandonment in Byzantine, Romanoesque, and Gothic times, it was again introduced by the Italian Renaissance architects, and still continued to be a favourite form in Europe. That not only showed the conservatism of mankind, but also the rarity of successful invention, as there was every reason to believe that it was adopted in, or shortly after, the Bronze Age (all these developments were illustrated by diagrams and drawings). The lecturer pointed out that Diocletian's palace at Spalato, built about the end of the third century, was one of the most interesting buildings in existence, as it showed the epoch at which the Romans began to think for themselves, when they throw aside the post and lintel construction of the Greeks, with which Roman buildings had hitherto been adorned, and used their own arches springing direct from the capitals of the columns, thus laying the foundation for Byzantine, Romanoesque, and Gothic architecture. The "Porta Aurea," of that palace was the prototype of the majority of Byzantine doorways throughout the East. Mr. Aitchison next pointed out that the arch on two columns came to be looked upon as an ordinance, and was then used in Romanoesque doorways in successive layers, so to speak, each one including the one before it. The beautiful doorways of St. Trophime at Arles and at St. Gilles were the most perfect forms of that kind of doorway, which was the prototype of Gothic doorways. The excellence of the two examples named was due to the influence of the Byzantine work in Central Syria. The fine sculpture of those two doorways was due to the imitation of the imported figure work from Constantinople, and to the study of the Gallo-Roman sculpture. The Mosque of Touloun in Egypt, built by a Christian architect in 885 A.D., had its four columns to the *Kiblah* placed as "nook shafts," and the *Kiblah* had a pointed arch. Hence he might be excused for mentioning it in connexion with doorways. Fergusson, in his "History of Architecture," said that from that mosque "we must date the complete foundation of a new style." And truly there we saw the beginning of honeycomb work, which was found in the pendentives of the dome in front of the *Kiblah*. The architect of the mosque was imprisoned by Ahmed Ibn Touloun, the Governor of Egypt, for advising him to use old columns for the mosque. The Governor said that marble perished by fire, and he wanted an original mosque of brick, that would withstand fire and the inundations of the Nile. The architect from his prison managed to let the Governor know that he could build him what he wanted, and when summoned before him took a skin of parchment and drew out the plan without a column, but said he must be allowed four columns for the *Kiblah*. The plan, with the original treatment of the piers, so pleased the Governor that he told the architect to build the mosque. He gave him 100,000 pieces of gold for the workmen's wages, and promised to furnish him with all the materials he wanted. Two years afterwards the mosque was opened for service, and the Governor was so pleased with its convenience, appearance, and originality, that he presented the architect with 10,000 pieces of gold, and gave him a pension for life as well. A royal gift like that must have been a great stimulus to architects, but the Arabs were as famous for generosity as the English were for meanness to the architects. One of the capitals to these four columns bore a strong resemblance to one at San Vitale at Ravenna, executed in the time of Justinian, after 525 A.D. By way of advice to his hearers, Mr. Aitchison said:—"When a doorway is on the front of your building, and not behind a portico, try and concentrate on it a due amount of importance without making it so obtrusive that it will not compose and harmonise with the front. Do not make it a mere hole in the wall, into which the owner may sneak. Also, carefully consider what elements of beauty are most in accordance with your own taste; then study the style that contains the greatest number of those elements, and endeavour to so vary and add to them that your variations may be an improvement, and mark the style as your own. No architect, I think, should desire to be like 'three labourers of Babel' by using different styles, for if he

\* Illustrated in the *Builder* for Dec. 11, 1886.

really an architect he must have some convictions, and what sort of work can a man do when he is working against his conviction? I may, perhaps, be allowed to paraphrase one of the political cries, and say, "One man, one style."—Besides other advice and admonitions to the student, the purport of the lecture was to show that the widest variations in architecture were got by gradual addition to or suppression from an original type, just as the widely-differing wings of the albatross and the apteryx had been derived from one common type.

Mr. Aitchison's second lecture was on "Windows," and was delivered on Thursday evening. His third and concluding lecture, on "Balustrades," will be delivered on Monday evening next. On Wednesday next Mr. Reginald S. Poole will lecture on "Medals."

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The seventh ordinary meeting of this Institute for the present session was held on Monday evening last, Mr. Alfred Waterhouse, R.A. (Vice-President), in the chair.

The Liverpool Cathedral Memorial.

Mr. John Oldrid Scott asked leave to make a personal explanation arising out of the matter of the memorial in reference to the Liverpool competition. This was a question in which he, as well as all church architects, and, indeed, all members of the profession, had been deeply interested, and when the matter was decided he and others felt very strongly about it. He met one of the competitors, Mr. Bodley, and Mr. Brooks, and sympathised with both, as he felt that their designs, in his humble opinion, were a long way ahead. That was a mere private matter, but out of it had grown all this disturbance, which he very much regretted. The matter went through various phases, and ultimately came to the memorial, which was sent out in a particular form. After it had received a considerable number of signatures, he had a call from Mr. Aston Webb on behalf of the Competitions Committee of the Institute. Mr. Webb then informed him that the Committee objected to the memorial because, on the face of it, it appeared to discredit Mr. Christian's report, and also to invite expressions of public opinion. At that time Mr. Webb laid before him a corrected copy of the memorial, with two alterations, one being a mere matter of form, and another an essential correction. Mr. Webb had drawn his pencil through the words, "for the purpose of eliciting the best skilled and widest public opinion upon them." This was an essential alteration, because it struck out what seemed to be considered objectionable by the Competitions Committee. The other alteration was a mere suggestion as to the transposition of certain words, and he therefore looked upon it not merely as an expression of opinion, but as an actual suggestion for an altered form of memorial. The Committee also suggested this alteration in the construction, viz., that the following words should be placed at the end,—

"On which so much depends respecting the future of the English church, and the art of architecture throughout the kingdom." He therefore looked upon it as an actual suggestion from the Committee to alter the memorial. Mr. Seddon, with whom he was acting, was out of town, and being unable to communicate with him, he took it upon himself to accept what he thought was the suggestion of the Competitions Committee. He desired to communicate with the competitors as early as possible, and so he wrote to the building journals as follows:—"At the suggestion of the Committee on Competitions of the Royal Institute of British Architects, the proposed memorial, which has received about 300 signatures, will be modified in the following terms," and then it went on in the terms he understood the Committee to suggest. He now felt that it might have been more civil in him to have waited another week, but his not doing so was purely an error of judgment. He trusted he had made it clear that he was acting, as he thought, fairly in the matter. It was not as if he had half accepted the proposals of the Competitions Committee; he had accepted them *in toto*, and, therefore, he had no idea that the matter should have been referred back to them. He saw now that it

would have been more courteous had he submitted it again to Mr. Webb to be laid before the Competitions Committee, and regretted he had not taken that course. He hoped he had said sufficient to explain his action in the matter, to the satisfaction of the Institute.

Mr. Aston Webb remarked that the Competitions Committee would doubtless accept Mr. Scott's explanation. Mr. Scott had referred to alterations being made in pencil, but he had made a mistake in regard to that, as he (the speaker) distinctly recollected that they were made in ink. Mr. Scott had also omitted to mention two important points. The Committee objected first to the sentence which asked for an exhibition in order to elicit further opinion, and also to its being asked for before a decision had been arrived at by the Committee. Those were the two points in the memorial the Committee considered as most objectionable. It was true, no doubt, as Mr. Scott said, that he had not out everything to which the Committee strongly objected; but, on the other hand, they objected to have the memorial fathered on the Competitions Committee. Had it been referred to the Committee they would probably have taken no further steps in the matter; but, at the same time, they would have raised the objection to its being fathered upon them.

The Chairman added that it would be undesirable to prolong the discussion. Mr. Scott had made a fair explanation, and the members had also had the benefit of Mr. Webb's re-statement of the case, which appeared to have fully met with their approval.

Obituary.

Mr. William H. White (Secretary) announced the decease, on the 19th of February, of a distinguished French scholar in the domain of archaeology, M. Olivier Rayet, an Hon. Corr. Member of the Royal Institute of British Architects. M. Rayet, who died at the early age of thirty-nine, after a serious illness resulting from overwork, was a member of the School of France at Athens, a Professor at the Collège de France, and Directeur-adjoint of the Ecole des Hautes-Études. But he would be best remembered as author of the "Monuments de l'Art Antique," which would have caused the portals of the Institut de France to open to him before the age at which such an honour is usually accorded. His other great work, "Milet et le Golfe Latmique," was the result of researches made in Asia Minor, in conjunction with Mr. Albert Thomas, Hon. Corr. Member, at the cost of some of the Rothschild family,—a work not yet completed, only the earlier parts having been received for the Institute Library from the talented authors.

Japanese Architecture.

Mr. Josiah Conder then read a paper on "Domestic, Civil, and Palatial Buildings in Japan," of which we give an abstract, with illustrations, on preceding pages.

The Chairman then announced that the next meeting, on the 14th inst., would be a special general one for the election of the Royal Gold Medalist; after which a paper would be read by Professor Kerr on a professional subject.

COMPETITIONS.

*Memorial Fountain, Reading.*—About twenty-five designs were received from various architects in an open competition for a memorial fountain to celebrate the Jubilee Year. The committee were unanimous in selecting the designs by Mr. G. W. Webb, A.R.I.B.A., of Friar-street, Reading, under the motto of "Faith, Hope, and Charity." The fountain is to be built of stone, and to cost 400l.

*Kendal Grammar School.*—We are informed that seven local architects competed for the above buildings, and that the design submitted by Mr. Stephen Shaw, of Kendal, has been accepted, and will be carried out at once under his superintendence. They will be of limestone, with freestone dressings and Westmoreland slated roof.

*Guilford Castle and Bowling Green Estates.*—For the laying out of the Guilford Castle and Bowling Green Estates, twenty-four sets of drawings have been sent in, and the Council have awarded the premiums as follow:—First (30l.), to Messrs. Littlewood & Aston, Great James-street, Bedford-row; second (20l.), to Messrs. Cheal & Son, Crowley; and, third (10l.), to Mr. Fletcher, Princes-street, Cavendish-square.

CENTRAL ASSOCIATION OF MASTER BUILDERS OF LONDON.

The fifteenth annual general meeting of the Central Association of Master Builders of London was held at the offices, 31, Bedford-street, Strand, on Wednesday, the 23rd ult. In the absence of the President, Mr. Frederick J. Dove, was voted to the chair.

Copies of the balance-sheet having been handed to the members present, the Secretary read the balance-sheet prepared to the 31st of January, 1887, and signed by the auditors. It was resolved,—“That the balance-sheet as audited and signed be approved and adopted.”

The Secretary next read the following report:—

“The committee have the pleasure to present their fifteenth annual report to the members, and it is so glad to be able to state that they believe its usefulness is generally appreciated by the trade; they are also hopeful that the present year will show the long-looked-for improvement in the building trade.

The committee regret to state that the guarantee fund has not yet been fully subscribed, but trust that during the present year the Secretary may be enabled to obtain subscriptions for the small amount which is deficient, and members will be pleased to learn that although the member on whose behalf the fund was raised was not successful in his appeal, still the action of your committee was instrumental in benefiting him to the extent of nearly 700l. Members will be glad to learn of the success of a contractor who carried a somewhat similar case (Wood v. The Tendrill Board of Guardians) to the High Court.

This association, in connection with the Institute of Builders and the National Association of Master Builders, appointed a sub-committee to watch the proposed amendments to the Employers' Liability Act in Parliament last year, and Mr. Bird and Mr. Cowin gave evidence before the Select Committee of the House of Commons appointed to inquire into the working of the Act. The Select Committee have since issued their report which, among other things, recommends the withdrawal of the clause rendering it compulsory for notice of injury to be given to an employer within six weeks, and that a contractor shall be held responsible for accidents caused to sub-contractors' workmen. As members are aware, the Act expires with the present year, and two new Bills to amend it have been again introduced into Parliament, but these will probably be withdrawn, notice having been given by the Government of their intention to introduce a measure dealing with the matter at the earliest opportunity, and in view of the above-mentioned report there is reason to expect that every effort will be made by the trade's unions to increase the already great responsibility of employers.

A Bill has been introduced into Parliament by Sir James McGarel Hogk with reference to the removal of ash-soil under streets, and the laying of mains or pipes in new streets.

A Bill to amend the law relating to the rating of machinery has also been introduced.

The Sanitary Assurance Association have arranged for the introduction of a Sanitary Registration of Buildings Bill during the present Session, to make it compulsory on the part of the owner, lessee, sub-lessee, or occupier in towns or districts of 2,000 inhabitants, to deposit with a registration authority a certificate that the sanitary condition of all schools, colleges, hospitals, asylums, hotels, and lodging-houses is satisfactory.

The foregoing matters will be carefully watched by the committee, and such action as may be deemed advisable in the interest of the trade generally will be taken, in conjunction with the several kindred associations.

The action taken by the Plumbers' Company in granting certificates to plumbers was referred to in the report of the committee last year, and your committee think it desirable that the position of the trade in reference to this matter, and also to the question of plumbers working different hours to other branches of building mechanics, should have the earnest consideration of the Association.

A movement was made in the Newcastle district last year to establish an eight-hour league, with the object of obtaining the co-operation of the trades' unions throughout the country, and there is little doubt great exertions will be made to give effect to it.

In view of the proposed Amendments of the Employers' Liability Act, the committee wish to direct the attention of members to the Builders' Accident Insurance, Limited. The Company has been in existence for over five years, and may, therefore, be considered to be firmly established, as, in addition to having a premium income of over 5,600l. per annum, the funds in hand on the 31st of May, 1886, amounted to 7,250l., and the committee believe it to be the only company covering the same number of risks for the premium charged of 1s. The Company also covers risks to the outside public at the extraordinarily low rate of 1s. for every 100l. paid in wages.\*

After some remarks by the Chairman upon the several matters therein, and by Mr. Maton in respect to the clause referring to the Guarantee Fund,

The Chairman moved, it was seconded by Mr. J. W. Hobbs, and resolved, “That the Report as read be adopted.”

It was moved by Mr. Adamson, seconded by Mr. Greenwood, and resolved,

“That the thanks of this meeting be accorded to Mr. George Burt for his able services as President during the period he had been in office, together with an expression of regret that indisposition should have prevented his being present.”

The Secretary reported the changes in the officers and committee, and stated that the balloting-list had been prepared in accordance with Rules XV. and XVI.

The Chairman, officers, and committee then retired from office, and it was moved by Mr.

\* See in report. It should be Tendrill (see *Builder*, p. 100, ante).

H. Staines, seconded by Mr. Moslin, and resolved,

"That the officers, committee, and auditors, as printed on the list forwarded to all members with the notice convening the meeting, be and are hereby elected."

The newly-elected members then took office, and, in the unavoidable absence of Mr. Bird, Mr. F. J. Dove was again voted to the chair.

Some discussion took place in reference to the subjects mentioned in the report, in which Messrs. May, Rider, Macey, Hobbs, Adamson, Greenwood, Wall, and Colls took part, and it was resolved,—

"That with reference to the several Bills before Parliament affecting the building trade, that it should be left to the committee to take such steps as they might consider best in the interest of the trade to alter or oppose them in the House of Commons."

It was moved by Mr. Rider, seconded by Mr. Hobbs, and resolved,—

"That it is desirable that the working hours of plumbers should in the future be the same as those of all other branches of the building trade, and that the committee be requested to take such steps as they may think fit to produce the result."

Finally, on the motion of Mr. Wall, seconded by Mr. Hobbs, a vote of thanks was passed to Mr. Dove for his services in the chair.

### WROUGHT IRON.

FROM MR. J. STARKIE GARDNER'S interesting paper on this subject, read by him before the Applied Art Section of the Society of Arts on the 22nd ult., as briefly mentioned in our last, we quote the following:—

It is perfectly obvious that the smith of today has a much easier task than his predecessors of the Middle Ages. It appears impossible to trace the exact forms of the bars which found their way to market from the Forest of Dean or the Weald of Sussex, say, in the days of Elizabeth; but considering that the bars had to be beaten out on an anvil under the relatively primitive tilt-hammer, it is improbable that any great variety of section was produced, or that the angles of the bars were mathematically true. The "bars" were, in fact, probably analogous to the "puddle-bars" of today, that is, very elongated ingots ready to be fashioned into finished bars, but not themselves available to be cut up and used without labour, like the bars from the rolling mills at the present day. The fact alone that the smith had to beat out most of the sections himself in the Middle Ages has caused a most pronounced difference between Mediaeval and nineteenth century smiths' work, and must ever be kept in mind in contrasting together the work of such widely different ages. Few of us probably sympathise with those who affect to prefer as a matter of taste the ugliest old production to the most beautiful modern one, but it is perfectly true of old ironwork that it possesses interest and attractions that few examples of modern work can possibly equal. If you enter a cathedral where some happily surviving antiquity has been made the theme for reproduction in modern times, such as the grill work in Canterbury, Winchester, or Chichester cathedrals, you immediately become conscious, without being an antiquary or specialist, and without being able at first perhaps to define precisely why, which is the old and which the new. The explanation is simply that the old-time smith cut a piece from his shingled bar, which he judged by the eye would beat out into a rod of a given length, and curl up into a scroll of the desired form. More or less sufficed for him, and by his method of work he produced an irregularity and play in even the most monotonous design, which is artistically charming to us, but which was perhaps even a source of chagrin to himself. The modern smith, on the other hand, when he receives a commission, buys the required number of rods, cuts them up into pieces of exactly the same length, makes a standard pattern, and if there is much repetition, a tool to gauge the scrolls and insure their uniformity. If there is any irregularity it is considered bad smithing, and if under the conditions it is the result of mere carelessness, the result may be inartistic. The aversion to straight bars seen in the oldest examples was also probably due to the fact that perhaps the most difficult task that could be set a primitive smith was to handle a long heavy bar, and to beat it out perfectly true with mathematically exact and sharp angles. Another reason for the generally artistic superiority of the old work may have been that it was only entrusted to those who had

a special aptitude, and if such a workman was not forthcoming, the work was either not executed, or was made in the simplest form; whilst, if he were forthcoming, the details at least of the design were left to his own fancy, and were, therefore, well within his own powers. In other words, it was the existence of the skilled smith that created the demand, rather than the demand that created the smith, and it seems a reasonable inference that none such had to beg for work in the Middle Ages. When a grill was wanted for Westminster Abbey, it was not the local man who had the commission; but a smith from Leighton, or a smith from Lewes, was fetched and maintained until the task was completed. Finally, it is only reasonable to suppose that the smiths of those days were not fettered by estimate or bound by time, and that the art-work was produced for art's sake, by a genuine artist, whose brains were not picked, as in these competitive days, by a crowd of imitators who copy every original design that is accessible, until the originator is weary of his happiest ideas before he has been able to derive any adequate benefit from them.

The first thing the modern smith requires is a design, and very often a working drawing showing the exact sizes of iron to be used, and the method of fixing them together. Some day, perhaps, our training schools may turn out a class of artisans such as exists in France and Italy, capable of designing as well as accomplishing the manual labour. One cannot but believe, so practical are the old designs, that in most cases they were created by the smith who executed the work, after merely a consultation with the architect. The few smiths who can do this now work at an advantage, as, unless the artist who makes their working drawings has a thoroughly practical knowledge of the craft, he will introduce needless difficulties and intricacies, which renders the work unnecessarily expensive. . . . Hinge-work is, perhaps, the one branch of smithing in which the smith of to-day stands in absolutely the same position as the smith of eight centuries ago. Rolling mills have done nothing to lessen his task, and no sections of iron can be bought ready made that are of much avail.

### Illustrations.

#### NEW PREMISES, CHELSEA.

THIS is an illustration of four new shops and dwelling-houses being built for Mr. J. J. Stroulger, at the corner of Sloane-square and the eastern entrance to the Cadogan Estate. The materials used are red brick, with light-red terra-cotta dressings. The building is designed so that the objectionable, but necessary, party-walls may be hidden when breaking through the roof. The gables and return ridges are built in solid brickwork, the ridges and upper courses of tiles being laid in cement. The contractors are Messrs. Stimpson & Co., Brompton-road, and the terra-cotta is supplied by Mr. G. Jennings, of Parkstone, Dorset. The building has been erected under the superintendence of Mr. Frederick G. Knight, architect.

#### DESIGN FOR STAINED GLASS.

THESE two designs, were made by Mr. E. Burne Jones, A.R.A., for a window at Paisley executed by Messrs. William Morris & Co. Our illustrations are from photographs by Mr. Frederick Hollyer.

#### YORK PROBATE REGISTRY.

THIS building has been erected in Duncomb-place, facing the Cathedral, to afford better accommodation for the deposit of wills. These were formerly stored in a building erected in the angle formed by the south aisle and south transept of the Cathedral, while the Registrar's offices were on the opposite side of the street. The two have now been combined in the new building, which also includes a residence for the Principal Clerk.

The dressings are of Stainton stone from near Barnard Castle, and the walling is from the Heaton Quarries, near Bradford. On the ground-floor are the general offices and the strong-room, which is 66 ft. long and 24 ft. 6 in. broad and 15 ft. 6 in. high, surrounded by iron shelving,

the upper tiers being accessible by a gallery. On the first floor is the Registrar's private office and waiting-room.

The site was provided by the Corporation, and the building was erected by Messrs. Bull & Co., from the designs of Mr. Henry Tanner, Architect to Her Majesty's Office of Works.

#### THE "ORME" BEDE HOUSES, LOUTH.

THESE almshouses and grounds, situate in the centre of the town, and forming a picturesque feature, were formally opened in August last for the accommodation of ten men. They are the generous gift of the Rev. Frederick Orme, late rector of Lyndon, in the county of Rutland, who was a pupil at King Edward VI.'s Grammar School in Louth, some sixty years ago, and his father, the Rev. Thomas Orme, was head-master of the same school in 1796. The houses were handsomely endowed by the donor, who appointed seven trustees to carry out the trusts contained in the deed by which they were appointed. The donor has erected and endowed these almshouses in grateful recognition of his own and his family's connexion with King Edward VI.'s Grammar School. The Rev. Frederick Orme died on the 18th of December last.

The buildings are of brick, with stone window copings, and other ornamental features. Each cottage contains two rooms, with scullery and other offices. This arrangement is shown on the small plan. At the end of the grounds there is a lodge for an attendant. The whole site is enclosed by a handsome iron railing on a solid low wall. Mr. Fowler, of Louth, was the architect, and the buildings were erected under his immediate supervision.

#### BUSINESS PREMISES, ST. PAUL'S CHURCHYARD.

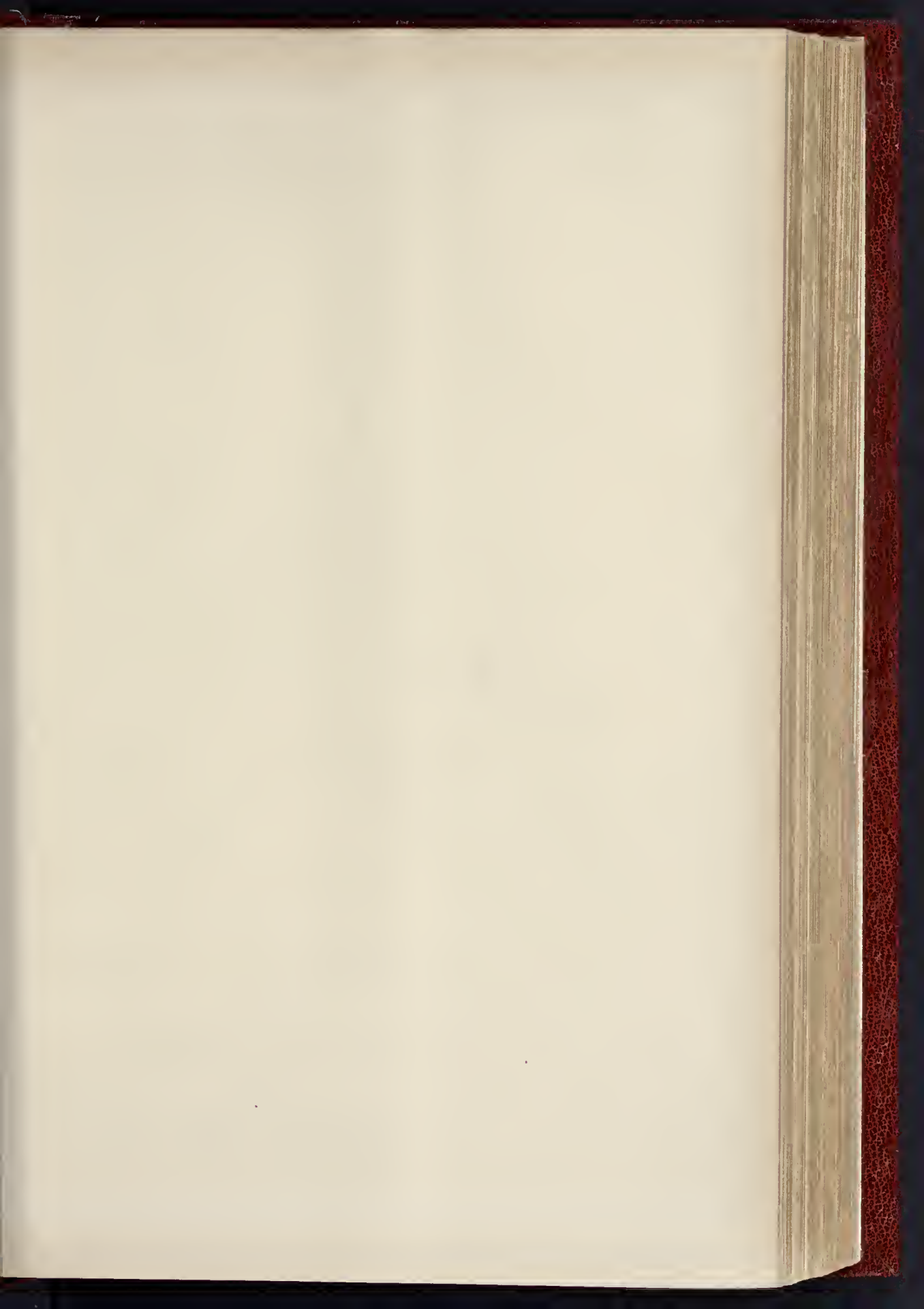
THESE six warehouses occupy two-thirds of the former site of St. Paul's School, in St. Paul's Churchyard, which site it was at one time proposed to throw into the public way, a scheme which had to be abandoned on the ground of cost. The six buildings illustrated comprise the north wing and central feature of the façade, of which Mr. Delisse Joseph is the architect,—the south wing, by another architect, having been given in the *Builder* for Oct. 9, 1886. The architects had originally prepared independent designs for their respective portions, but it was eventually decided so to modify their designs that the whole frontage could be treated as a harmonious composition. The frontage to St. Paul's Churchyard of the buildings, forming the subject of the perspective, is carried out in Portland stone, with granite pilasters and bases on the ground floor, the Old Change frontage being in glazed bricks and Portland stone,—the stone having been worked by Mr. Barnes, at Portland, from details sent down by the architect, and the granite being supplied by Messrs. Fanning & Co. There is a large amount of structural ironwork in the buildings, which was supplied by Messrs. Williams & Co. The goods lifts are by Messrs. Waygood. The builder was Mr. Thomas Pryor, of Kingsland, the architect being, as before stated, Mr. Delisse Joseph of Basinghall street.

#### ROOD SCREEN, WARFIELD CHURCH.

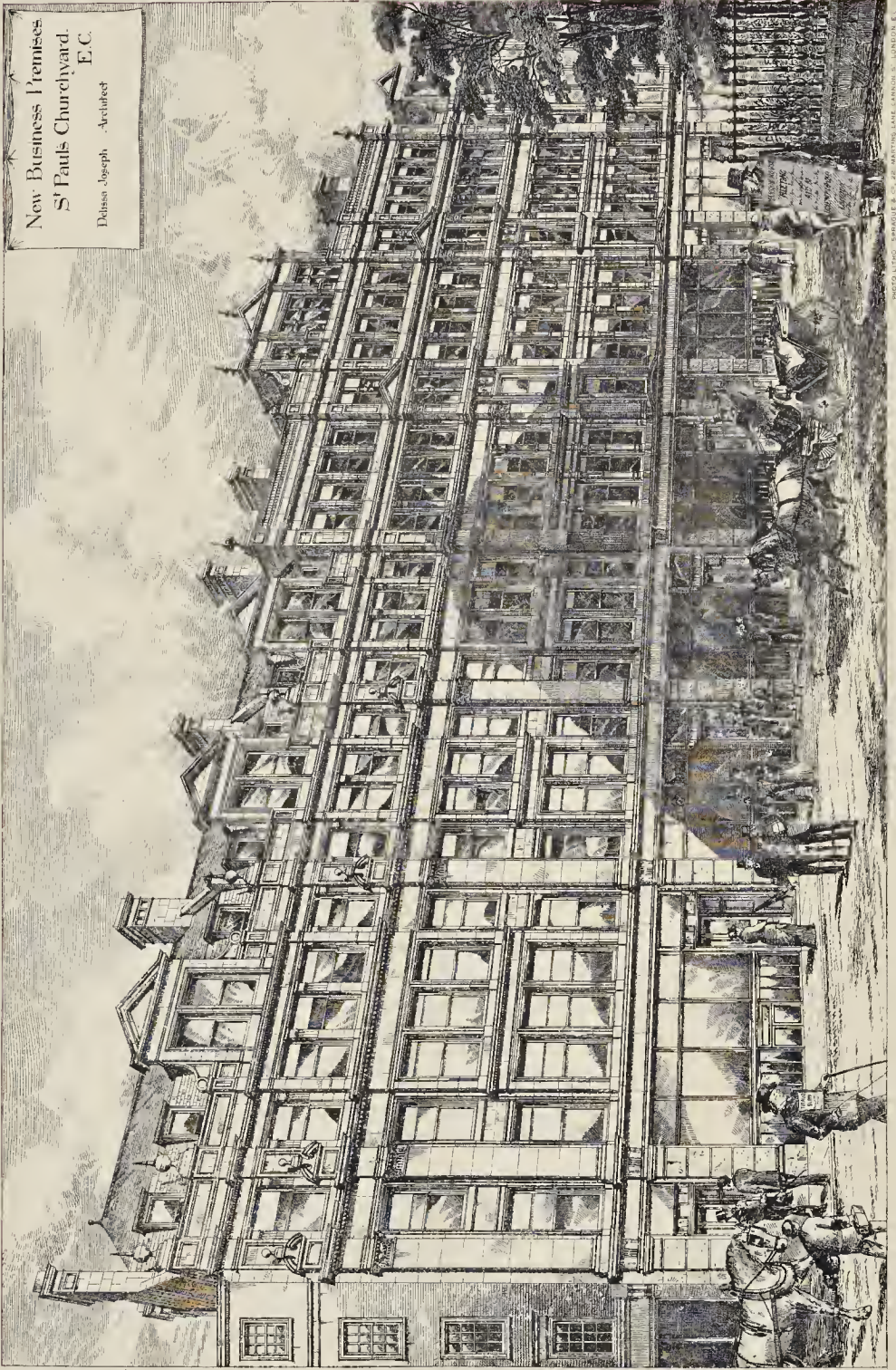
THIS interesting example of Late Gothic woodwork stands in the village church at Warfield, about five miles east-north-east from Wokingham, in Berkshire. It will be noticed that the old rood-loft remains. The screen and other parts of the church were restored by the late Mr. G. E. Street, R.A.

#### Birmingham Architectural Association.

The eighth ordinary meeting of the current session was held at Queen's College, on Tuesday evening last. The Vice-President (Mr. John Cotton) was in the chair. Mr. E. E. Westwood was elected a member of the Association. A paper was read by Mr. J. W. Touks, on "Heraldry in modern Art." The lecturer gave a very succinct account of the rise and development of heraldry, and illustrated his remarks by some fine impressions of seals, &c. A vote of thanks, proposed by Mr. J. Cotton, and supported by Messrs. A. V. Inghal, W. H. Bidlake, and Victor Scrutton (hon. sec.), was unanimously accorded to the lecturer. After a response from Mr. Touks the meeting terminated.



THE BUILDER, MARCH 5, 1887.

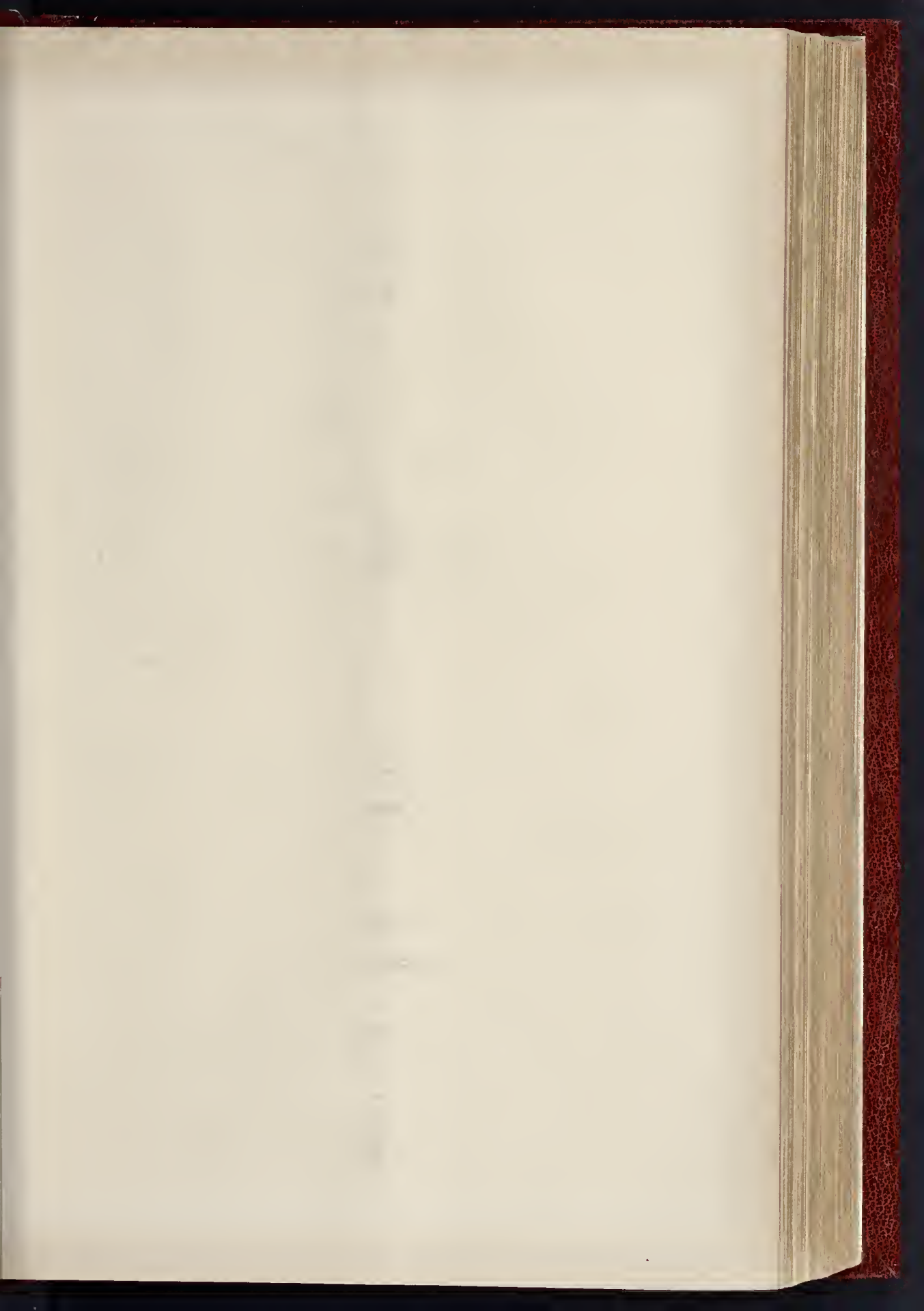


New Business Premises  
St Pauls Churchyard,  
E.C.

Dobson Joseph Architect

PHOTO LITHO BY HARRISON & SONS, 25, ABINGDON STREET, LONDON, E.C.



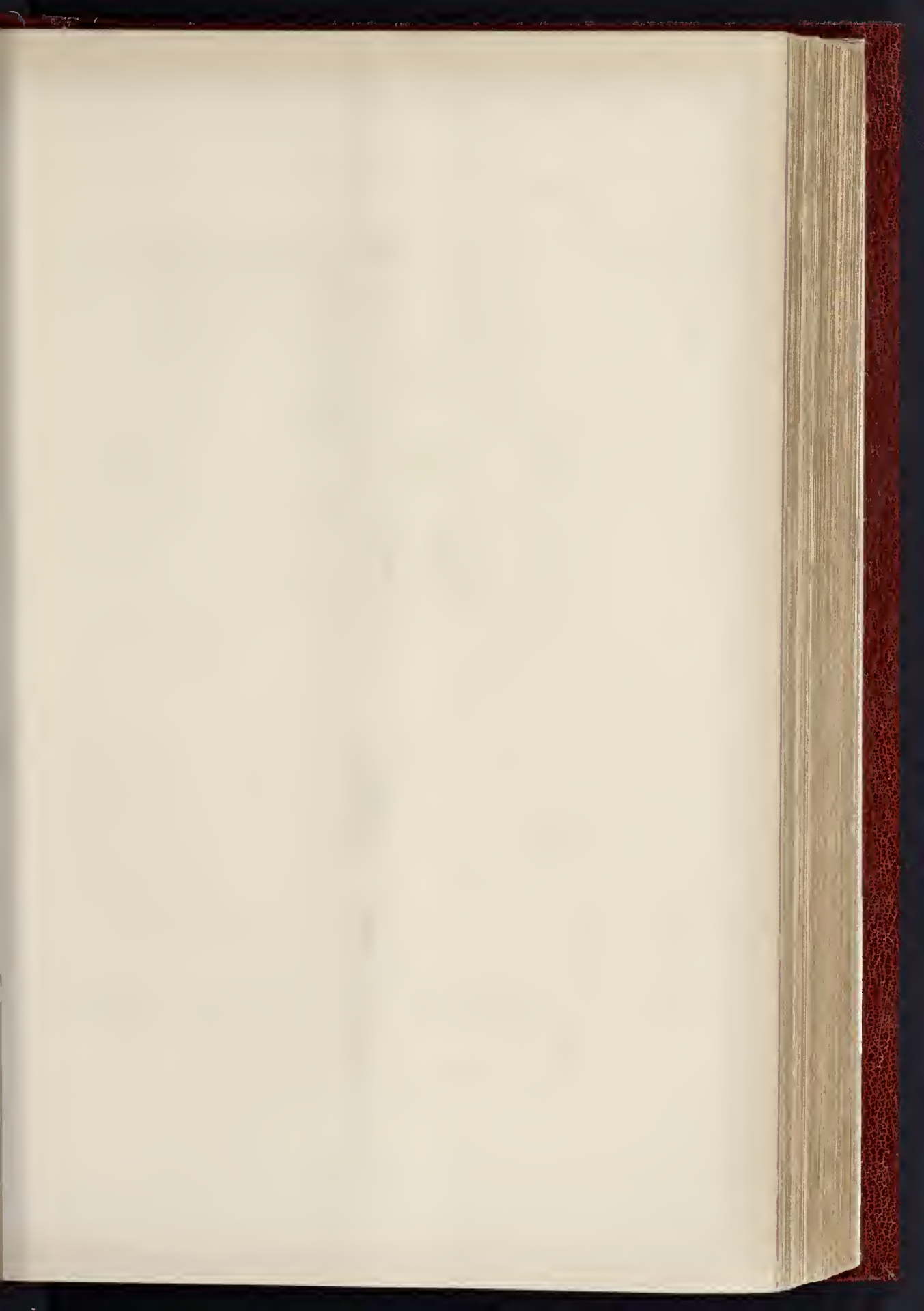




Front Elevation.

Edwards & Parry, Architects, London, E.C.

THE PROBATE OFFICE, YORK.—MR. HENRY TANNER, A.R.I.B.A., ARCHITECT.





INK PHOTO, SPRAGUE & CO., LONDON

DESIGN FOR STAINED GLASS.—BY MR. E. BURNE JONES, A.R.A.

"GIVETH TO THE POOR."

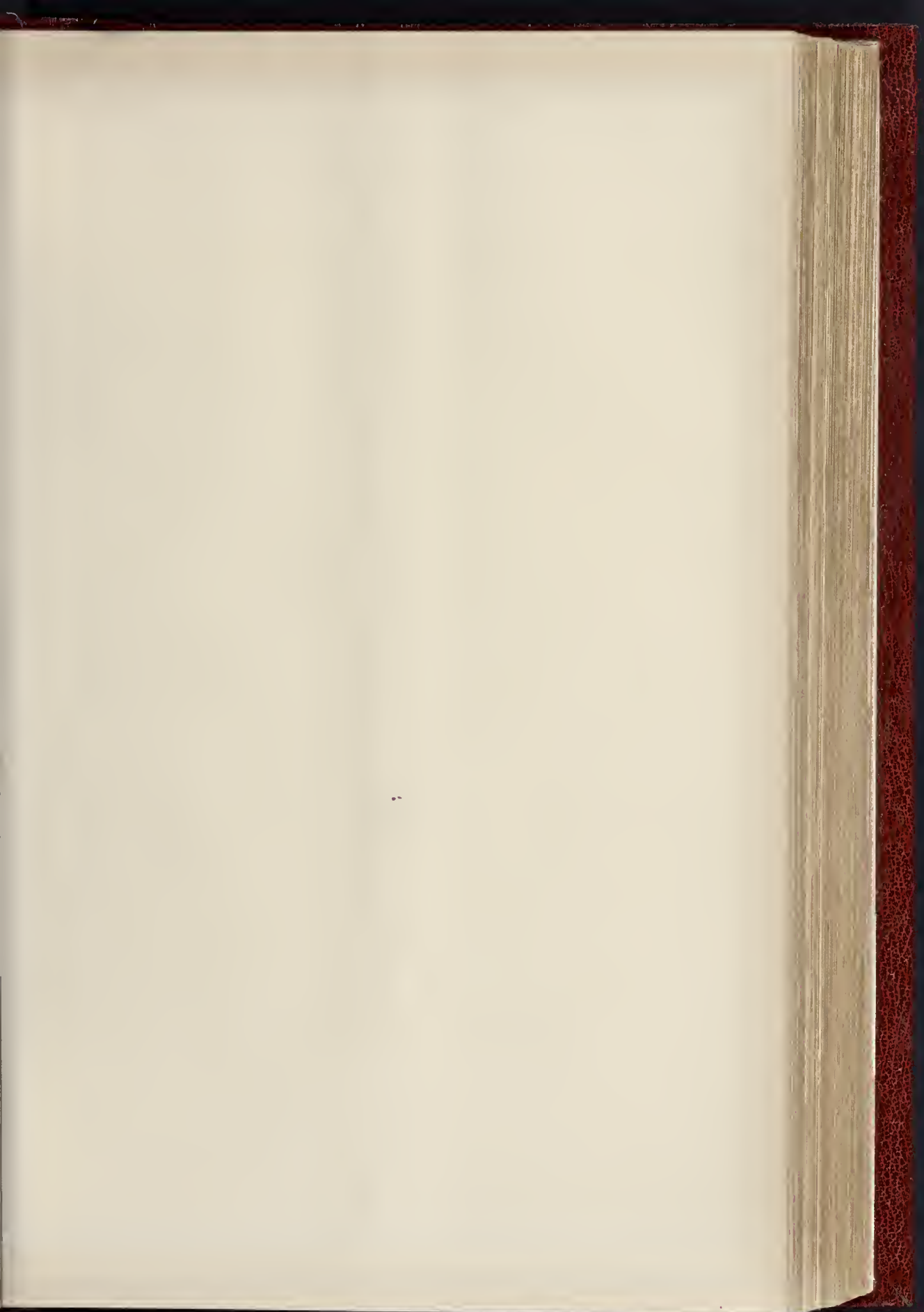






PHOTO-LITHO SPRAGUE & CO. 22 MARTIN LANE, LONDON E.C.





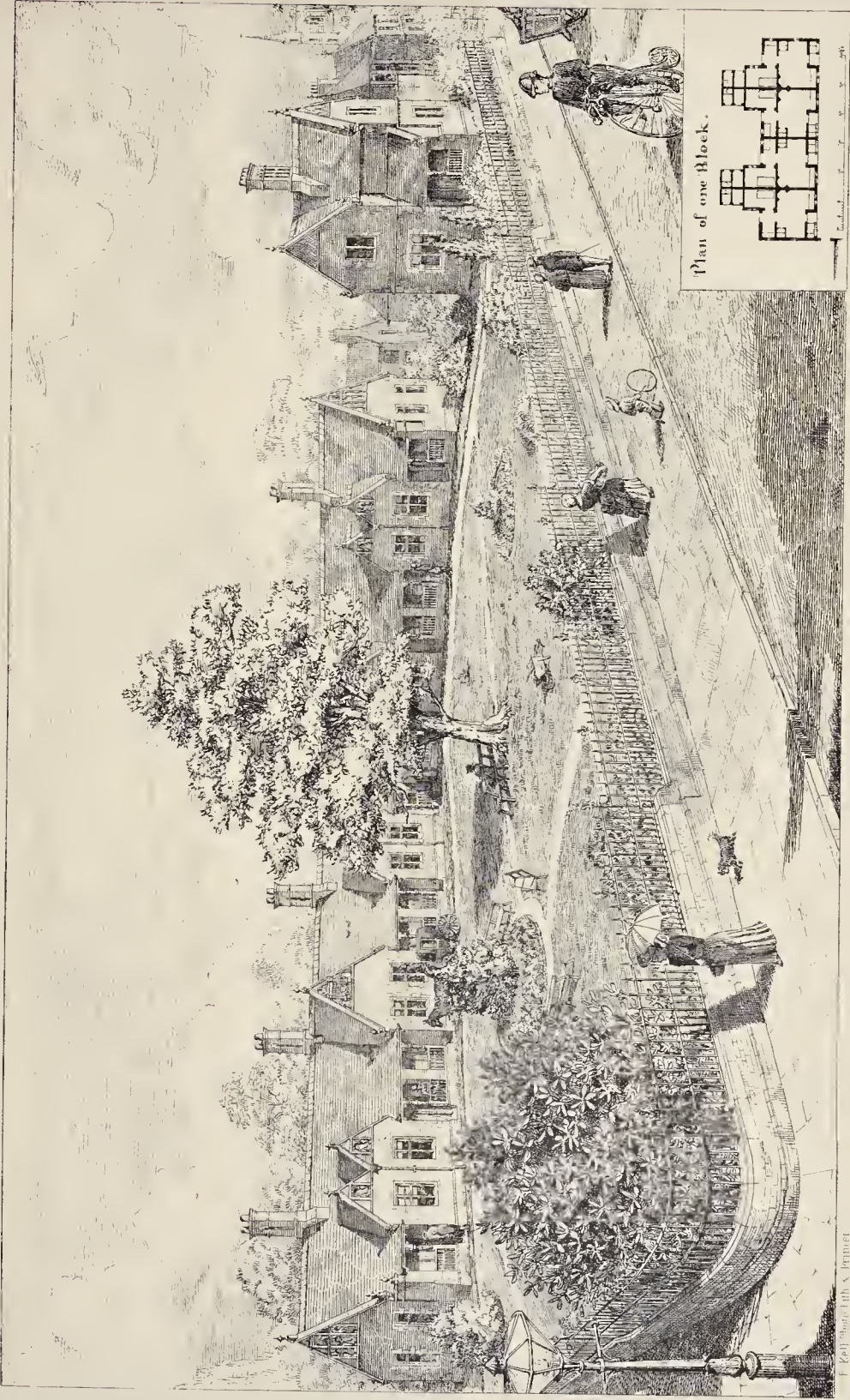


INK PHOTO SPRAGUE & CO LONDON

DESIGN FOR STAINED GLASS.—BY MR. E. BURNE JONES, A.R.A.

"WITH THE FRUIT OF HER HANDS."





J. G. & Co. Litho. & Printers

THE "ORME" BEDE HOUSES, LOUTH.—MR. JAMES FOWLER, F.R.I.B.A., ARCHITECT.

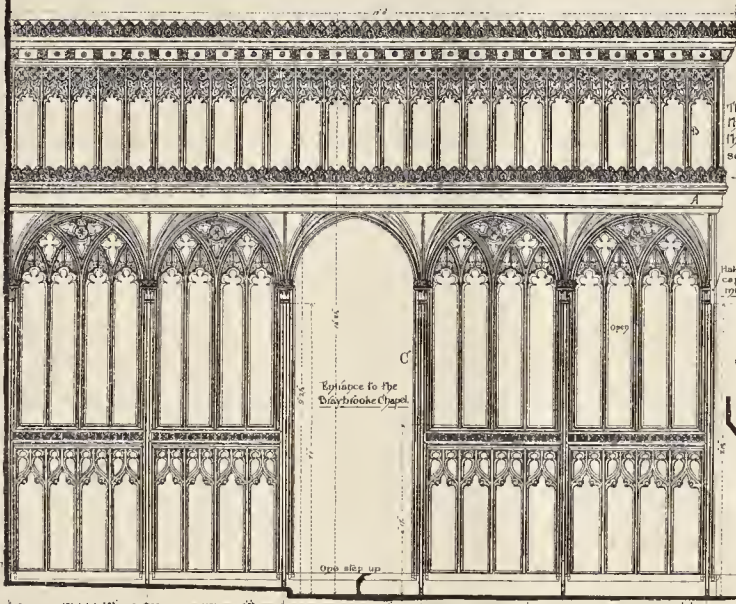
SECTION OF THE HOUSES.

Plan of one Block.



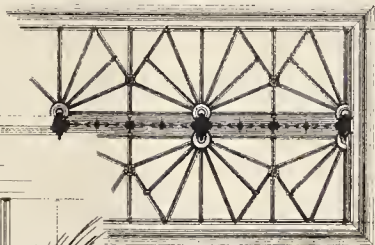
NOTES— All that part of the screen which is exposed to view is coped with oak. When the church was restored by the late Mr. G.E. Street, R.A. many decayed or injured portions of the screen were replaced.

# ROOD SCREEN, WARRIOLD CHURCH.



This wall is slightly out of the perpendicular.

NOTE— The screen stands at the West end of the Diastrobic Chapel.



Plan looking down.



Plan looking up.



Detail of Bay.



Detail of upper panels.



Detail of lower panels.



Full size sketch of ceiling.



Section of moulding above upper panels.

The greater part of the wood-work and this part of the screen has been restored.

Section of moulding A.

Half this cap is missing.

Section of moulding B.

Section of moulding to caps.

Section of moulding at C showing also section of large and small mullions.

Section of sill.

— Arthur E. Permain, —  
Mens of Coll. Oct. 1865.



THE ARCHITECTURAL ASSOCIATION:  
DISCUSSION ON MR. WALTER CRANE'S PAPER.\*

The Chairman (Mr. J. A. Gotch, F.R.I.B.A., President), in inviting discussion, said that the lament Mr. Crane had given utterance to was one that occurred as often as the question of modern art was discussed; and, unfortunately, the voices of those who joined in the chorus of lament outnumbered those which showed any reasonable way out of the difficulty. In fact, he had never heard a solution of this difficulty advanced at all, and it was a question in his mind whether, along with other changes that were taking place in the world, they would not eventually have to alter their notions of what art ought to be, and in what beauty consisted. The whole of modern life was different to what life was in what were termed the palmy days of art. Life was much more diverse now, whereas one of the great charms of Mediaeval life, and one of the incentives to the beauty then existing, appeared to have been the much greater simplicity which obtained. The calls upon a man's inventive faculties were very much less.

A sort of school was spontaneously established in every branch of art, and in those schools all men and artists worked towards one common aim, and on common lines. The result was that where one man left off another man took up the matter and pushed it further on. Each man did not require to learn for himself the whole history of art, as was expected at the present day. Now, however, before the architect could really think of art he had to apply a very large amount of scientific knowledge to his work. For instance, the sanitary question discussed at the last meeting involved important additions to the work of the modern architect as compared with him of the Middle Ages, when people did not know what a drain was. Thus the time devoted by the unfortunate architect of to-day to acquiring a knowledge of sanitary science could have been devoted by his forerunner solely to the study of beauty. Then, again, the whole conditions of modern life, as Mr. Crane had said, were antagonistic to picturesqueness in a way. Take, for instance, the extension of towns. It was perfectly obvious to all who had to do with the laying out of new neighbourhoods, that matters of economy and convenience must override every other consideration. The properties had to be laid out in straight lines, to avoid complications, and it was only in certain neighbourhoods, where money could be spent in preserving picturesqueness, that a departure could be made from this rule. The only thing that architects could do under the circumstances, in this ordinary hum-drum work, was to try and make "reach-me-down" architecture as good as possible. He could not agree with Mr. Crane in deploring the manner in which art had been brought home to everybody in the present day; indeed, Mr. Crane was a standing example of one who had helped in that very work. Another thing that tended to the detriment of modern architecture and of art generally was the fact that our craftsmen were not designers; they had to carry out the design of some one else, and the designer necessarily did not acquire that knowledge of the use of tools which was so useful in designing, and which the old designers possessed in so marked a degree. It was no good, however, adding to the volume of work which Mr. Crane had poured forth. He only hoped some of the members would be able to throw a little light upon this gross darkness.

Mr. William White, F.S.A., proposed a vote of thanks to Mr. Crane for his interesting lecture. The members had been accustomed to have rather practical subjects brought before them at these meetings, but that evening they had been carried far above practical matters, to the theories and foundations of art. Mr. Crane had lamented that art was at a very low ebb, but it seemed that the origin of his complaint was, for one thing, in the marvellous increase of population, the vast necessity for the support of the people, which presented so wonderful a contrast to the old times when things grew up gradually, and when there was, as it were, the growth of the individual. The strikers of those days framed the schools of art to which the Chairman had called attention, and which schools formed the bases of development for centuries. The art of the Mediaeval craftsman was wholly traditional, but was not necessarily stagnant. Art was transmitted in two

distinct modes; in the one case by the development of scientific principles applied to the art, and in the other case it was wholly, or almost wholly, traditional by rule, and not by principles. The growth of art all through the Middle Ages in Europe was the growth of style from one century to another; whilst there was reason for believing that in India, China, and other Eastern countries it was a tradition of rule. Hence it was that they could see the exact reproduction as far as the principles and design were concerned, in carpets, curtains, and fabrics of every description, continued from century to century, almost the same. But when he spoke of the development of art through schools by the application of science, it was most evident that that was the case from the early times of the Greeks down to the fifteenth century. The geometrical proportions, systematically carried out by the Greeks in all art buildings, as demonstrated by Professor Hyster Lewis, Mr. Penrose, and others, would clearly show that, and if they were to look for the development of art at all, they must not be crammed with all that they were to learn *ab initio* from outside, so to speak. Here they were put into the position of what was termed education for art, everything being instilled into them by that means. Some could be taught, and others could not. The man who was an artist could be taught, and he would evolve from his own mind, from his own life, and from applications of nature, that which it was in his power to produce, while another man was unable to do it. The only way of growing towards this was through the schools of art, if they were but carried out in a more theoretical way,—having everything taught by precedent. He did not believe for a moment they would arrive at the development of art through any amount of federal life, or communistic society. The ideas giving rise to the communistic, social, and federal life, arose more, as he had said, from the enormous increase of the population, and the necessities of life, than from what was sometimes called the "robbery" of those who appropriated the good things to themselves.

Mr. F. T. W. Miller, in seconding the vote of thanks, remarked that the lecture turned more on the art of architecture than on "The Architecture of Art." There were two things on which he would join issue with Mr. Crane. The first was a sort of reference to the idea that under free and communistic governments, republics, and so on, great works were and would be produced. Whether they would be produced, time only would show, but that they had not been produced in the past was easily demonstrated. All the great works of the artists of old, whether in the shape of architecture, sculpture, painting, or poetry, had been produced under despotic governments. This was the case with Venice and the whole of Europe during the Middle Ages, when art culminated and the bud developed into the flower. The flower had since gone to seed, from which possibly might rise again a more glorious blossom, though not in our time. Then, again, Mr. Crane, having made several artistic wails, seemed to wish that they should go back to the manners of the Middle Ages. He (the speaker) used at one time to imagine that the men of bygone ages were somehow or other of a higher, better, and nobler type than the present class of persons who walked about in 40s. suits. He had abandoned that idea long ago, and believed there was as much "jerry building" in the Middle Ages as now, only the "jerry building" had disappeared, leaving merely the strong and stately fabrics. He did not believe men were any better in the old times. Art was always changing, and must ever do so with men's situations and needs. They had been passing, during the last forty or fifty years, through a strange experience of human life; they were in it now, and so were not well able to judge of it. It would rather be for the men of future generations to do so. Had the old masters been under the present condition of things would they have done better than the men of to-day? He very much doubted if they would. The men of to-day were in the rush and traffic of a mechanical and scientific age, and art had to stand by; but that it was dead for one did not believe.

Mr. W. Randolph did not believe that any nations had ever set themselves to be picturesque; they were so, but it was those who came after who had discovered it. He could not agree with some of the rather heretical propositions of the last speaker. The Middle Ages, in spite of certain superficial abuses, were, as

Montalembert said, bristling with liberty. No doubt there was building then which was not so good as that which had come down to the present time, but in Bruges, Lubek, and Nurnberg common-place Mediaeval buildings could yet be seen. Of course, the monumental architecture was more splendidly done, but he believed that in those days everything was honestly and well done. If artistic nity depended on social unity, this itself depended on religious nity.

Mr. H. O. Cresswell remarked that a reference to the "jerry builder" always sufficed to raise a laugh in that room, but he believed if there were no "jerry buyers" there would be no "jerry builders." When a man desired to have a magnificent house fitted with all the modern requirements for half of what he ought to pay then the "jerry builder" did his best to supply him, cutting out in the thickness of the walls what he supplied in extra accommodation.

Mr. Leonard Stokes said that the tone of the paper seemed to be that of a lament that more time was not devoted to each individual object, but it should be remembered that architects nowadays had a very great many things to attend to. In fact, they were expected to do too much and to know all about every trade from the beginning to the end of a specification, and as much of art as came into it. That was the reason why the specialists had such a great pull over the architects. The paper, although a little dismal in tone, was most admirable and interesting one. The members would do well to take it to heart and endeavour to spend as much time as they could over the various things they had to do, and not scamp their designing in the way that builders scamped the execution.

Mr. Barrow thought that if architecture and art were now in their decline, it was owing to pecuniary causes. The architect or artist had so much to do for his money that he could not devote his time to the beauties of his art. Hence it was, he believed, in a great measure, that architecture are not so brilliant as in the old days, when great men were set aside for erecting cathedrals and public buildings. Art might be revived again if money could only be dissociated from it, and if every man who had the necessary taste could be allowed to devote himself to it, without thinking of the pecuniary return.

Mr. Francis Hooper expressed a doubt whether the cause of art would be furthered by the propagation of socialistic theories. A communism amongst the workers of various crafts was desirable, embracing both employers and employed, but in Classic and Mediaeval times the patrons of art were found amongst the highly educated and wealthy members of the community. As to the lack of individuality in design now so lamented in what was termed artistic work, much was due to the ever-extending use of machinery which had supplanted the handicraft of the past. A motive power without intellect was at the root of many troubles. That, however, might be stigmatised as the abuse rather than the use of machinery. For to it we owed much work which but for its aid would be either too expensive or too scarce for the enjoyment of the masses.

Mr. Max Clark thought that if they, as architects, devoted the greatest amount of energy they possessed to the work in hand, they would have made one step towards what might be called socialism.

The vote of thanks was then put and very cordially received.

Mr. Walter Crane, in replying, said he was glad that his paper had evoked so many expressions of opinion. He was sorry, however, to have heard it termed a lament without any grounds of hope. The members had even seemed to think that he regretted the lapse of Mediaeval habits and customs, but that was not exactly his meaning. He had pointed here and there to periods of history which he thought had the advantage, but he had no desire to live in any other age than the present. He was certainly very far from being the hopeless person some of them had imagined. He had also been taken to task for what were termed his Socialistic views, but he quite realised that no single man was answerable for the present state of things. It was the result of a course of evolution, which he who ran might read; no one could alter it at once, and he did not pretend to offer a solution which any one might put in his waistcoat pocket. He would rather be quite satisfied if people would think it out for

\* Printed in extenso in *Builder* last week, see p. 313, ante.

the Institution was a deserving one, and seemed to have ready to hand all the machinery for carrying out a great deal of good work.

Mr. Thos. Stirling seconded the motion, which was carried.

On the motion of Mr. Roe, the retiring officers were thanked for their services.

Mr. Trollope, in reply, said it quite seemed to him, from what had fallen from the proposer, that his poor efforts had not been appreciated, and he could only say that what he had done had been a pleasure to him.

Officers for the present year were afterwards elected.

Mr. Brooks then proposed for adoption a new section to the Orphan rules, which, after some opposition, was carried in the following form, viz.,—

"That no more than two children of one family shall be receiving the benefits of the Orphan Fund at the same time. And should there be no presentation vacant at the time when an application for the second child be made, no further presentation shall be purchased until the Committee have another eligible candidate before them, when after due notice an election by ballot shall be declared."

The proceedings closed with a vote of thanks to Mr. Freeman for his kindness in presiding on the occasion.

**PROPOSED COMPLETION OF THE OPEN SPACE BY PICCADILLY CIRCUS.**

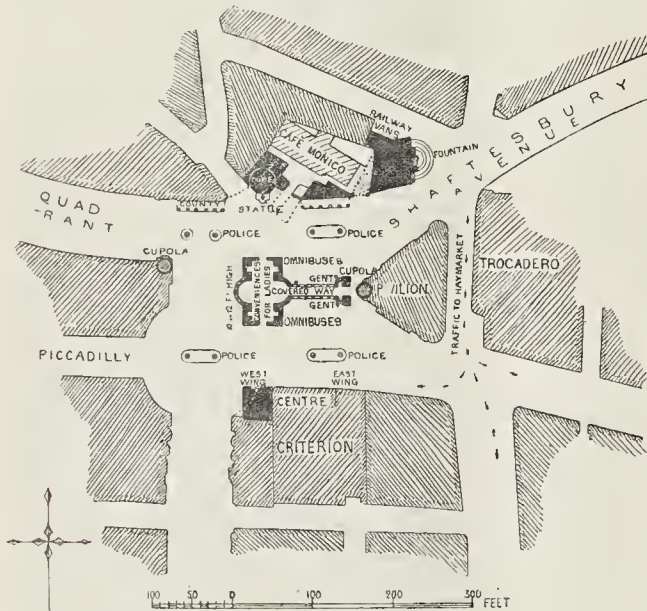
SIR,—Shaftesbury-avenue has connected St. Pancras and Bloomsbury with Piccadilly and Victoria, and a new service of omnibuses has naturally availed itself of the new route, while

and it would, no doubt, be better, as was then pointed out, to complete the open space by some further enlargement.

Several important but incongruous elements have to be dealt with in such an operation. We have three quarters of a Circus, two-thirds of a Criterion, the eccentric County Fire Office, and the "Pavilion" with three fronts facing as many different widths of thoroughfare. These things have come into existence, and there is no intention here of criticising any of them, but rather of seeing how they can be brought into harmony.

Now, in any scheme of this sort vested interests have to be considered. Hendrie's (the perfumer's) shop, in Tichborne-street, has already been dealt with. Next comes the Café Monico, chiefly hidden away in the background, but with a frontage to the street, and an access partly through a courtyard. By building on this courtyard and adding a second frontage, the capacity and publicity of the café would be improved. The accompanying plan shows how this can be achieved on a line of frontage set back so as to throw the Quadrant and Shaftesbury-avenue into one continuous sweep. This gets rid of the promontory that blocks the view from the Quadrant, and, at the same time, it throws the western angle of the Pavilion into the centre of a noble space.

The north side of this space has next to be considered. It is bounded east and west by



the existing traffic from Regent Quadrant to Waterloo-place and Coventry-street is as crowded as ever it was. There are thus two lines of vehicles crossing each other at an obtuse angle, and yet observed from each other by a solid promontory of houses just where they meet. Add to this the line of traffic east and west between Piccadilly and Coventry-street, besides a host of railway vans obscuring the view of foot-passengers, and we have only to wait for the London Pavilion Music-hall to be converted into a hospital, with plenty of accident wards.

There is, however, a pleasanter way of meeting the case, and that is by bringing the traffic under easy control.

In the *Builder* of October 24, 1885, a plan was suggested for converting the line of the former Tichborne-street into a pavement for foot-passengers only, and of re-erecting a portion of the former Circus as a valuable block of shops, and thus replacing the now lost symmetry of Nash's grand thoroughfare. When an open space, however, has been once gained, people are loth to see it blocked up again, even though the nation and the parish would reap very substantial profit from this scheme;

Swan & Edgar's and the Pavilion. These could be easily emphasised by a pair of cupolas, such as Nash has placed on other buildings in Regent-street. Between these a centre line is struck towards the north obviously marking a site for the statue of Lord Shaftesbury, not isolated, but placed in front of the wall of a dominant central building. A repetition (let us hope in stone) of the County Fire Office to the east of this central building would complete the north side of the space, forming a composition which could be taken in at a glance from many points of view.

The three remaining quarters of the circus are awkward: a semicircle is far preferable. Let, therefore, the Criterion be completed, and absorb the south-eastern quarter of the Circus, to the manifest improvement of both. Mr. Verity's fine design would then be enjoyable as seen from the north, and the encroachment upon the Circus would be valuable as ground-rent.

Lastly, there is a demand for public "conferences" which should be met if they can be made obvious, but not conspicuous. Delicacy has to be considered. A covered way is, therefore, suggested, to answer both as a waiting

place for omnibuses and an approach to ladies' lavatories; the gentlemen's conveniences being separately placed and approached.

The whole structure might be surmounted by a terrace for flower stalls, and yet be kept quite low; while its position would achieve the object first mentioned of checking the dangerous traffic in this crowded crossing.

Feb., 1887. EDWARD J. FARVER.

**WORKING STUDENTSHIPS AT SOUTH KENSINGTON.**

SIR,—I am directed to request that you will be so good as to allow me, through the medium of your columns, to inform manufacturers and others engaged in industries in which art is more or less concerned, that the Lords of the Committee of Council on Education have decided to make arrangements for the admission of a limited number of persons employed in those industries, to study in the South Kensington Museum, Library, and Schools, without the payment of any fee, for periods of from two to nine months according to circumstances.

Detailed rules with regard to these Working Studentships will be sent on application to the Department. Briefly, the conditions may be stated to be, that the designer or workman, for whom admission is sought, shall show that he is sufficient power of drawing and sketching to be able to profit by the opportunities afforded; that he is actually engaged in some art industry, and that the proprietors of the works in which he is engaged undertake to maintain him while he is studying at South Kensington. When admitted, the working student will be set, under direction, to study in the Museum and Art Library from examples relating to the industry in which he is employed, and he will also receive instruction in drawing and designing in the Art School, suited, as far as may be, to his special case.

My Lords have taken this step with a view to render the Museum of more special and direct use to the country, and they trust that the valuable collection of examples of applied art, which has now been brought together, may thus be more fully appreciated and taken advantage of by the directors of industry in the country.

J. F. D. DONNELLY.

Science and Art Department, Feb. 28.

**THE LIVERPOOL CATHEDRAL COMPETITION.**

SIR,—In signing the circular sent round by Mr. J. O. Scott and Mr. Seidon, I, in common with Professor Kerr and others, intended merely to ask for an opportunity of seeing the drawings in London, certainly not to attempt to upset the award of Mr. Christian.

I should have written to withdraw my name when I found others understood the special point of the circular to be a reconsideration of the award, but I noted that it had been modified. I still hope it will be the means of affording us the treat of seeing the competition drawings in London.

In proof of my own bona fides in the matter,—though it is otherwise of no importance,—I may say that, as far as I have yet seen, I quite sympathise with the conclusion come to by Mr. Christian, having known something of Liverpool in former years.

C. F. HAYWARD.

Museum-street, Feb. 23.

**THE IMPERIAL INSTITUTE COMPETITION.**

SIR,—Without wishing to question for a moment the ability of the six gentlemen who have been selected to compete for the above, it does seem a hardship to the large number of architects in the United Kingdom that they have not the opportunity of showing their ability in so important and national an undertaking.

Following the precedent of the competition for the Houses of Parliament, the Government Offices, and the new Admiralty Offices, why should not the design for the Imperial Institute be thrown open to all? The result could not fail to be a success, besides being satisfactory to the profession, who, I am sure, feel aggrieved that the competition is at present limited to only six. If the drawings were limited to a small number, and to sketches only with plan to a small scale, the work of selection, with Mr. Waterhouse on the committee, would be a light one, as his practised eye would soon separate the "wheat from the chaff," and every architect who competed would have a satisfaction in feeling that he had had, at all events, a chance in the race, and would retain his design in view to come as his effort for the "Jubilee Building of Queen Victoria." The 1,200, allotted as prizes might be divided into, say, twenty-four of 50l. each instead of six at 200l., as now intended.

I feel sure that, if the Royal Institute of British Architects were to take the matter up and present a memorial in the terms I have suggested, the committee of the Imperial Institute would concur



in the proposal. It seems fitting and proper that so national a building should be dealt with in its inception on a broad and liberal basis. It would involve no extra cost, but be productive of satisfaction to a great many architects who now feel somewhat slighted at the course adopted.

LOYALTY.

VALVE AND "WASH-OUT" CLOSETS.

SIR.—The controversy between the "valve" closet and the "wash-out," again provoked by Professor Corfield's Lecture, does not seem likely to be settled just yet. The "valve" is objectionable as likely to run dry, and as having a space between it and the trap beneath for the generation and accumulation of foul air. The usual "wash-out" is objectionable in practice as very often failing to wash-out without a disgusting vortex, and in principle as having a trap beneath, almost out of sight, which very often does not clear itself; and having also a considerable surface of pipe leading down to the trap from the basin, which gives off exhalation in drying, and is consequently not so free from smell as a well-conducted closet ought to be. In these respects the usual "wash-out" is undoubtedly worse than a good "valve." It is but a mere trifle, if at all, better than a common hopper-pan, which is commonly deficient in the force and direction of its flush; and which likewise is not always clean in its use, but is otherwise quite as sanitary.

I believe that medical science requires the pan, whatever it may be, to contain a surface of water measuring 9 in. or 10 in. in diameter and 3 in. or 4 in. in depth within 7 in. or 8 in. of the seat. The valve closet certainly does fulfil these conditions perfectly, so that it has strong arguments in its favour as against a defective "wash-out." But it is not so essential that the "wash-out," although I know of only one which is free from those enumerated, and really fulfils the required conditions. It contains the requisite surface and depth of water within reasonable depth of the seat; it traps within the basin at its exit, and not beneath. It has no half-hidden pit of pipe beneath to accumulate the smell, and to exhale in drying. The basin is well rinsed in flushing. But, as your correspondent observes, all basins require to be kept properly and regularly cleaned. I am, sure I shall never be satisfied with any closet which falls short of it in any of these respects.

WILLIAM WHITE, F.S.A.

Wimpole street, February 27.

SIR.—I notice a letter from one of your correspondents, on p. 331, who seems to object to my views upon the "wash-out" closet, and who mentions that he was much struck at the prejudice shown against the wash-out water-closet in the discussion at the Architectural Association. Your correspondent states that "those who spoke have had no experience of the wash-out closet." I think you will allow me to state that it is just my experience, as a practical plumber and as an employer of some of the best plumbing talent known in London, which leads me to the conclusion I expressed at the meeting. In a few remarks I made I mentioned cases in which water-closets had been fixed of the wash-out type many years ago, and had to be abandoned, and I may, for the information of your correspondent, say I have seen many scores of closets on this principle, which, instead of being sanitary improvements, are, to my view, a perfect nuisance. I am glad, however, that I am not the only practical man who holds the same views on this important subject.

Your correspondent says "there is no action beneath the seat to corrode." Now, it is just the action beneath the seat I object to, and perhaps if your correspondent had attended the meeting he would have altered his views.

JOHN SMEATON.

Great Queen-street, W.C., Feb. 25.

\* \* We have also received a letter on this subject from Mr. S. Symes, architect, Lower Dominick-street, Dublin, who gives it as the result of his experience that there is no closet equal to the "wash-out," if properly arranged and constructed. But we do not think that anything will be gained by the insertion of further letters in reference to the matter just now. Each side has had its say, and we have expressed our own opinion on the subject.

**The "Lancaster" Pneumatic Door-Check.**—This is the title of a new door-check which is certainly neat in appearance, compact, and readily fixed. It is claimed that the door may be held partially or entirely open for any length of time without injury to the check; that it effectually prevents the door from slamming; that it is capable of the most delicate adjustment; and that only one size is required for either large or small doors. From examination of the contrivance it appears to possess these qualifications, but we have not yet had one fixed on trial. When we have done so we may be able to say something more in its favour. It is made by Messrs. Anthony Bell & Sons, Lancaster.

The Student's Column.

FIELD WORK AND INSTRUMENTS.—X.

Surveying Instruments.

IX.—THE THEODOLITE (continued).

FIGURES 3 to 9 show elevations and details of the instrument illustrated in plan by fig. 1 of our last article.

The telescope is fitted with achromatic glasses, the object of which is to remove the indistinctness of vision which would be caused by chromatic aberration within the telescope. We know by experience that the rays of light, unless acted upon by some external cause, travel in straight lines, but that when a ray of light passes obliquely out of one medium into another of a different density, it becomes bent or refracted, and its several component colours are separated and dispersed in a definite order, the red portion of the ray being the most refrangible and the violet the least refrangible. A ray of light, in passing obliquely from the atmospheric medium into a lens, undergoes a compound deviation, known as spherical and chromatic aberration, which it becomes the business of an optician to remove in the production of an achromatic telescope. The spherical aberration is obviated by making the lenses of suitable shapes, and the chromatic aberration by re-nitting the colours, so that a colourless image may be formed at the focus within the telescope. The object-glass is fixed at the outside end of the inner tube, and is made of a comparative large size and of large focal length, in order that not only may sufficient light fall upon it to produce a distinct vision, but also that the rays of light may be the more accurately refracted. When a ray of light passes from a denser into a rarer medium, the angle of refraction is greater than the angle of incidence; but when the ray passes from a rarer into a denser medium, the angle of refraction is less than the angle of incidence. It is the property of convex lenses to diminish divergency, and of concave lenses to increase it.

The object-glass is formed of three lenses, held together and encircled by a thin brass ring, over which an outer brass ring is fitted. It consists of a double convex centre of light flint glass, with outside concave surface of green crown glass.

The colours, which are separated by the refraction of the first lens, are partly re-united by the refraction of the second or central lens, but the introduction of the third lens practically perfects the result.

After the lenses in the object-glass are adjusted in their relative position to one another they are secured by the makers with a pin soldered within the cell which holds them. A notch being cut in the edge of each lens, the object-glass slides upon the pin, and is thereby guided and secured in its proper position. The outer ring is turned closely round the edge and burnished in a lathe.

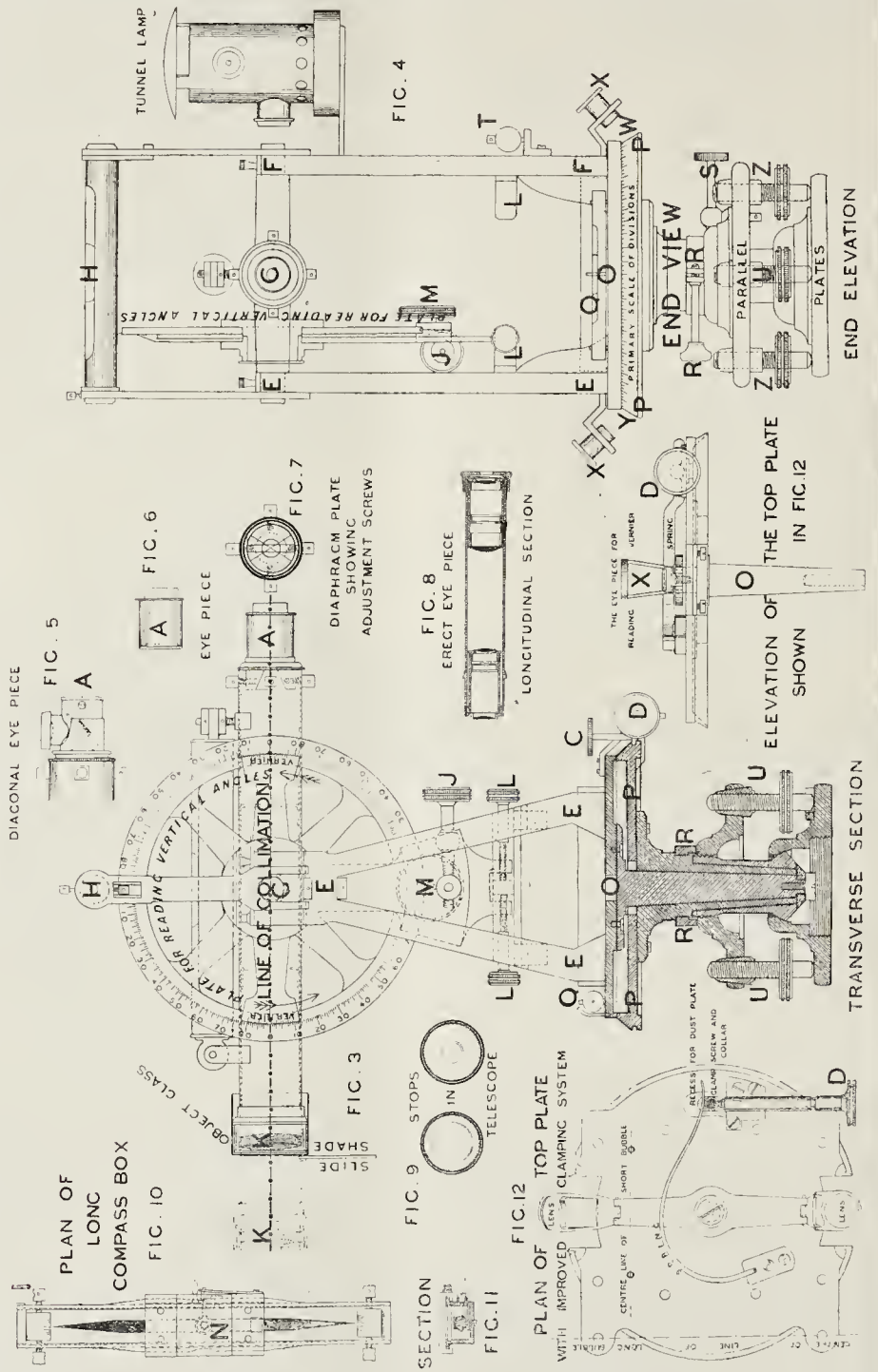
The eye-piece used is the Ramsden or positive eye-piece, consisting of two plano-convex lenses with the convex surfaces inside the eye-piece facing one another. The lenses are placed at a distance apart equal to half the sum of their focal lengths. In a positive eye-piece the focus lies beyond the lens which stands inside the telescope and therefore a positive eye-piece is adapted for use with instruments having fixed spiders' threads in the focus of the object-glass. In a negative eye-piece the two plano-convex lenses are placed with both the convex surfaces towards the object-glass, and hence the passage of rays from an achromatic object-glass after refraction in the glass of the eye-piece next the object-glass come to a focus within the eye-piece.

The line of sight within the telescope is technically called the line of collimation, derived from an old Latin word, "collimare," for which the word "collimare" is now substituted, and signifies to direct something straight at a mark ("con" together, and "linea," line). This line forms the optical axis of the instrument, and joins the optical centre of the object-glass with the intersection of cross hairs in a diaphragm plate, which are situated at the common focus of the object-glass and of the eye-piece, marked A. The diaphragm plate is sustained within the outer tube by four capstan-headed screws, by means of which the line of collimation is adjusted in a manner about to be described. Upon this plate, as shown

in fig. 7, are fixed the "cross-hairs," intersecting one another within a circular hole in the centre of the plate, and consisting of spider's lines, one horizontal, two vertical, and two deviating slightly to opposite sides of a central vertical line, arranged so as to define a central point as well as to guide the eye in both a horizontal and vertical direction. The web used is that of a common garden spider, not the house-spider. The house-spider spins his web in sheets, but the spider found in gardens during the summer and autumn spins his web in geometric patterns formed of thin cords. These webs may be obtained by bending a piece of wire in the shape of a two-pronged fork, with a space of 2 in. or 3 in. between the prongs, and turning it over in the hand while the spider is allowed to drop from one prong to the other, so as to collect the line of web formed by the spider in the fall. These webs can then be readily affixed to the diaphragm-plate in their proper position. The short eye-piece, as shown in fig. 6, may be removed and taken to pieces for the purpose of wiping the glasses when required, but, as will be observed, when the eye-piece is withdrawn, the diaphragm plate is totally unprotected, and care must be taken not to destroy the cross-hairs on wiping the open end of the telescope. The object-glass may also be taken out and wiped with a soft silk handkerchief, or a soft piece of chamois leather, so as not to scratch the surface, but should be screwed back to the exact position it occupied before removal, as its optical centre is assumed to have been set true by the makers when fixing it into the telescope. To effect this, it is well upon receiving a new instrument from the makers to scribe carefully a mark across the ring, and the end of the inner tube to which the object-glass is attached, and then, after removal, to screw it back in its place, and observe that the lines so marked coincide. When the object-glass becomes dull, as will be found the case after working in wet weather, the best way to eliminate the moisture which may have gained access between the lenses is to take out the object-glass when packing up the instrument in its box, and wrap it up in a piece of clean blotting-paper, leaving it in a dry and warm place for a few hours. The dark glass cap supplied in the box with the instrument fits on to the short eye-piece, and is intended for use as a sun-glass.

One of the first adjustments requisite in the use of the telescope is known as the adjustment for parallax, a term derived from the Greek παρά (para), beside, and ἀλλοίωσις (alloiosis), to change or alter a little. A parallax is likely to lead to an inaccurate reading or observation, and can be detected when the observer moves his eye up and down or sideways when looking through the telescope. The eye-piece marked A is moved in and out of its socket until the cross hairs are not simply observed, but seen distinctly. This adjustment, which will obviate any apparent change in the position of an object caused by a slight change of position in the observer, may be best effected by directing the telescope towards a white ground, or towards the sky, so as to project the cross hairs upon a clear disc. It must be verified each time that the instrument is set up for use. As the socket which holds the eye-piece is screwed on to the rear end of the telescope, it is advisable, in order to avoid unscrewing the socket when varying the distance of the eye-piece, to revolve it in the direction of the hands of a watch. When this socket is unscrewed, a diagonal eye-piece, consisting of two tubes with a rectangular elbow fitted in a separate socket, as shown in fig. 5, can be attached for observing great altitudes; a ray of light entering by the axis of one tube is reflected by the mirror centrally through the other tube. It will be observed that the image of the object viewed is inverted within the telescope when the short eye-piece is used, but by the substitution in the socket of an additional tube, shown in fig. 8, an erect vision may be obtained. The extra glasses and additional length of tube, however, cause a loss of light, and hence the long eye-piece is seldom used. After adjusting for parallax, the side milled head, marked B in fig. 1, is turned until the foci of the object-glass and of the eye-piece coincide. This is known by the distinctness of the image in the telescope. The clear vision is aided by the introduction of stop-pieces, shown in fig. 9, and fixed within the inner tube, as indicated by dotted lines in fig. 3. These serve to avoid reflected light, and to give

THE THEODOLITE  
TRANSIT INSTRUMENT.



sharp definition. They have holes of such diameters and are arranged in such positions that the only rays of light which reach the common focus of the object-glass and eye-piece at the intersection of the cross hairs in the diaphragm plate are those rays which are included within the cone of vision converged by the object-glass.

The extent to which the inner tube can be moved in and out is indicated by the dotted lines in the diagram, and the slide shade marked K is intended for use when the sun is shining powerfully upon the object-glass, or when rain is falling. The nearer the point viewed, the further out must the inner tube be propelled so as to focus the object. The name theodolite is derived from the Greek θεώματα (theomai), or θῆμα (theomai), I see, or θῆ (theo), I run, and δολικός (dolikos), long, and the instrument is specially adapted for long vision; but it is the maker's business to see that the telescopic action of the tubes is sufficiently perfect, in order that the line of collimation when adjusted for a long distance may be correct for a short one. Should wet work in between the two tubes in the telescope, as will be the case when using the instrument in showery weather, the inner tube must be continually moved in and out, and carefully dried each time until nearly all the moisture is removed, when the heat of a warm room will complete the drying. The inside of the tube and stops are covered with a dull black pigment, in order that no light may be reflected by its surface.

The magnifying power of a telescope is found by dividing the distance between the diaphragm and the nearest surface of the object glass by the focal length of the eye-piece. When looking through the telescope from the eye end with the eye-piece removed, the eye being near the focus of the object-glass, the whole of the object-glass should be seen, and all parts of the intervening tube concealed, otherwise the stops are not properly fixed.

Over the top horizontal plate are fixed two small spiral-levels at right angles to one another. They are adjusted in position by the makers by means of the capstan-headed screws attached to them. The long bubble attached to the telescope is seldom used in ordinary surveying. Great pains are taken by the manufacturers to make these bubbles sensitive. The inside or soffit of the level-tube is carefully ground with emery powder and water upon a brass rod which is bent to a slight curve longitudinally upon the inner upper surface, so as to insure the steadier action of the bubble when the tube is filled to the required amount. Spirit is found to be a more manageable medium in adjusting the bubbles than water. It is also less liable to freeze in cold weather. The grinding of the tubes may be so accurately executed as to enable the steady deviation of the bubble from the centre of its run, to register small angular deviations from the horizontal. It will be found that the length of the bubble is affected by temperature, and hence the glass tubes are generally graduated upon their upper surfaces to guide the eye in setting the bubbles level.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

2,302, Improvements in Water-closets, &c. R. B. Phillips.

According to this invention, the basin is of earthenware fitted with an outlet-pipe of lead. This lead or metal pipe is then scoured with cement. The basin is so formed as to retain water in its lower part, and the lower part of the pipe is so constructed that its margin dips into the water in the basin, so that should the jointing fail between the metal and the earthenware, the escape of foul air is prevented by the water sealing at the lower extremity of the metal pipe.

2,671, Chimney or Ventilating Caps. C. Swindell and W. Clifford.

By this invention a chamber of an annular shape is used, the roof or curved sides of this annular chamber being continued to the centre so as to form a close top to the space enclosed by the inner wall of the chamber. The hole or slots for emission of the smoke or updraft of wind are guarded by louvres which deflect the current, all being arranged radially at a tangent round a common centre.

3,420, Basic Bricks. G. A. Jarvis.

The patentee mixes burned magnesian lime with flint spar, silicates, and chlorides of different chemical substances, and then presses them by hydraulic power into moulds. The bricks are heated to a high temperature.

3,569, Wall Bonds and Damp Course. J. Dyson.

According to this invention, a brick is made in two parts, which in use are dovetailed together in the outer part of the wall. The part for the outer wall is burned as an ordinary brick; the other part, which will be the wall cavity, is glazed, is dished in the centre, and grooved. All water percolating through the outer wall, falling into this glazed groove, is carried down the cavity and into the earth. Thus the walls are made damp-proof, and the bricks act also as a bond to the wall.

4,239, Steps, Ladders, &c. A. W. H. Wood.

This invention relates to a combination of steps with the ordinary rungs ladder. The parts are connected by means of a hinge fastened to the bottom of each side of the upper part and to the back of the lower part near the top rung. They thus fold close together, but when opened at an angle form steps, and may be fastened with a hook and staple or a metal loop, passing over the two parts above the hinge on each side.

6,426, Floors, Roofs, and Arches. W. Parry.

According to the invention, blocks of bricks, terra-cotta, or building stones are formed with vertical projections down or along one side of the bottom edge fitting into corresponding recesses or grooves on the opposite side of the stone or block. Thus the blocks register with each other in the process of building, and bind the work in such a manner that it forms a mass which the inventor claims to be incapable of being riven asunder or cracked.

NEW APPLICATIONS FOR PATENTS.

Feb. 18.—2,634, Stephens and Clark, Portland, Roman, and Other Cements.—2,635, Harcourt and Shaw, Apparatus for Closing Doors.

Feb. 19.—2,590, E. Poole, Roofing Tiles, to Prevent Stripping by Wind, &c.

Feb. 21.—2,637, J. Duckett, Water-closets.—2,659, B. Crook, Fastening Knobs to Spindles.—2,668, Smith and Roome, Repeating Wood Carving and Shaping Machine.—2,685, R. Adams, Door-Closing Appliance, and Checks for Same.

Feb. 22.—2,716, S. Hart, Connecting Metal Pipes, &c., for Water or Gas.—2,725, D. Cheetham, Preventing Draughts, &c. from passing between the Sashes of Windows.—2,742, Shaw and Chittick, Flooring or Roofing Warehouses, Bridges, &c.—2,785, W. Gaultier, Stop Blocks for Doors, Gates, &c.—2,786, S. Wilding, Pressing Floor Boards together.

Feb. 23.—2,799, P. Stringer, Rim Latches.—2,805, E. Lloyd, Automatic Sash, Casement, and Door Fastener.—2,807, J. Shaw, Cooking Ranges.—2,817, H. Moore, Self-Locking Bolts.—2,820, A. Bonit, Filing.

Feb. 24.—2,843, T. Kemp, Sanitary Water-closet Apparatus.—2,845, W. Kimberley, Plough and Sash Filling Planes.

PROVISIONAL SPECIFICATIONS ACCEPTED.

679, J. Corsan, Producing Ornamentation on Wood.—1,083, B. Fryer, Fire Grates.—1,143, A. Best, Window Fasteners.—1,147, J. & G. Shelvock, Bascetons for Keyholes.—1,213, W. Lunt, Door or Finger Plates.—1,839, E. A. Wright, Cover of Wind-guard for Chimneys or Ventilators.—850, R. Kenny, Earthenware Drain-pipes, &c.—1,024, A. Hillidge, Indicator and other Fastenings for Doors.—1,362, J. Macintyre and Others, Kitchen Ranges.—1,493, J. J. Wilson, Apparatus for Smoky Chimneys.—1,532, Woodriddle & Jones, Forming Floors.—1,990, G. Heffer, Constructing Harbours, Piers, Breakwaters, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

2,758, J. Bale, Self-adjusting Waterproof Louvers for Ventilating Buildings.—4,982, T. Porter, Draught and Dust Excluder for Doors and Windows.—5,513, W. Walker, Cooking Ranges.—5,795, G. Gauna-way, Ventilator.—5,820, J. Warwick, Manufacture of White Lead.—3,488, H. Price, Hopper Ventilating Casements.—15,562, H. Lowe, Roofing Tiles.—5,076, W. Lockhart, Sliding Sashes.—6,292, G. Sharp, sen., Chimney Top or Ventilator.—15,203, W. Kellogg, Sash Pulleys.—1,193, W. Eckstein, Ventilators.

Free Lectures at Carpenters' Hall.

The first of the present series of Free Lectures on matters connected with building was given on Wednesday evening last at Carpenters' Hall, London Wall. The lecturer was Mr. Banister Fletcher, F.R.I.B.A., Warden of the Carpenters' Company, who chose as his subject "English Carpenters and Foreign Competition." There was a large audience, who frequently applauded the delivery of the lecture, a report of which will appear in our next.

**Polytechnic Science, Art, and Technical Classes.**—We are informed that the Right Hon. the Marquis of Hartington, M.P., has consented to distribute the medals, prizes, and certificates to the successful students of the Polytechnic science, art, technical, and trade classes, on Wednesday, March 16th.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

FEBRUARY 22.

By DEBENHAM, TEWSON, & CO.  
Euston-road—Nos. 268 to 274 even, and premises in rear, area 17,400 ft., freehold, £12,000  
City—21, Adde-street, freehold, area 539 ft., 3,000  
Stoke Newington—n. 71, Albion-road, freehold, 860  
Harington—Freehold house and fruit plantation, 11a. 2r. 16p. 2,850

By H. RUDLEY.

Hampstead-road—No. 15, Nodley-street, 29 years, ground-rent 6l. 6s. 400  
Edgware-road—29, 21, and 23, Burn-street, 32 years, ground-rent 6l. 6s. 550  
Improved ground-rent of 102, 16s., term 32 years 125  
Portland place—29, Foley-street, 10 years, ground-rent 23l. 390  
Camden Town—135 and 137, Arlington-road, 60 years, ground-rent 20l. 745

FEBRUARY 23.

By C. D. FIELD & SONS.  
Blackfriars—1, Broadwalk, copyhold, 295  
8, Queen's Arms-court, copyhold, 215  
61, Nelson-square, 18 years, ground-rent, 6l. 16s. 10d. 295

By DEBENT & SON.

Camberwell New-road—No. 213, term 17 years, ground-rent 5l. 100  
Whitechapel-road—No. 249, term 197 years, no ground-rent 670  
Kennington-cross—3 to 9 odd, Upper Kennington-lane, 18 years, ground-rent 49l. 8s. 730

By F. HARRIS.

Greenwich—21 and 22, Egerton-road, 55 years, ground-rent 10l. 18s. 6d. 660  
Clapham—Ground-rent of 25l. a year, reversion in 27 years 1,100  
Ground-rent of 10l. a year, reversion in 42 years 463

FEBRUARY 24.

By GLEASER & SONS.

Soho—15, Old Compton-street, freehold 2,270

By FAREBROTHERS, ELLIS, & CO.

Haymarket—17, Oxenden-street, freehold 1,560

By HARRIS & JENKINS.

Poplar—124, Brunswick-street, copyhold, 229

Plaistow—19, Grange-road, freehold 295

By E. SIMMONS.

Mile End—34, Harford-street, 30 years, ground-rent 2l. 10s. 205

Bermondsey—6 and 8, Stork's-road, 63 years, ground-rent 10l. 600

Wandsworth-road—Ground-rents of 39l. 8s., term 22 years 345

Edgware-road—1 to 64, Bowman's-buildings, 88 years, ground-rent 250l. 6,000

Lavender-hill—No. 83, term 85 years, ground-rent 6l. 500

By NEWSON & HARDING.

Tottenham—5 and 6, Parfield-villas, 63 years, ground-rent 5l. 10s. 220

Islington—Ground-rents of 18l. a year, reversion in 47 years 562

21 and 22, Clarence-street, 60 years, ground-rent 12l. 12s. 685

Holloway—138, Hornsey-road, 55 years, ground-rent 6l. 365

61, Durham-road, 67 years, ground-rent 4l. 210

FEBRUARY 25.

By B. REID.

Paddington—31, Elmatham-mews, 78 years, ground-rent 5l. 200

By BLANK HANCOCK & CALVERTON.

Croydon, High-street—The New Inn and premises, freehold 4,090

MEETINGS.

SATURDAY, MARCH 5.

Architectural Association.—Visit to the Church of Corpus Christi, Brixton-rise, and St. Mary's Church, Clapham, 8 p.m. (See advertisement last week.)  
Association of Public Sanitary Inspectors.—Mr. J. A. Davenport, C.E., on "Rural Sanitation." (Town-hall, Westminster. 6.30 p.m.)

MONDAY, MARCH 7.

Royal Academy of Arts (Lectures in Architecture).—Mr. G. Atchison, A.R.A., on "Balustrades." 8 p.m.  
Architects' Benevolent Society.—Paper by Mr. T. W. Wheeler, Q.C., on "Disapidations and the Legal Obligation to Repair." 8 p.m.  
Society of Engineers.—Mr. E. Olander on "Bridge Floors; their Design, Weight, and Cost." 7.30 p.m.  
Society of Arts (Contar Lectures).—Mr. W. Y. Dent on "Building Materials." IV. 8 p.m.  
London Institution.—Mr. Andrew Lang, M.A., on "Life in Homer's Days." 6 p.m.  
Estate Exchange.—Annual General Meeting. 8 p.m.  
Leeds and Yorkshire Architectural Society.—Mr. F. W. Wigfall on "The Philosophy of Bricks." 8 p.m.  
Victoria Institute.—8 p.m.

TUESDAY, MARCH 8.

Institution of Civil Engineers.—Further discussion on Mr. J. J. Webster's paper on "Dredging Operations and Appliances." 8 p.m.  
Manchester Architectural Association.—(1) Paper by Mr. B. Talbot on "Ornament." (2) Nomination. Officers. 7.30 p.m.

WEDNESDAY, MARCH 9.

Royal Academy of Arts.—Mr. Reginald S. Poole on "Medals." 8 p.m.  
Architects' Benevolent Society.—Thirty-seventh Annual Meeting. 5 p.m.  
Society of Arts.—Mr. William P. Marshall on "Railway Brakes." 8 p.m.  
York Architectural Association.—Mr. F. A. Camidge on "Building Law." 7.45 p.m.

THURSDAY, MARCH 10.

Society of Telegraph-Engineers and Electricians.—Mr. Desmond G. Fitz Oerald on "Reversible Lead Batteries and their Use for Electric Lighting." 8 p.m.

FRIDAY, MARCH 12.

Edinburgh Architectural Association.—Visit to Liberton Tower, Inch House, &c.

LONDON.—For alterations at No. 76, Guilford-street, Russell-square. Mr. J. E. Sears, architect  
 T. E. Mitchell ..... £151 0 0  
 Marden ..... 157 0 0

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 S. J. Jerrard, Lewisham ..... £330 0 0  
 Hart Bros., Chislehurst ..... 300 0 0  
 T. Knight, Sidcup (accepted) ..... 245 0 0

SEVENOAKS (Kent).—For the erection of a Baptist chapel, Sevenoaks, Kent. Mr. J. Wills, architect, Derby:—  
 Wills (accepted) ..... £2,820 0 0

SOUTH NORMANTON.—For the erection of a Wesleyan chapel, South Normanton. Mr. J. Wills, architect, Derby:—  
 Page (accepted) ..... £365 0 0

STONEY STRATFORD (Bucks).—For the erection of new banking premises, for the Bucks and Oxon Union Bank, Limited, Mr. Charles P. Ayres, architect, Watford:—  
 W. Saar, Hemel Hempstead ..... £2,600 0 0  
 J. W. White, Stoney Stratford ..... 2,439 0 0  
 Marshall & Boyse, Buckingham ..... 2,367 0 0  
 T. & S. Orchard, Basingstoke ..... 2,244 0 0

[Architect's estimate, £3,571.]  
 \*Accepted.

STRATFORD.—For additional stabling, Angel-lane, Stratford, for Messrs. Carter, Patterson, & Co., under the superintendence of Mr. W. Eve, 10, Union-court:—  
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 J. Oadfrey & Son ..... 690 0 0  
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 Hickling (accepted) ..... £930 0 0

WALLINGTON (Surrey).—For the erection of the Presbyterian Church of England and Lecture-hall, Wallington, Surrey. Mr. J. Wills, architect, Derby:—  
 Stewart (accepted) ..... £3,955 0 0

WINCHESTER.—For alterations and repairs at Nos. 30 and 31, High-street, Winchester, for Messrs. Clarke & Sons, of Abingdon, Berks. Mr. J. G. T. West, architect, Abingdon:—  
 W. Coles, Winchester ..... £180 0 0  
 Carter & Sons (accepted) ..... 395 0 0

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A. B. (have not appeared).—C. F. H.—P. P. (Paris).—C. H. H. (unavailable).—J. O.—J. L. (last week).—H. A.—E. F. P. (your question is too vague).—K. B. (should send full list, and in proper form).—I. P. B. (desired).—A. H. S. (the word has already been employed: viz "Northumberland avenue" and "substationary avenue").—H. P. (not important enough).—C. D. M.—B. & P. (no space now: should have been sent sooner).—E. & N. (one item omitted as not complying with our conditions).—T. J. M. & Co.—J. T. P. (next week).—F. & H. F. H. (too late).—"Quarry Worked Stone" (next week).

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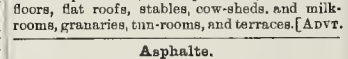
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# The Builder.

VOL. LII. No. 231.

SATURDAY, MARCH 12, 1887.

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### The New Railway Bill.



**L**ORD STANLEY of Preston introduced the Government Railway Bill into the House of Lords last week without preface or comment. It consists of four parts and forty-six

clauses, together with a short schedule, and, in the arrangement of the parts, as well as in many of the provisions, is almost identical with Mr. Mundella's measure of last year. It was inevitable that the permanent appointment of the Railway Commission should occupy a prominent place; and the first part of the Bill, as before, deals with this subject. Last year's proposal was that the re-constituted Commission should consist of three members,—a Judge of the High Court as Chief Commissioner, with two "practical men of business" as his colleagues. Although the eminent services of the present Commissioners warranted a belief that they would not be passed over in the selection, the terms of the Bill left it open for the Government to appoint men who were not so thoroughly acquainted with this particular subject. Lord Stanley's scheme provides that there shall be three appointed, and three *ex officio* Commissioners, and with regard to one of the former, experience in railway business is made a necessary qualification. The Chief Commissioner is to be "of experience in the law," so that, as regards the three appointed Commissioners, the constitution of the Court is similar to that of the existing Commission, except that the "legal" member was not previously named as the chief. Although the *ex officio* members are three in number, there is really but one added to the strength of the Court, as these members are to be Judges of Superior Courts for England, Scotland, and Ireland respectively, so that one of them may attend important cases in whichever part of the kingdom it may be necessary that they should be heard. The fact that the permanent Commissioners are to devote their whole time to their duties under the Act is a distinct improvement upon Mr. Mundella's arrangement, under which the President of the Court would be at times occupied with other and varied business. The jurisdiction given to the Court is much the same as that conferred upon the Railway Commission by the Act of 1873. They may hear and determine any disputes as to tolls and rates, and order any reasonable traffic facilities,—notwithstanding any agreements existing between companies,—and award damages in cases where any aggrieved party

may, in their opinion, justly claim them. Rating appeals to which railway and canal companies are parties may be transferred to them, and this part of the Bill should be satisfactory to the companies themselves, as they sometimes seem to think that they receive scant justice at Quarter Sessions. A necessary clause,—but one which will probably meet with opposition,—is that giving a *locus standi* to associations, &c., for the purpose of making complaints without there being any proof that such authority is aggrieved in the matter. This is essential, as the forces are so unequal in a contest in which an isolated individual or firm enters the lists against a railway company. The law of "might is right" has too often prevailed, and under a system allowing a corporate body to prosecute such cases, they would have a much better chance of being carried to a fair and legitimate conclusion. A safeguard against vexatious actions is provided by a clause making it necessary for such an association to obtain a certificate to the effect that it is, in the opinion of the Board of Trade, a proper body to make such complaint.

The main bone of contention will be the clause dealing with rates and charges, which is again No. 24. In comparing this part of the Bill with that of last year, and finding clauses deemed unsatisfactory by both parties re-inserted almost word for word, one is irresistibly reminded of a recent utterance of Sir Edward Watkin's. Speaking of the trade of this country, and that of the United States, he said:—"The American Ministers are men of business, but our governing body are not. The great interests of the country are best served by being in the hands of men who have risen from business to statesmanship. *Our people have no initiative.*" The present Government are flattering Mr. Mundella in adopting his plan for settling the difficulty,—though it is quite probable that he in turn had adopted it from a predecessor in office,—but as this plan has already been discussed and found but little favour, it is somewhat disappointing to find that we have still no alternative proposition. At the same time, it must be allowed that the difficulties in the way of satisfying the demands of those interested are very great, and the Government doubtless trust to receiving suggestions during the passage of the measure through the House, which they may adopt in amendments, and which may tend to render it more acceptable. The directions to the railway companies are rather more definite and precise, and are that within twelve months from the commencement of the Act (January 1st, 1888) they shall submit to the Board of Trade revised classifications of *merchandise traffic*, and revised schedules of charges,—the words in italics now appearing

for the first time. They are instructed to set forth the nature and amount of all terminal charges, showing the circumstances under which such charges are proposed to be made. The Board of Trade are to receive and consider objections, and to endeavour to bring about an agreement on points of difference, and submit the classification and schedules to Parliament as finally revised for the purpose of being made law. If the parties fail thus to agree, the Board of Trade are to decide upon a classification which appears to themselves to be just and reasonable. The Board is also constituted arbiter in case of subsequent dispute, with power to relegate such matters to "any other competent person" who will act as negotiator. It seems strange that this responsibility should be put upon the Board of Trade with a permanent Railway Commission in existence, and the authority given to the former body to depute some person outside the Board to communicate between the disputants indicates that it is foreseen that they themselves may not be sufficiently acquainted with the details of railway work to deal satisfactorily with the cases which may arise. It is worthy of remark that a Bill recently brought into the House of Commons (the St. Austell Valleys Railway and Dock Bill) provides that if any question shall arise as to the reasonableness of the rates charged for certain services, the same shall be from time to time referred to and determined by the Board of Trade, so that the promoters of that measure, at all events, are not disinclined to submit to the arbitration of the Board. It is probably intended to relieve the Commission of cases which can be disposed of without their intervention, those in which no amicable settlement can be arrived at being eventually referred to them. It is quite possible that the system may be found advantageous from a public point of view, as the results of such proceedings are to be reported to Parliament. Very definite directions are given for the publication of rates and charges of every description, and a great point will be gained if the public are enabled to tell readily what the railway companies are really empowered to charge, this being next to impossible at present. The conditions under which "group rates" are legalised are clearer, but the clause, as before, clashes with those relating to preference rates. A practical way of reconciling these matters would be very welcome, but in this also we look in vain for "initiative" in the present measure.

Preference rates are again strictly prohibited, but with a mischievous reservation, which destroys the value of the clause from the home-producer's point of view, and which should

reconcile the railway companies to this part of the Bill, as it makes their position stronger than before. This saving-clause (adopted without alteration from last year's Bill) runs thus:—"In deciding whether a lower charge or difference of treatment does or does not amount to an undue preference, the Commissioners may, so far as they think reasonable, in addition to any other considerations affecting the case, take into consideration whether such lower charge or difference of treatment is necessary for the purpose of securing the traffic in respect of which it is made." The letter of "B." in the *Times* of February 9th, commenting upon the statement that the Great Eastern Railway charged twice as much for bringing fish from Harwich as they do from Rotterdam, says,—“They would charge more for the Rotterdam traffic if they could, but if they did they would not get the traffic. The fish would come direct by sea, or not at all. They do not make the Rotterdam rate low to give the Dutchman advantage, but simply because they cannot help it. They do not exact double profits from the home trade to make up a loss on the foreign. They do not act unfairly or unjustly to the people of Harwich because they make some profit on the foreign trade. The railway company would not construct its railway to carry Rotterdam fish at the price at which it carries it, but the railway being there it ekes out its miserable profit by carrying at the rate it does.” It would appear that if, as is stated, some profit is made on the foreign trade, this result can only be arrived at by ignoring a great part of the working expenses in calculating this profit, simply because these expenses are already incurred in connexion with home traffic. But if, as would naturally be supposed, the amount of profit is arrived at by comparing the total of receipts from both sources with the total expense incurred, the profit on the inland traffic must be enormous. The railway managers assert that they carry no traffic at a loss, even the lowest rates yielding a margin of profit over working expenses, and if this be true in the case in question, our conclusion must be true also; or, on the other hand, it must be inferred that the preference complained of can only be given at the expense of the English fisherman. It will be hard to convince the latter that he is not thereby prejudiced, even though the consignee, and not he, has to pay for the carriage; for were he not thus handicapped he would get a correspondingly higher price for his fish (to which the fact of his being nearer the consumer entitles him) and thus be encouraged to send larger consignments, instead of, as is frequently the case, being compelled to labour for nothing. Lower prices rule than formerly, too, for agricultural produce, owing to the exceptional facilities given to the imported traffic and when the inland rates are not lowered, the percentage of carriage to value is so far increased that it ceases to be profitable to grow many crops, except for local demand. The way in which both the trains and delivery vans of competing companies race each other for the import traffic indicates that it is considered remunerative, and although (according to the argument of "B.") the railways were not constructed for the purpose of carrying this traffic, it is driving out of the market many of those for whose benefit they were constructed. Of course, we are not going so far as to say that the railways were intended for the benefit of this or that class only, and that the consumer is not to be considered, for it is precisely the extent of the consideration which these interests are respectively entitled to that lies at the root of the question.

The following definition of "terminals" is given in clause 43, putting a very different and much wider construction upon the term than that implied by the phrase "handling terminals." "The term 'terminal charges' includes charges in respect of stations, sidings, wharfs, depots, warehouses, cranes, and other similar matters, and of any services rendered thereat." Several railway Bills now before Parliament contain clauses empowering the companies to charge for a long list of special services, the enumeration concluding with the words "and for any other accommodation or

service of whatever kind." If similarly unlimited powers were possessed by all lines with regard to both "handling" and "station" terminals, it is doubtful whether they would not take an undue advantage, for, to say the least, they entertain ideas as to reasonableness differing very widely from those of the public.

There are six clauses relating to canals, and we are quite prepared to give the Government credit for a bold and vigorous policy in this respect. Detailed returns are required from all canal companies, showing the accommodation they are capable of affording, and the state of efficiency they are in, also reports of any intended stoppage. Provision is also made for the inspection of canals by officers of the Board of Trade, and the Department are to be furnished with copies of all by-laws, lists of tolls, &c., for their approval. Clause 36 prohibits any railway company or officer from applying any of the company's funds to the acquisition of canal property or interest, under very heavy penalties, and if this part of the Bill becomes law it will prevent any further development of what Mr. Mundella has described as the "throttling" of canals which compete with railways. It is, of course, too late to remedy the evils already existing, and it is useless to complain that the Bill is not retrospective, seeing that the canal property which is already in the hands of railway companies was acquired when they were unfettered by any such prohibition, and were free to take any course which they might consider to be conducive to the prosperity of their own undertakings.

The companies are naturally preparing to resist such clauses in the measure as point to a curtailing of their privileges, though it is to be hoped that they have modified their opinions as to the justice they may expect from Parliament, and will approach the subject in a more temperate attitude than they did last year. At one of the "anti-confiscation" meetings, a speaker said that there were now a larger number of Members of Parliament who had no great stake in the country than at any previous time, and that the House was hardly capable of taking a proper view of the question. Although loudly applauded when uttered, we do not think this opinion was seriously entertained by the majority of railway shareholders after the excitement occasioned by exaggerated statements had worn off, and we trust that a calm discussion of the new Bill may result in a beneficial railway reform.

#### KUGLER'S HANDBOOK OF PAINTING.



ALTHOUGH the Handbook of the Italian Schools of Painting, "based on the handbook of Kugler," has been edited and re-edited, and received many additions from various hands, its re-appearance from time to time in these more or less modified forms is a tacit testimony to the soundness of the original work. It is only in the case of a book that has been well done to begin with that it is worth while to make those periodical revisions which are required to bring it up to the date of the most recent criticism and investigation. And in its main characteristics Kugler is a model handbook of the kind. It is just the right size for a handbook, not unwieldy, giving the historical outlines of its great subject in a concentrated and business-like manner, not wasting space with irrelevant analysis or enthusiasm, but weaving into its historical record just enough of criticism on the leading schools and their leading names to vary the baldness of historical narrative, and to render the treatise to some extent suggestive to the imagination and fancy of the reader as well as instructive to his faculty of acquiring and retaining facts and dates. The small but careful outline illustrations, increased to nearly the number of 250 in the present edition, form adequate memoranda of the works referred to, and are sufficiently explanatory of the descriptions and remarks in the text, without laying any claim to an actual transcription of the artistic quality of the paintings, which would be impossible on the scale, and within the restrictions as to cost, of a popular handbook

The English form of the work, itself a modification of the original, has passed through several hands, so that it is rather difficult now to assign to every one his or her part in the fifth and latest edition. The German original, "Handbuch der Geschichte der Malerei von Constantin dem Grossen his auf unsere Zeit," was published at Berlin in 1837. In 1851 a translation of the portion relating to the Italian schools was published in England under the editorship of Sir Charles Eastlake. Since then the labours of Messrs. Crowe and Cavalcaselle added so far to the available knowledge of the lives and works of Italian painters as to render a new edition desirable, and this was undertaken by Lady Eastlake in 1874. The present edition (the fifth) is revised and partly rewritten by Sir Henry Layard.\*

The present editor's main reason for the appearance of the present edition is the publication, since Lady Eastlake's edition, of Signor Morelli's work "Italian Masters in German Galleries," first published under the assumed Russian name of "Lermolieff." The appearance of a work which has brought so much new knowledge to bear on the subject, and unsettled so many old convictions, would alone, in the eyes of the present editor, have rendered a new edition of the handbook necessary: the proper object of a "Handbook" being, of course, not to investigate or propagate new views, but to place in a compact and condensed form the accepted views of the best authorities. In addition to this, many pictures have been removed from the sites in which they were originally referred to in the Handbook, to local galleries and museums, which changes of place require record; and, last, but not least, our own National Gallery has of late years received such numerous and important additions as to call for revised notice and description. Sir Henry Layard, who is a Trustee of the National Gallery, adds a note in regard to this regretting that the want of space in the National Gallery "and the defective construction of the building itself, considering the purpose for which it was intended," render a complete systematic and chronological arrangement of the pictures, according to schools, impossible. We quite agree with him in thinking that the want of such arrangement of the pictures on a definite system is a great misfortune; but we should like to understand exactly what he refers to in regard to the defective construction of the building. The National Gallery has grown up in a rather piecemeal manner; but when the last important additions were made, did the authorities suggest to the architect any systematic scheme of arrangement for which the building should be planned and prepared? And if not, whose was the fault? Or does Sir Henry mean to express his regret at the cheese-paring policy whereby the projected rebuilding of our National Gallery, on a scale and in a manner suitable for its important functions, was put a stop to? If so, we are entirely with him.

The critical judgments expressed in the book are mostly still those of Kugler, coloured more or less by those of his former editor, Sir Charles Eastlake, and accompanied by occasional expressions of dissent or modification through the medium of the footnotes of the present editor, though these marginal suggestions of difference are but few. But an important modification has been made in the classification of the subject. The old division into "Periods of Development" has been discarded, and the chapters deal successively with the characteristics of the most distinct styles and schools of painting, as divided or grouped by chronology or topography or both; the Byzantine style, the Romanesque style, the Florentine school, the Umbrian school, &c. "Hard- and- fast lines," the editor truly remarks in his preface, "fixing periods of development, are not to be drawn in the history of art. They can at best be but arbitrary and scientific." The editor suggests the adoption of Morelli's classification; the "heroic" period, in which the religious

\* Handbook of Painting. The Italian Schools. Based on the Handbook of Kugler. Originally edited by Sir Charles Eastlake, P.R.A. Fifth edition, thoroughly revised and in part re-written by Austen Henry Layard, G.C.B., D.C.L., &c., with nearly 250 illustrations. 2 vols. London: John Murray. 1887.

sentiment is dominant, and paintings of sacred subjects are made for the encouragement of piety; the second period, in which the artist gave himself to the study of anatomy and perspective and to the closer imitation of nature, and which Morelli terms the period of "character"; and lastly the period of "Renaissance," in which the technical process of painting reached their highest perfection. The first of these periods, that of the especially religious art, where the interest consists not so much in the execution of the painting as in the sanctity and significance of the figures or the event which it represents, is, no doubt, traceable in the early period of all national art in which the representation of the human figure is concerned; and the distinction between the painting made for a purely religious purpose, and the painting made for the sake of artistic beauty and intellectual enjoyment, is one of the broadest and most marked distinctions which the history of art can show. But for the other two of Morelli's divisions, as summed up here, they appear to us pretty nearly as arbitrary, and as capable of misapplication, as any others that have been made. A classification of some kind, no doubt, assists the study of the history of an art, or the writing of the history, at all events; but with the exception of the broad distinction, just alluded to, between subjective and objective art, all these classifications depend on the point of view from which we choose to consider the whole subject, and what is true for one student or for one view of the subject is incomplete or misleading for another.

The minor divisions into local schools during a certain period of Italian painting are, of course, by no means arbitrary, and their well-marked distinctions afford a good suggestion for grouping the subject into chapters in dealing with this portion of the history. The strongly-marked local characteristics in the early period of Italian Renaissance art are of curious interest, and, occurring in regions so little removed geographically from each other, tell an unmistakable tale of the difficulties of communication, and the conservative jealousies of the small States, in the Italy of that period. As Sir Henry Layard remarks, "The connexion between race and art would form an interesting subject for study and investigation. The zones in which the fine arts have flourished, and those in which the populations have no natural disposition for them, might almost be marked out geographically on a map of Italy."

Concerning the larger business of mapping out chronologically the epochs of Italian painting and their achievements and characteristics, which is the main object of the Handbook before us, space would not serve here to speak at length, nor is it necessary, beyond remarking that whatever changes and modifications have been made in the literary form of the present edition, they are such as tend towards increasing its efficiency and usefulness as a *vide mecum* and book of reference. It is impossible, of course, not to reflect, in turning over even such an outline of the subject as can be given in a handbook of this size, on the extraordinary and varied interest of this long history of the use of the faculty of pictorial representation in one region only of the modern world. The study suggested is not merely that of the various technical means of pictorial representation, and their use and development, but of the intellectual attitude of the Italian mind, at various stages of its career, towards the scenery presented by the outer world; the spectacle of human life and of the landscape in which it is framed. Nothing in the critical portion of the book is better than the characterisation of the once widespread Byzantine school, that gilded mummy which kept up for so many generations the solemn semblance of life, and in which, as Sir Henry Layard puts it, the worn-out forms of the old world were found embalmed for the benefit of posterity. The gradual awakening of this dead art, the stirring of these dry bones under the first breathings of the new life of the early Renaissance, forms a chapter in the intellectual history of mankind, which has an interest quite beyond what are usually supposed to be the limits of artistic history.

The distance from the Byzantine art to that of Raffaele is like a voyage to the intellectual antipodes of the subject. In the former, the art is the obedient and formal handmaid of a church whose own life was almost smothered in the hands of ceremonial; in the latter, art is freely walking her own path, breathing her own atmosphere, taking her forms and inspiration from human life, and only affecting a kind of traditional respect for a church which, from being the mistress and director of art, is now suing to the great painters of the day to decorate her churches according to their own tastes and intellectual aspirations, and ready to take thankfully what they are pleased to give. Something of reverence and earnestness may have been lost, no doubt, in these times of Pagan joyousness and energy of artistic life; but it was *life*, at all events, and the Byzantine art, however rich in its trappings, represented but the formal lying-in-state of the dead body of the art of the ancient world.

Among the critical portions of the second volume, the extremely just and well-balanced view taken of Titian's genius may be commended to notice; doing full justice to its intellectual greatness, while not blind to its spiritual coldness and want of sympathy with the pathetic side of human life, of which, indeed, the princely and pleasure-loving Venetian master must have seen and known but little. The estimate of Tintoretto as originally given is retained in the text, but protested against in a note, as doing inadequate justice to a painter whose great qualities have been better recognised since the earlier editions of Kugler were published. The actual estimate of Pordenone attaches more importance to his work than the popular mind has yet realised, but we believe with justice. One may note, in the grand design of the altar-piece from S. Giovanni Elemosinario at Venice, given as an illustration of his manner, a remarkable similarity to the style and feeling of some of Blake's figures in the attitude and lines of the figure of St. Sebastian on the left of the picture.

In the preface to the present edition special attention is drawn to one deplorable subject,—the extent to which many of the works of the great masters of Italian painting have been "restored." It is painful to read that "the celebrated altarpiece of Titian in the Church of the Friari, with the portraits of the Pesaro family, has, it is believed, been restored seven times" (1). The Italian authorities have systematically employed persons in their galleries for these abandoned purposes, and are now beginning to find out their mistake after the mischief has been done, and when that has been taken away which no Government and no funds can restore.

## NOTES.

**I**T is not without uneasy feelings that we read in the daily papers that "several applications have been received from Schools of Science and Art in the colonies and dependencies of the United Kingdom to ally themselves with the Department of Science and Art, and to have the benefit of its examinations," and that arrangements are in progress for having a still further centralisation of art-examinations, in regard to work from the colonies as well as from the provinces. No doubt the aims and aspirations of the colonists are most praiseworthy, but if they knew the opinion of many persons in this country as to the deadening effect of this artistic bureaucracy, they would perhaps think twice about their move. What we should desire would be to see the colonies striking out new lines of their own in art, under new social and climatic influences. As it is, we seem threatened with having the whole of our dependencies turned into one big machine for grinding art on the approved South Kensington pattern.

**T**HE Metropolitan Board of Works have resolved to apply to Parliament to allow of an appeal to the Appeal Committee of the Board (which is a Committee of the whole Board)

in the case of dispute with regard to the decision of general lines of buildings by the Superintending Architect. It was not stated in what form the sanction of Parliament will be sought, but, judging from the past practice of the Board, they will probably seek to effect the alteration they desire to make by means of a clause in an Omnibus Bill, as, since the defeat of the Metropolitan Management and Building Acts Amendment Bill of 1874, the Board have not attempted any comprehensive alteration of the law, and have contented themselves with homocopathic measures of reform introduced in such a manner as to escape observation. In whatever form it may be introduced, it is very doubtful whether Parliament will acquiesce in such an amendment of the law, looking to the fact that the present machinery has worked satisfactorily for the last twenty-five years. The Select Committee to whom the Board's abortive Bill of 1874 was referred reported emphatically that it was not desirable to alter the language of the existing Acts in any case in which the necessity of an alteration has not been demonstrated by experience. The Chairman of the Board was a member of this Committee, and will find a difficulty in recommending Parliament to adopt a change, not merely of language but of principle, dealing with a matter of great public interest in face of this declaration and his own acquiescence in the report of the Committee.

**I**N the discussion (reported in another column) that took place at the Metropolitan Board of Works on the 5th inst., with reference to this question, a suggestion that the appeal should be to the Royal Institute of British Architects was received with derision. The majority of the Board appeared to be of opinion that the duty of deciding general lines of buildings was the easiest thing in the world, in which view they differed from Lord Selborne, whose opinion on the subject we quoted last week, and this, from the constitution of the assemblage, was only what one might expect. One member went so far as to say that he considered the Board to be quite competent to decide general lines of buildings for themselves, it was only a matter of common sense. It was stated in the course of the debate that out of 337 decisions given between the years 1863 and 1886, there were only twenty-five cases in which the decision of the Superintending Architect had been disputed, an average of one case a year. We notice that several of the daily papers which are not usually particularly enamoured of the Board and its doings commend its action in this matter, and give their reasons for such commendation. The very statement of these reasons is sufficient to invalidate the judgment arrived at by the writers. We have often noticed that the glibness with which the daily journalist comments upon matters appertaining to architecture is in an inverse ratio to his acquaintance with the subject.

**A**CCORDING to the *Times* of Saturday last, "The Duke of Westminster, the Archbishop of Westminster, Viscount Falkland, Viscount Lewisham, M.P., General Lord John Taylor, Lieutenant General Sir Gerald Graham, V.C., K.C.B., Sir Frederic Leighton, P.R.A., Sir James D. Linton, P.R.I., and the Mayor of Croydon are among those who have already joined the National Committee for the maintenance of the Crystal Palace as a national institution." That is all very well, but do these good people understand that in that case they must begin by making the building such as would render it a permanent national possession? And how are they going to accomplish that, unless by rebuilding it in a more monumental manner?

**F**ROM Mr. Plunket's reply to a question asked on Monday last, it appears that the exclusion of fog from the House of Commons by special appliances is contemplated. The First Commissioner of Works on that occasion stated that during a November fog many years ago Dr. Percy made an experiment of filtering through cotton wool the air which was supplied

to the House of Commons from the Commons court, and that it was so far successful as to impress him with the hope that by this kind of filtration the interior of the House of Commons might be rendered fog-proof at but a trifling expense; but that before applying this process of fog filtration to the interior of the House of Commons it would be necessary to make preliminary experiments, and Mr. Plunket had asked him to make such experiments on the earliest convenient opportunity. As the Smoke Abatement Society has not yet succeeded in abolishing the London fog, according to the hopes which it somewhat rashly held out to a suffering public, there seems to be here an opening for a new industry in London in the manufacture of fog-filters.

IT appears that on Friday, last week, Mr. Conybeare, of all persons in the world (or in the House), asked the First Lord of the Treasury why there were so few architects invited to compete for the Imperial Institute, and why "no competitors had been selected from Liverpool, Glasgow, Manchester, Birmingham, Leeds, and other great representative towns." We are also of opinion that there should have been at least an open sketch competition; but we fear we can hardly regard Mr. Conybeare's question as evincing any interest in getting the best architecture possible.

— "Timeo Danaos et dona ferentes"

is the feeling it awakens on our part; it is probably only a move on behalf of some provincial constituent, of the pure Radical faith.

THE demolition of some old tenements which formed the southern side of Bleeding Heart-yard has quite altered the aspect of a quarter which Charles Dickens rescued for a while from obscurity during the publication of his "Little Dorrit." The buildings in question stood against the end of what was once Union-court, and the blank wall that blocks off Ely-place, Holborn. Union-court, site of Scroope's Inn, formerly opened into Charles-street,—ever memorable as the home of Joseph Strutt, author of "Sports and Pastimes"—and was rebuilt about fifteen years ago as Viaduct-buildings. The steps leading down hence into Great Saffron-hill, locally known as "The Hill," are indicative of the court's elevation above the course of the River Fleet. It is to be observed that the sign of the tavern in Charles-street, by the yard corner, is with easy impartiality, spelt both as Bleeding Heart and Bleeding Hart. The origin of the name is doubtful. Some may derive it from the sweetly-smelling dark red wall-flower, the "bloody warrior" of Norfolk and Dorset peasantry, and which in our Midland and Western counties is frequently known as the "bleeding heart." In his Poems of Rural Life, in the Dorsetshire dialect, the late Rev. W. Barnes gives a gloss on this name, whilst among the flowers of a cottage garden described in one of the poems he enumerates "jelli flowers" and "bloody wayors stained w' red." Others connect it with the supposed tragical end of the Lady Elizabeth, daughter of Thomas (Cecil), first Earl of Exeter, wife to Sir Edward Coke, Attorney-General, and widow of the nephew and heir of the great Sir Christopher Hatton. That imperious and wayward dame, who never allowed her second husband to enter her house here, is said to have contracted her soul to the devil. The compact determined on the night of a grand festival (January 2nd, 1646) at Hatton House. The evil one accordingly joined the festivities in cavalier guise, and after treading a stately measure with his hostess, allured her into the garden, where he tore her to pieces. On this spot was found her heart, still beating; in the same garden, perhaps, wherein Richard, Duke of Gloucester, when, as he says, last in Holborn, had seen the good strawberries of my Lord of Ely. Yet the name of Bleeding Heart for this place would not appear to have been adopted before the middle of the eighteenth century. About thirty years since at Aton, Warwickshire, the sign of the White Hart Inn was depicted as a white heart, or ace of hearts.

THE Metropolitan Board of Works have begun operations in pursuance of their Woolwich Ferry scheme. For this, the first free ferry to be established by the Board, have been acquired the sites of some premises, many of them perhaps 300 or more years old, in the High Nile, and Surgeon streets, Woolwich. The Board have accepted the designs and tender of Sir W. Armstrong, Mitchell, & Co., of Elswick, for two steam ferry boats to carry foot passengers, cattle, and vehicles, each vessel to cost 10,050*l*. The boats will travel to a point on the opposite shore close by the North Woolwich Railway Station and the Pavilion Gardens, to which we referred in our last week's number.

WE are not aware what has been the result of the application of Messrs. Bucknall & Jennings, which appeared in our issue of the 26th ult., for funds to carry up an appeal from the decision of the County Court Judge at Swansea, who had allowed them less than 2½ per cent. as payment for taking out quantities. It may be well, however, to point out that a decision of a County Court Judge upon a question of amount is no precedent at all. One judge may think the amount of percentage is reasonable, another may fix it at some other figure. Again, if a Divisional Court of the Queen's Bench Division were to allow 2 per cent. or 1 per cent., that again would not form any precedent unless it was the logical result of a definite principle laid down by the Court. It has more than once been pointed out by us that the 5 per cent. remuneration usually paid to architects can only be obtained in an action at law if the judge or the jury considers it a reasonable sum. In the same way a charge by quantity surveyors, though it may be usual, is not one which can be recovered at law unless the tribunal considers it reasonable.

BETTER late than never! At last it has seemed good to the authorities of the Louvre that the two archaic "Apollo" statues from Actium should be published. They appear in the *Gazette Archéologique*, année 12, pl. 29. They were discovered by M. Champoiscau, then French Consul at Janina, in 1868. They are perfectly well known to every travelled archaeologist, they are alluded to in every serious work on Greek sculpture, their importance in the history of archaic Greek art no one questions, and now, after nearly twenty years, they are accessible to the student in two good heliograph plates. They will now fall into their place in the familiar procession of the Apollos of Thera, of Orchomenos, of Perdicovrysi, of Tenea, and the Strangford and Choiseul Gouffier Apollos. The plate is accompanied by an interesting article by M. Collignon. He declines to settle the vexed question whether these familiar type are in reality Apollos or statues of athletes, or, again, funeral monuments. The two Actium figures, found, as they were, close to the precinct of Apollo, may reasonably be supposed to be statues of the god. On the other hand, they may be votive statues of athletes, victors in the Actium games (*τὰ Ἀκτιακά*). M. Collignon gives a list of the "Apollo" statues, and classifies them according to provenance. From his classification it appears that the type is common to northern and central Greece, the islands, and Sicily. So far no instance occurs in Asia Minor. The origin of the type has been matter for much discussion. It has certain analogies with Egyptian sculpture, but is marked by a naturalism and vigorous anatomy that differentiate it. M. Collignon suggests that the "Apollo" stone statues are copies, or, rather, developments, of more rigid wooden originals, and that these originals were themselves conceived under Egyptian influence.

THE same periodical (*Gazette Archéologique*, pl. 37, 38) publishes two interesting terracottas from the collection of MM. Rollin et Fenardant. The first, which is of very delicate workmanship, represents Pan seated by the side of a Nymph in front of a term of Priapos. The Nymph, in play or in self-defence, seizes

Pan by the right ear. Probably to the nymphs, as well as to the "reverend graces," Pan was, as Pindar says, a "darling joy" (*μίδμηνα τροπάρω*). The second terra-cotta has a more serious subject, the rape of Cassandra by Ajax. Cassandra is not, as she usually appears on vase paintings, clinging to a temple image, but simply seated on an altar, Ajax catches her by the hair, but her face betrays but little of terror, his still less of ferocity. There is a manifest intent to euphemise the scene. The figure of Cassandra is of quite disproportionately small size, but the same may be said of all the black-figured vase representations. This seems to have been a traditional means of emphasising the helplessness of the victim.

A CORRESPONDENT has favoured us with a circular emanating from a remote little place in Devonshire, where a committee has been formed for erecting a cottage hospital, the cost of which is "limited to 1,200*l*., including all sanitary, heating, cooking, and lighting apparatus and fittings." Other requirements of the Committee are that "the plans, specifications, and bills of quantities," are to be sent in by a certain date named. (The italics are ours.) The Committee further announce that "they will pay for no plan," although they add that "the architect whose design is accepted will be paid the usual commission of five per cent. on the outlay, to include all his expenses." Nothing is said about the appointment of a professional assessor. From the fact that the copy of the circular which has reached us was sent to an architect in Liverpool, we suppose it has been pretty widely distributed, but we can only express the hope that the response to it will be as limited as the conditions deserve.

THE opponents of the erection of the proposed Dust Destructor at Notting Hill, by the Kensington Vestry, whose empowering Bill has passed a Committee of the House of Commons, condemn the apparatus in extravagant language, but the experience of most of the large provincial towns in the Midlands, where efficiently-working destructors are in operation, often in thickly-populated districts, does not seem to warrant this unqualified condemnation. It should be borne in mind that the complete sewerage system of London renders unnecessary the objectionable general or mixed midden still to be seen in many of the large provincial towns, and that it is only, for the most part, the dry ashes and dust of the households and the streets which need be consumed in the destructor. The excreta goes away in the sewers, and the offal, fleshy, and other offensive animal refuse can be, as is already successfully done in several instances, conveyed to the country as manure, mixed with that quantity of dust and trade refuse which would make it conveniently carriageable. Owing to its low value as a manure, the metropolitan districts find increasing difficulty in disposing, except at a serious cost, of their dust. Even Chelsea, with its barging and railway facilities, finds that the cost of its dust disposal has nearly trebled within a very short time, so that, along with the other districts, it is forced to consider the question of the application of other means of getting rid of ashes and dry refuse. Almost all sanitary engineers are of opinion that destructors of an efficient and tried kind can be worked in a thickly-populated district without creating a tangible nuisance to the neighbourhood.

THE *Journal of Education*, commenting on the delay in opening Holloway College, states that it is reported that the delay has been occasioned not only by the difficulty of finding a principal, in the choice of whom the Council are much hampered by the founder's statutes, but also by a more substantial impediment, the absence of drains, a detail which the *Journal* observes that architects have a way of overlooking. This is a preposterous charge, which it is not worth while contradicting. That there may be some defects in the drainage of the College is only too probable, these occurring, as our readers know



only too well, in spite of every care on the part of the architect, but that there should be no drains at all is, of course, impossible. The *Journal of Education* may be able to educate itself on this point by referring to the *Builder* for July 3, 1886, p. 37.

ACCORDING to the San Remo correspondent of the *Times* (March 8th), the earthquake in that quarter has proved a practical critic of jerry building, and all the houses that have come fairly down are "of wretched construction,"—"mortar which one can rub into dust, all kinds of stone thrown together any way," &c., &c. If this is the mission of the earthquake we might even welcome it here. It would at least be a purifying influence from the point of view of true architecture, though to throw down all the jerry-built houses in London would, perhaps, be a task beyond the powers even of any average earthquake.

#### CROYDON PALACE.

CROYDON PALACE for more than a century has ceased to be a residence of the Archbishops of Canterbury; but, although it has very much fallen into decay, and has been converted to secular purposes, the largest portion of the structure still remains,—more than enough to enable us to form an idea of its extent and magnificence in days gone by. In a paper on "The Architecture and Heraldry of Croydon Palace," by the Rev. J. Cave Browne, read last year at a meeting of the Surrey Archaeological Society, the author remarks:—"Happily, at the present time Croydon Palace is not a ruin; may it never become one! Its once palatial walls are alive with what the poet calls 'reverent history'; for in their very massiveness and range we may read the tale of the piety, the perils, and hospitality of the so-called 'Dark Ages' in which they arose."

The most perfect part of the group of buildings at Croydon is the Hall, which was built in the fifteenth century by Archbishop Stafford, on the site of an earlier structure, which probably owed its original foundation to Stephen Langton in the earlier part, or to John Peckham towards the close, of the thirteenth century. Both of these prelates in their day were great builders; and they were great benefactors to the old manor-houses appertaining to the see of Canterbury. Bunsard, in his account of the Old Palace at Croydon, says that the manor, as is known from "Domesday Book," belonged to the see of Canterbury ever since the days of Archbishop Lanfranc, who became primate a few years after the Norman Conquest, and died in 1089. When the manor-house was first built cannot be ascertained with certainty; but its origin is generally attributed to Archbishop Langton, in the time of King John. Be that as it may, there are few Archbishops between the thirteenth and eighteenth centuries with whom the manor-house cannot establish its connexion. The palace was probably much enlarged by Courtenay and Arundel in the beginning of the fourteenth, and found its most magnificent restorer in Stafford in the middle of the fifteenth century.

The palace, substantially almost unaltered, stands on the south and east sides of the parish churchyard, and through its moat ran, formerly, a clear stream that abounded in trout. Previously to its partial demolition, the buildings formed a large square court or quadrangle, and comprised, besides its banqueting-hall, guard-chamber, long gallery, and chapel (all of which are still standing), various ranges of apartments for the servants and retainers, &c. The hall and adjoining offices, which remain, are built of stone; the rest of the apartments are mostly cased with red brick.

The great hall, with its fine, open-timbered roof, is still in good preservation; but "the date, on which the lord of the mansion and his guests were wont to sit in days when the proudest noble deemed it no dishonour to eat his meals in the common hall with the humblest of his servants, has disappeared." The arms of Archbishop Stafford (1443-52), which appear conspicuously on the corbels below the windows, prove that it was built by that prelate. The withdrawing-room,—generally, though erroneously, styled the guard-chamber,—with its fine oriel window, owes its construction to Archbishop Arundel (1396-1414), the friend of

Bolingbroke, whom he crowned as Henry IV., and so is about half a century earlier than the present hall. The earliest mention of a chapel in the Palace of Croydon was in 1283, at which date Archbishop Peckham held an ordination within its walls; both Cramer and Ridley are known to have officiated in that chapel. On the knobs of the oak benches at the west end of the choir are carved the arms of Archbishop Laud (1633-1660), who was in the building when intelligence was brought him of the assassination of his friend, the Duke of Buckingham. The arms of Laud's successor, Archbishop Juxon, who attended Charles I. on the scaffold, adorn the east end benches of the chapel; and it was he who probably caused the arms of his predecessors to be sculptured there along with his own.

Although, as stated above, among the heraldic decorations of the great hall, the arms of Archbishop Stafford are the most conspicuous, still it must not be overlooked that there are evidences of an earlier building. Two lancet windows, which formerly pierced the flank gable at the east, but were lost in the fall of the entire eastern wall in 1830; the Decorated porch on the north, with its finely-grained roof; the corresponding garden door and doorway on the south, clearly must have belonged to a building of earlier date, which Stafford probably found in partial decay, and restored with his wonted liberality. Though inferior in size and grandeur to the hall of Lambeth Palace, that of Croydon is a building of goodly proportions, being nearly 60 ft. long by 48 ft. wide, and it is divided into four bays, each containing a three-light window, except the eastern one on the north side, where the space is occupied by a small room over the entrance porch; this was used either as a minstrels' chamber, or as a passage room to a minstrels' gallery running along the eastern wall over a wooden screen. Under the screen were, no doubt, the three usual doors, leading respectively to the buttery, the kitchen, and the cellar; but along with the downfall of the eastern wall, gallery and screen and doorways have all disappeared. To the windows in their present mutilated form it is scarcely possible to assign even an approximate date; for crowbar or chisel and mallet have effectually removed all trace of cusp and curve, and left only the bare battered mullions, while the widening and less pointed arches and mouldings of the windows themselves may indicate any part of that vague period of transition between the Decorated and Perpendicular, which would comprehend the styles both of Courtenay's and Stafford's times. The roof, however, remains unimpaired, with its wide-spaced tie-beams of Spanish chestnut, its arched principals without kingpost or brace, and its timbers open to the very roof, resting upon what constitutes the great beauty of the hall, a series of angel corbels, supporting shields, once rich in heraldic blazonry. Conspicuous among these, at the western end, as stated above, are the arms of its chief restorer, if not rebuilder, Archbishop Stafford, which appear singly,—a chevron, with and without the mitre of difference, and also per pale with those of Canterbury and of his former see of Bath and Wells; while on the neighbouring shields are the arms of his noble kinsmen, Henry, Earl of Stafford, and Humphrey, Duke of Buckingham. On the more eastern corbels are also the arms of Laud, Juxon, and Herring, who were the more recent restorers of the building.

At the upper end of the hall, in the centre of the dais, once stood the stone chair or throne used by the archbishops on State occasions, over which projected a canopy of stonework of massive proportions and remarkable construction. In front, upon a square panel between angel supporters, is a shield bearing the arms of Edward the Confessor impaling the royal arms, England and France, quarterly,—a device which would itself assign it to the reign of Henry VI., who proclaimed the Confessor the patron saint of England. The angel supporting the whole carries a scroll inscribed, "DOMINE SALVUM FAC REGEM," and rests upon a shield bearing the arms of Archbishop Stafford; while in the north angle of the projection is a shield bearing the family chevron without the mitre, and in the south angle the saltire of the see of Bath and Wells. This massive block of stonework fell down in the middle of the last century, and apparently destroyed the seat for which it had served as a canopy. Archbishop Herring (1747-1757),

anxious to preserve it as a strange, yet historic, device, placed it on its present plain haemset of masonry, close against the west wall; and although layers of yellow wash have quite obliterated all the rich colour with which the angels and the shields were bedecked, the faces and figures, as well as the heraldic changes and the general character of the whole group, have been remarkably well preserved. At the southern end of the dais is a shallow recess, with the usual oriel window, not unlike that at Hampton Court Palace. It is only fair to add that while this building was used as a leaching factory, the greatest care was taken by its occupiers, Messrs. Oswald, to protect these exquisite corbels and the other architectural details from injury; and if they should be repainted heraldically again it will be found that they have not been injured, but preserved, by successive coats of whitewash.

The withdrawing-room or guard-chamber, has been utilised as a dwelling-house. This part of the palace, "judging by its heraldry," remarks Mr. Cave-Browne in the paper above mentioned, "was clearly the work of Arundel; yet, possibly," he adds, "if we read aright the arches of the stone" roof, his was the honour of completing the work designed by his predecessor, Courtenay. There can be no doubt that an apartment of imposing dimensions stood here previously, though known by a different name; for it was in *principali camera sui manerii de Croydon* that Peckham received the pall 600 years ago, and above a century before Arundel, or even Courtenay, succeeded to the primacy. It is probable," he adds, "that the need of a guard-chamber was the more fully realised by the soldier-minded Courtenay when he was appointed custodian of no less distinguished a prisoner than the young Duke of Rothesay, afterwards King James I. of Scotland, who had been captured at sea while flying to France to seek an asylum for his unscrupulous uncle, the Regent, Duke of Albany. From the rigours of his first imprisonment in Pevensey Castle he was transferred to the milder guardianship of the chivalrons Primate at Croydon, where he lived for some years." In this apartment, or in the great hall, how many historic scenes have been enacted! More than once the pall, brought fresh from Rome, has been placed here on the shoulders of the successors of St. Augustine; and royal and other illustrious personages have doubtless been entertained with music and dancing, and masques and revelry.

The chief gem of this withdrawing-room is an oriel window, which once looked out into a small quadrangle, but now commands a view over only a few tiled roofs of offices. It was formerly enriched with painted glass, which exhibited the arms of England and of the illustrious house of Courtenay.

On the south, close to this once noble chamber, ran the Long Gallery, in which Queen Elizabeth delighted to dance "galliards" with her courtiers, and in 1687 she is recorded to have bestowed the Great Seal of England on the handsome and courtly Sir Christopher Hatton. The Long Gallery is still intact, so far as concerns its outer walls; though it has been cut up internally into a variety of bedrooms and sitting-rooms. At its eastern extremity is Queen Elizabeth's State bedroom; but its oak paneling, its ornamental ceiling, rich with heraldry, and the rest of its decorations, are entirely gone. The whole of this chamber and of the Long Gallery was cased in solid red bricks by Archbishop Wake, more than a century and a half ago. Its windows looked out upon the Archbishop's private gardens and "pleasance," now turned into a field.

Beyond the "guard chamber" is another large apartment, a century older still, if we may judge from its plain-timbered roof, which is still as sound and good as when it was first erected. It is divided into two parts by a floor; and the upper part, which has an opening looking down into the guard-chamber, is commonly known as "the music gallery." It may, however, be doubted whether this name is correct: possibly it was used as a dormitory for guests.

A slight wooden gallery, apparently of the sixteenth century, connects this part of the buildings with the chapel, which in its internal arrangements is very like the chapels of some of the smaller colleges at Oxford and Cam-

\* The roof is not of stone; the original timber roof remains above the modern wagon-shaped ceiling which conceals it from view, and which has been painted a dull stone colour.

bridge. The Tudor arches of the windows mark the approximate date of the present building, which doubtless superseded a previous structure. The whole of it is cased in brick; but the brickwork is very finely executed, especially at the west end, which looks into the parish churchyard, where the Keys of St. Peter are worked into the wall in black brick very conspicuously. It is said that the chapel, as it now stands, is the work of Archbishop Bourchier, but all papers and documents relating to its foundation and erection have long since been lost.

"The existence of an earlier chapel," writes Mr. E. Walford, in his "Greater London," "is clear. Archbishop Peckham's Register expressly states that his reception of the pall took place in *camerâ principali*, and his confirmation two days afterwards in *capellâ sui manerii de Croydon* in the year 1382: and the learned but persecuted archbishop, Reginald Peacock, was consecrated in the chapel at Croydon in 1414. But it is with Land that the present building is especially associated; for, according to his custom, and more fully even than at Lambeth itself, he has recorded here in heraldic characters the history of his rise. On the carved poppy-heads of the western stalls appear his arms in connexion with those of every preferment that he held, impaling the Principality of St. John's College, Oxford, the Deanery of Gloucester, and the Sees of St. David's, Bath and Wells, London, and Canterbury, while on the eastern block are those of Archbishop Juxon."

This, however, is scarcely correct; for it would seem on a close examination that all the carving of the stalls in the chapel is of one date, and, if so, it must have been the work, not of Land, but of his successor, Juxon.

From Land's time the history of Croydon Palace is well known, and may be told very briefly. At the Great Rebellion it was confiscated and sold to Sir William Brereton, who turned the chapel into a kitchen, to gratify his own taste, for he is described in a pamphlet of his time as having "terribly long teeth and a prodigious stomach." Archbishop Juxon, as already stated, did what he could to restore the chapel to its former pious uses; but since his day it has received but scant care and attention. The communion-table was removed in 1810, and the stonework and the carving of its windows were covered with stucco, plaster, and white-wash, while its stall-work and poppy-head carvings were daubed over with brown paint. Of late years it has been used, at one time as an armoury for the local militia, and at another as a parish day-school,—for girls, fortunately, as it is to be feared that they have suffered still more cruel mutilation at the hands of from the penknives of the same number of boys.

Two meetings of local and metropolitan antiquaries were held in December last within the walls of the palace, at which Mr. E. P. Loftus Brock, F.S.A., explained with great care and minuteness the most interesting features of the building; and an appeal has been made by an active member of our two leading archaeological societies to the patriotism of the people of Croydon not to allow such a building,—one of which they may well be proud,—to be swept away needlessly. The newly enfranchised borough of Croydon has a population of between 90,000 and 100,000 souls, and the four or five thousand pounds which would be necessary to repair it and to convert it into a fit receptacle for a museum and public library, or into a training college for school teachers, ought not to be any difficulty to so wealthy a body of residents. We are told that the addition of a quarter of a farthing in the pound to the local rates would be ample for the purpose.

#### Manchester Architectural Association.

The members of this Association visited the works of Messrs. Morrison, Ingram, & Co., sanitary engineers, brass and iron founders, Corabrook, on the 4th inst. They commenced by going through the warehouse and examining the latest improvements in sanitary appliances, both in earthenware and metal. Mr. Ingram then conducted them through the iron and brass foundries to witness the casting. The process of both enamelling and decorating was next viewed, after which they passed on to the fitting-up and brass finishing and testing rooms. The visit was rendered most interesting and instructive by Mr. Ingram explaining the value and utility of every article and process.

#### EDINBURGH NOTES.

The interest taken by the citizens of Edinburgh in the competitive designs for the municipal buildings is worthy of notice. Large numbers have visited the Waverley Market, where the drawings are placed, and their respective merits are keenly commented upon, not only verbally, but in numerous letters to the press. The designs as a whole are generally admitted to be of exceptional merit, but the variety of opinion as to the most suitable is wide. Although the design to which the first place has been awarded is considered to be in itself a refined and elegant composition, few who appreciate the unique character of the site and the traditions associated with it would like to see it occupied by "Edina Classica." Had the north side of St. Andrew-square been the spot selected (as at one time proposed), there would be little hesitation in accepting the design submitted by the Messrs. Leeming. But the old town,

"Whose ridgy back heaves to the sky,  
Filed deep and massy, close and high,"

is not the place for a structure of this character. The visitor to Edinburgh who is possessed of æsthetic proclivities cannot but be struck by the ragged sullenness of the ridge of the High-street, as seen from the new town, and anything which would tend to destroy or modify this characteristic should be carefully avoided. Indeed, the north or back elevation is that which will attract most notice, and this fact has been kept in view by every competitor; but there is much variety in the treatment of the sky-line, a most important point in the present instance. Other competitors besides "Edina Classica" break the sky-line by means of a dome and subsidiary adjuncts, but a tower forms the culminating feature of most of the designs, and such would be much more suitable for the position, provided always that it did not compete with or overpower the well-known tower of St. Giles's Cathedral. To obviate such objection some of the competitors have placed the tower at the south-east angle, where it would be furthest removed from the Cathedral.

The exhibition of the designs has had the effect of weakening the former opposition to the proposal for new buildings, but not a few are strongly in favour of retaining the present buildings, with alterations and additions. "This building, known as the 'Royal Exchange,' was begun in 1754 by Lord Provost Drummond. It still stands out as architecturally superior to almost everything that has been done since in this city in the same style of architecture. It is designed in that phase of Italian that marks the middle of the Eighteenth Century, and as then used in Great Britain, it became distinctively national in feeling and application as compared with the same style and time in the other countries of Europe. Although simple and somewhat severe, there is a feeling of manly vigour about it; its detail and proportions are scholarly and elegant; it has a purpose-like look and much common sense, and it is most substantially built. It marks an important epoch in the history of Edinburgh, and the reign of one of our most energetic and far-seeing provosts; and I hold that Edinburgh would be distinctly poorer in interest and in architecture if this building were removed. The building is in the form of a quadrangle, but the north-west corner of it was never built." This quotation is taken from a pamphlet issued by the author of the design submitted under the motto, "Crescent in Shield." His scheme, he says, "provides for completing the north-west corner of the quadrangle, and for making an addition on the west side of it, a small one on the east side, removing the entire roofs and giving them a steeper pitch, and rebuilding all the chimney-heads; also for an alteration of the portico on the south side of the quadrangle." He closes his brochure by pressing his scheme strongly on the Corporation, for the following reasons:—

"First,—It will preserve to the City one of the best buildings we have, and the cost of taking down the present building on the site would be greater than the value of the old materials obtained.

Secondly,—A less amount of property will have to be purchased. It will only be necessary to acquire those parts of the quadrangle not belonging to the city, and the strips of old property on the east and west sides.

Thirdly,—The present quadrangle, if completed and re-arranged, will give all the accom-

modation asked for, and leave something for future increase.

Fourthly,—The cost of the scheme submitted will be certainly one-fifth, and probably one-seventh or one-eighth part of the cost of an entirely new building.

Fifthly,—The conduct of the business of the city would not be disarranged by having to remove to other, and in all probability more inadequate, accommodation than in the present building.

Sixthly,—The cost of hiring other buildings for probably eight years would be saved.

Seventhly,—The building operations will not interfere in any way with the city officials now using the present chambers. The east and west sides of the quadrangle could be taken in hand first, and as soon as completed, occupied. The minor alterations on the present council chambers can then be carried out, and the whole could be completed in three years."

This is all very well in its way, but, after all, the design thus submitted did not comply with the terms of the competition, and, strictly speaking, should not have been exhibited along with those which did so. The author seems to plume himself upon having struck out an original idea, but there are others to whom it also occurred, and who are equally entitled to consideration should such a scheme be finally resolved upon. The Town Council have resolved that a *plébiscite* of the electors be taken on the question whether the Municipal Buildings Bill should be withdrawn or prosecuted, and it was remitted to the Lord Provost's Committee to draw up the form of *plébiscite*, and report to a special meeting of Council.

#### MR. AITCHISON'S LECTURES AT THE ROYAL ACADEMY.

WINDOWS.

MR. GEORGE AITCHISON, A.R.A., delivered his second lecture\* this session to the students of the Royal Academy on the 3rd inst., when he took for his subject "Windows." At the outset he showed that our word "window," or "wind-eyes," meaning a hole for the winds to get in, was directly derived from two Latin words, *ventus*, the wind (probably pronounced *ventus*), and *oculus*, the eye (the same as the Greek *okhos*), the old Latin form of *oculus*, which meant a little eye; and not from "windore," as Butler had it,—

"Knowing they were of doubtful gender,  
And that they came in at a window,"  
*Hudibras*, pt. 1, c. 2, line 214.

We had only to look at the houses we passed by daily to see that the bulk of the windows, when they were not mere holes in brickwork, both as to shape and dressings, came down to us, like the name, almost direct from Classic times. A window was much more complex in its relations than a doorway. Doubtless the earliest doorways were mere holes to creep in at, though they eventually became ornamental features of a building; but, big or little, their main uses were as exits and entrances for man. Windows were at first peepholes,—mere chinks or crannies for the safe observation of enemies, whether those enemies were men or wild beasts. They were, in fact, the loopholes of fortresses; and it was not until we arrived at a time when cities were defended by walls that what might be called "civil" windows were to be found. All early windows, too, were unglazed, and the exclusion of the wind, not to speak of cold, was certainly as important as the admission of sufficient light. Besides the consideration of cold, there was the exclusion of rain, hail, and snow in cold countries, and it was even more necessary to guard against these than to admit a due amount of light. And what was true of cold was true of heat. In hot countries, the exclusion of heat from buildings was one of the great problems. As soon as windows came to be glazed, the size of them depended on the size of the rooms and the country they were in, for the amount of light varied with its intensity. A very small opening would admit enough light where the light was intense. We in England were of course most interested in the quantity and quality of light we got here, and we ought to proportion our windows to the strength of the light and our own requirements. There were also other points to be considered. How should our windows be proportioned and disposed so as to get the greatest amount of

\* For summary of first lecture, on "Doorways," see last week's *Builder*, p. 318.

light and effect from them? Too little attention had been directed in modern times to the æsthetic effect that could be produced by variety in the size and position of windows, so as to obtain gradations of light, shade, and shadow, particularly in structures built mainly for effect. By the word "window" the lecturer said he meant an opening for light in a vertical wall. There was a well-known hypothetical rule in England for lighting a room whose length, breadth, and height were in due proportion, namely, that 1 ft. superficial of unobstructed light would sufficiently illuminate 100 cubic feet of space. In the case of skylights under the clear sky of Italy, the Pantheon at Rome might be cited as an instance of the large proportion of cubic space that could be lit by 1 ft. of skylight. Taking the diameter roughly as 145 ft. 6 in., and the height as 147 ft., the dome being a hemisphere of 145 ft. 6 in. diameter, the cubic contents would be 2,041,711 ft. The eye was 27 ft. in diameter, the area of this being 572 ft. 6 in. The cubic contents lit by each foot of aperture were therefore 3,565 cubic feet. In R. Morris's "Lectures on Architecture, and Architectural Proportions in Buildings" (London, 1734), he gave the following rule for lighting,—"If you multiply the height, length, and width of a room together, and extract the square root, this will give the real lighting area required." Suppose the room to be 20 ft. by 16 ft., and 12 ft. high, these dimensions multiplied together gave 3,840 cubic feet. The nearest integral square root was 62 ft., and that area, if divided into three equal windows properly proportioned, and placed at the end of the room, would sufficiently light it, *i. e.*, 1 ft. of opening lit 62 cubic feet. But as the square root would vary, that could not be a true solution, as a bigger room would get less proportionate light. For instance, let the room be 50 ft. by 30 ft. by 20 ft. high, the cubic contents would be 30,000 ft.; the nearest integral square root was 173. If the smaller room required to light it 1 ft. superficial for every 62 cubic feet, the larger room would be very dark if it had but 1 ft. of light to every 173 cubic feet. Mr. Aitchison quoted Viollet-le-Duc's remarks about windows, in his article on that subject. Those remarks the lecturer characterised as admirable, though the introduction to the article was in direct opposition to what was taught in optics, and so far as the lecturer could judge, contrary to fact. In Gothic times, as far as churches were concerned, the one great aim of the architects was to convert the walls into picture galleries, and as fine stained glass produced the most gorgeous and entrancing effects, the problem was to make as much of the walls window as possible, by gathering together all the supporting and necessarily blank parts, and by lessening them as far as possible in size. In England, where so much of the stained glass had been destroyed, many of the more important late Gothic churches looked like conservatories; but when we saw churches abroad that had not been treated in that manner, but had preserved their old stained glass, we could not be surprised at that desire, as the effect was lovely; and when the eye was satisfied with the beauty of the colour, there was amusement in deciphering the story. Strasbourg Cathedral was a favourable example of that, so far as the nave was concerned, but it was surpassed in grandeur by the effect of the earlier sanctuary, with the dark apse behind. It would be superb were it not that the apse had a small central window in it. We must, as a rule, go to the early churches before Gothic times to find studied effects of light and darkness, though there were some magnificent effects behind the choir of Westminster Abbey. At San Miniato, at Florence, besides the lovely and delicate tints that pervaded the church, whose resultant was a pearly greenish grey, the dark background of the choir set off the altar in light, just as some rich dark-coloured velvet set off a jewel framed in pearls. But the lecturer was not sure that the lighting was so well managed anywhere as at St. Mark's, Venice, where floods of light came through the immense end windows of the nave and transept, while the aisles and choir were in twilight. Nearly all the temples of antiquity were now doorless, windowless, and roofless, but we could not help believing that the greatest care was bestowed in producing effects at once grand and impressive by light and

shade. In the Temple of Diana at Nîmes a good effect was produced in one of the side passages by the middle of the vault being raised higher than the ends, so that the light came in by two lunettes. The lighting of ordinary rooms must naturally be more or less prosaic, for there the one thing wanted was to see. Still even there the architect might blunder. A long room that must be lit on the long side was often lit by two windows with a blank in the middle. That was a bad method of lighting, as a window in the middle, of the size of the two side ones, would light the room better, and would not be so offensive to the eye. The light should always be massed instead of being frittered away in morsels. Philosophers told us that cosmic energy was gradually dissipated in the making of dust. Some writers had praised the English Medieval architects for making the east ends of their cathedrals square, and putting an enormous window there, and had blamed the taste of the French architects, who kept to the round end. To the lecturer nothing was so marvellous as the square end; there was no "mystery" in it, and in the morning nothing was more painful than to have one's eyes put out by a glaring light. He could not help thinking that the perpetuation of such a blunder must rather be attributed to the power of the corporation of glaziers, than to the want of taste of the architects, in Romish times particularly, when the high altar was the important feature. Even in houses, vistas could often be managed in halls, and looking from light to gloom, or vice versa, was both striking and agreeable, not to speak of the cases where charming gradations of light could be obtained. Apropos of Viollet-le-Duc's remarks on the lighting of spaces, the lecturer observed that if the sizes of the windows were proportioned to the requirements of the rooms they were to light, the variety of the sizes would give great scope for architectural ingenuity. We did not now want to have the windows thrown haphazard over a front, as if they had been shot out of a cannon, and stuck. A few small windows well arranged gave scale to the large ones, and importance to the building. The Cornaro-Spini Palace might be taken as an example. Every architect must have noticed the absurdity of lighting in many modern houses, where two windows very imperfectly lit a large room, while a small room alongside was made almost as light as a conservatory, by having nearly the whole of one side taken up by the same-sized window. He (Mr. Aitchison) had seen cases where the large room got but 1 ft. of light to every 114 cubic feet, while the small one got 1 ft. of light to every 26 ft., though the big room was nearly three times as long as the small one, and though light varied in intensity as the square of the distance. There was, moreover, a feeling of satisfaction engendered when the outside of a house told us something of the inside, not to speak of its necessarily imparting its character to the building. Our fellow-workers in France said we gave ourselves no trouble about stamping their distinctive characters on our buildings,—that no one could tell whether a building was a court of justice, a hospital, a museum, a cathedral, or a school of art, by looking at its outside. Nearly all the Classical Greek remains that had come down to us were temples, public halls, theatres, and gateways, with the exception of a few tombs and monuments. We had no considerable ruins of palaces, houses, or other buildings, and the temples were mostly lit by some arrangement in the roof. At the Erechtheum, however, and at the Temple of Jupiter Olympius at Agrigento, we had specimens of windows; those of the former building were like some of the simpler doorways, a frustum of a triangle with a keeled architrave; and in the latter building they were, as shown in Professor Cocherell's restoration, plain oblong openings with inclined sides. There was little doubt that Classic windows were generally protected by pierced slabs of stone or marble, or by wooden or bronze lattice-work, and by shutters. Vitruvius said little about windows, only that their height was to be equal to one and a half times their width. We knew, however, from the remains at Pompeii and Herculaneum that doorways, windows, and niches were frequently adorned with pediments both triangular and segmental, and sometimes with pilasters. From the pierced slabs already mentioned the Gothic tracered windows were no doubt evolved. In tracing the genealogy of the features of archi-

ecture, however, it must be borne in mind that the greater number of buildings erected had perished "by time, war, flood, and fire," and that as yet we had but imperfect notices of those that still remained. In conclusion, the lecturer urged his hearers to endeavour to solve modern architectural problems in modern ways, not by slavish adherence to old models. He was not, he said, idiot enough to suppose that some clever fellow could sit down one evening and invent a new style by the next morning; but he thought we had new wants which must require new arrangements. We had new materials which had revolutionised construction,—cement-concrete and iron to wit,—and both those materials had to be studied in order that it might be seen how they could be made available, particularly iron, which had to be rendered fireproof. Suppose, said Mr. Aitchison, you imagine that some sensible person wants you to build him a church, fitted for Protestant worship, and for a certain number of worshippers (when I say "fitted," I do not mean in the shape of a cross with a long central stem, in which the bulk of the congregation can neither see nor hear; nor one surrounded with mortuary chapels); that the founder means it to be filled with stained glass, and to be fit for use (in other words, that it is not to be a greenhouse); that for the structure nothing but iron and cement concrete should be used, so that the church should not be burned down if the seats took fire; and that the building was wanted to be decent-looking inside and out, and not Gothic. With such a programme you would have plenty of opportunity for trying new sorts of windows. As soon as the public begins to think about public edifices, they will want them arranged in the best possible way for the purpose they have to fulfil.

## BALUSTRADES.

MR. AITCHISON'S third and concluding lecture was on "Balustrades," and was delivered on Monday evening last. The lecturer pointed out that the humble office of protection that balustrades fulfilled was by the genius of architects converted into the noble one of providing a new ornamental feature that gave scale, beauty, and finish to buildings, and that parapets and battlements were not distinguishable from balustrades, if the sense in which this word was used in France was allowed here, as French architects spoke of pierced and unpierced balustrades. With the exception of unpierced fence walls to stairs, balustrades were unknown to the Classics, who appear to have used fences of wood or metal when they did not use walls, and this practice appeared to have continued until the Christian architect built the mosque in Egypt for Ahmed Ibn Touloun in A.D. 885, and used pierced battlements. He explained the reason why the Medieval architects substituted perforated slabs in one piece for the open arched balustrades built of small stones, *viz.*, that numerous horizontal joints caused the balustrades to buckle, while the single slab was tongued into the cornice and remained firm. He traced the various forms of piercing used, and adverted to the practice of putting letters, names, or emblems in openwork parapets in the Medieval work, which was continued by the Renaissance architects of France, and he pointed out the great skill used in designing the balustrades of the Francis I. staircase at Blois. He also dwelt on the beauty of the design and execution of the pierced marble slabs forming the balustrades round the altar of Sta. Maria dei Miracoli at Venice, and the persistence there of balustrades formed of small slender shafts, which came down from Medieval times, until the introduction of the single and double-belled balusters, which are now the favorite forms. He suggested that they were probably derived from the turned woodwork of the Saracens. The first illustration of double-belled balusters he had found was in the first illustrated edition of Vitruvius of 1511. The first instance of the use of the word he had found was in Philander's edition of Vitruvius of 1586, where they are called "alustrice" or "alustice," on account of their resemblance to the flower of the wild pomegranate, *Balanasterion*, *Balanistum*. In his remarks on the difficulties involved in the use of balustrades from an æsthetic point of view, as they could not be well less than 3 ft. high, he pointed out how admirably this difficulty had been solved by the architect of Ismael Pasha's fountain at Cairo;

the halustrade of the upper floor was divided into two heights, the lower half filled with panels of lattice work, while the upper half was composed of small arches, which gave scale to the open arches above them, but which would have been dwarfed had the halustrade been in one height. The lecture was illustrated by diagrams, drawings, and pictures, and with a large collection of photographs.

#### WELSH CHURCHES. ARCHITECTURAL ASSOCIATION.

The tenth meeting of this Association for the present session was held on Friday, the 4th inst., Mr. J. A. Gotch (President) in the chair.

Previously to the ordinary meeting a special business meeting was held, when it was unanimously resolved to amend Rule 3 by the insertion of the words, "a periodical publication," after the words, "classes and lectures for the study of specific subjects (Rule 4)."

At the ordinary meeting held subsequently a paper was read by Mr. A. Baker on "Welsh Churches." After some introductory observations, the lecturer said,—

The flourishing independent state of the British church was exhibited when the college of Bangor Isaacod (numbering 2,000) refused to submit to the authority of St. Augustine when he came as the Papal Legate to solicit their assistance in evangelising the Saxons.

The British Church maintained its independence till the year 1175, when it submitted to the Roman Pontiff, who rededicated some of the churches to the saints in the Roman calendar, but the measure was so unpopular that he changed his plan and conciliated the people by canonising the old British worthies, and investing their memory with a halo of legendary miracles. But whatever objections they had to the rites and doctrines of the Romish church they had none to their architects who introduced the Norman style. I have noticed two varieties of plans in the small village churches of this date, the one a parallelogram, the other a nave and a chancel connected with it by a very small arch. In most churches where you now see modern chancel arches I think they have been substituted for these early arches. The disrespect in which the Normans held early British work is shown by instances having been found of their using the old British crosses for building materials, as, for example, the fragment found at Efenechtyd. Of the most beautiful examples of transitional work is the little church at Llanaber, near Barmouth.

Owing to the great destruction of church property which took place during the wars of Henry III.'s reign, the remains of Early English work are scanty. St. Asaph Cathedral was hurried in 1282. This brought about reaction favourable to the church, and in 1284 certain clergy of the diocese of St. Asaph travelled through the country with the famous copy of the gospels belonging to the cathedral for the purpose of obtaining funds for its rebuilding, which was completed in 1296. The very beautiful double lancet choir window discovered during the restoration of the cathedral was most probably created at this period. A general renovation of the churches ensued. I have some good specimens of the Decorative style then prevalent,—the arcade at Gulsfield and windows at Gyffylliog, Meifod, and at Llanrhaidr. Again troublous times followed. When Owen Glendower revolted, great injury was done to the churches. The fifteenth century was an era here as elsewhere of great church activity. In every parish may be seen evidences of work of this date, both in windows and roofs and other structural features, as well as in the screens, seats, and fittings necessary for the sumptuous ritual of the time. The roof-screens were of various types, some having flat roofs while others, as at Conway, are groined. Only a few of these remain, though every village church, however small, contains evidence of their existence in former times.

I was fortunate enough to discover in the restoration of Meliden Church that even the smallest churches were fitted with stalls similar in construction to those used in cathedrals. I have an illustration of a curiously-carved

bench in Rathin Church, which from its size and construction, I imagine it to have been a Llany stool.

One of the most beautiful architectural features of this period was the hammer-beam roof, of which many beautiful examples exist. That of Cilcen, a little village at the foot of Moeel Famma, is especially fine, being remarkable for the great size and elaborate moulding of its timber. A local tradition says that this roof was brought from Basingwerk Abbey, but this may be doubted, as it does not bear any evidence of having been refixed. The paneled chancel-ceilings are very numerous in this district, of which there is a very beautiful example in Llanrhaidr, where all the tracery panels vary, and are of the most elaborate and delicate designs. At this period timber porches with paneled sides and carved large-boards were placed over the entrance doorways; good examples of these are very numerous. The superstitious piety of the period is evidenced by a few remaining churchyard crosses, which were once universal. I exhibit a fine specimen from St. Donat's, Glamorganshire, and an equally beautiful one may be seen at Derwen, in Denbighshire. The existence of such beautiful and elaborate work in a poor mountainous district may be accounted for by the large sums of money offered to relics and the holy wells. A fragment of one of the most profitable of these relics may be seen in the porch of Llandderfel Church, at Bala. This relic was once a horse, made of wood and plated with silver, bearing on its hack St. Derfel, the patron saint of the church. At the Reformation the saint was detached from the horse, brought to London, and burned at St. Paul's Cross. All that now exists is the trunk of this horse, in its present state highly suggestive of a child's dilapidated toy. The streams that abound in these mountainous districts were utilised as holy wells, some having small chapels built over them, as at Llandullo Yarlhos, while others were covered with most gorgeous erections, as at Holywell, where the Countess of Richmond, the mother of Henry VII., built a chapel of unsurpassed beauty; it is well worthy of a pilgrimage of all art devotees.

The outward signs of prosperity in the Church, as exhibited in building, appears to have continued as late as the Reformation, in Henry VIII.'s reign, when it suddenly ceased; and in Edward VI.'s time, when the energies of the Church seem to have been directed rather to education and the revision of the liturgy, little or nothing appears to have been done. I suppose that this was also the case in Queen Mary's reign, as the Church's entire time and exertions were occupied in the restoration of the decorations and ritual abolished during the previous reign. Elizabeth's reign was marked by a general repair of fabrics, but more especially of the roofs, as there are but few churches that do not appear to have been re-roofed at this period. These roofs were notable for a construction unlike any of previous date, the trusses being of unusual depth, and 5 in. in thickness, the timbers in the rafters and purlins very broad and thin, and the purlins strengthened with carved wind-braces, the advantage gained by the use of the broad timbers being to allow for the deep tenons. The covering consists of alternate thick and thin boards. These roofs are well worth a very careful study, as their good preservation testifies to the excellence of their construction. During this reign what is commonly known as Jacobean work was introduced in England, but I have not seen any of it in the Welsh churches which can be attributed to a date as early as this. In Charles I.'s reign a number of small chapels were built, upon many of which great sums of money must have been spent. That at Rüg, near Corwen is the most interesting specimen, and well worth a visit. In the construction of this chapel some of the materials of the decorated parish church of Llanaelhafran were used, the fine hammer-beam roof being altered to fit the chapel, its timbers decorated with a rose pattern, and the date of its re-erection (1637) carved on the tie-beam. In addition to the Jacobean fittings there are now in the church very curious fifteenth-century benches. There is also a west gallery, which is the earliest example I have seen, and a chancel screen without a loft. Within the altar-rails are two canopied seats, remarkably like four-post beds. In Gyffylliog Church there existed a framing which once carried a bell-turret, of which few examples yet remain. This one, as

well as the porch, I regret to say, was destroyed by the present vicar.

In the time of the Commonwealth orders were given for the destruction of images, altars, tables turned altars, emblems, superstitious pictures, monuments and relics of idolatry, and commands were issued for the Communion-table to be placed in the body of the church. In 1643 there were orders for the sale of copes and surplices. In 1644 all images in the open air to be destroyed, and crosses removed from all plate. These orders were carried out except where private influence was sufficiently powerful to prevent them. Many fonts have been preserved for menial offices, as flower-pots and drains. I have found, too, that coal-holes were a favourite receptacle for the condemned ornaments.

In Llangyhalaf Church, in the Vale of Clwyd, I saw some interesting seats in which were illustrated the art of planing. The earlier specimens being very rude attempts to plane on thick timbers; the mouldings and workmanship become more delicate and true as the timbers were decreased in thickness till the standard of 1½ in. was reached.

At the restoration of Charles II. a spirited effort was made to put the churches into a fit state for worship, every church containing examples either of Jacobean seats, pulpits, or fonts. This was followed by the terribly uninteresting Georgian period, the age of plaster and "three-deckers," though I do not think one ought to say much against the three-deckers, as they were a necessity arising from the existence of galleries, which, at this time, assumed enormous proportions.

During the early part of the religious revival which ushered in the century there arose a feeling of the unfitness of the churches for public worship, and, owing to the ignorance of their value, it resulted in a terrible amount of destruction, which was happily, however, checked by the Gothic revival. I believe that if the labours of Pugin and Scott had been estimated at their true value, we should not have heard anything of the Association which, under the specious title of the "Society for the Preservation of Ancient Buildings," has misled so many.

Because many ignorant of Gothic art and church history have been allowed to lay their sacrilegious hands on our ancient monuments, an argument has been put forward that the only safeguard against further destruction is that they should be left entirely alone, and only such repairs effected as may from time to time be absolutely necessary.

Let us see how this will work out in practice. Let a church which is in a radically bad state of repair be tinkered up to suit the views of the society whose theory of preservation Time, which is the great destroyer, will, in the course of another generation, upset, and when in a succeeding generation this subject has faded from public view, and the school of architects trained to conservative restoration has died for want of patrons. What will be the feelings of an architect when he is called to view such a Church as Meliden, near Rhyll, and finding it apparently utterly devoid of all architectural features, the walls and ceilings a waste of plaster and whitewash? Would he not succumb at once to the appeal of the Vicar to "pull down" the ugly old place, and build a pretty new church? And the end of that church would certainly be destruction and not preservation. Now, what a loss to the diocese would this church, containing an unusual number of features of interest, be; for, having had the pleasure of restoring it, I found behind the west gallery some remains of the Early English west window, and the apex stone of the hell gable, of fourteenth-century date, was dug up. On taking down some rotten plastering, the different eras in the building of the church could be clearly seen by a comparison of the various kinds of masonry employed; the coursed masonry denoting the early thirteenth-century work, the work abutting against it being of the fourteenth century. This fourteenth-century work was done to repair the damage caused by the wars of Henry III.'s reign. At the east end there was evidence that it again suffered much injury, and was repaired in the fifteenth century, as all the eastern part of the church is of this date. When the north door was opened out, the old font was found buried in the wall. If this was done when the edict was

\* The object of this alteration is, we believe, to enable the Association to start and carry on a small journal which it is thought may be useful as a means of communication between the officers and members.

made for the destruction of fonts, the ohnrch must have been without a font for forty years, as the present font bears the date 1686. In surveying this church I had to summon up all the faith I possessed in its hidden value, and you see how I was rewarded. If my faith had not been inspired by education and strengthened by experience, I am sure I should have given it up as worthless and have gone in for the "nice new church."

The last piece of experience I have to give you is that relating to the cost of restoration work, which I hope will be accepted as a weapon with which to meet "the nice new church" suggestion.

I have found that the cost of restoring village churches of ordinary type averages from 15s. to 17. per superficial foot of the whole area of the church, the new fittings, if required, being of oak, and the roofs repaired with oak, and re-slatted. Allowing 7 ft. superficial for every member of the congregation, this would make the cost from 57. 5s. to 71. per sitting. A new church could not be built for the former sum, and for the latter it would be a poor skinny affair, with thin walls, poor details, and deal roofs and seats, and to produce a church as substantial and elaborate as the old church restored would cost at least 121. or 151. per sitting, and it would lack the historical interest of the old building.

The Chairman, in opening the discussion, remarked that Mr. Baker's paper was a striking instance of the interest that might be extracted from such a subject by one who had thoroughly studied it. It was also an encouragement to architects not to think too lightly of a church which at first sight appeared to possess little interest for them, because even if there were a scarcity of sketchable work in it the building was pretty sure to be of some historical value. No apology was required in bringing forward the subject of any branch of architecture, and although it did not fall to the lot of every one to restore churches, they had still a little attention to spare for the description of such work. It was impossible to discuss Mr. Baker's paper detail by detail, but there were a few points he would like to refer to. One was that a great deal more blame had been cast upon the Commonwealth than it really deserved. He believed the great era of ecclesiastical destruction was at the time of the Reformation. He would like to ask Mr. Baker what he did with a "three-decker" pulpit when he came across one? Did he regard it as coming within the category of works that ought to be retained or did he abolish it along with the galleries? A great many "three-deckers" were very interesting and beautiful specimens of work, which he (the speaker) would be very sorry to see destroyed. He was pleased to think that in the present day the Gothic appetite was not quite so voracious. Some ten or twenty years ago, if a church possessed a beautiful Jacobean altar, or panel, or anything of the kind, or even a Georgian reredos, as at Kettering Church, it was completely cleared away, and common place Gothic work put in its stead. No doubt this would be in keeping with the church, but it seemed to him that art suffered from the change, and he was therefore glad to think that, at the present time, people were not quite so mad on Gothic, or ready to regard a piece of Jacobean work as unworthy of retention. As Mr. Baker had forcibly pointed out, all these things were of interest in the history of the church, and could not well be spared. The real difficulty was to decide where the history began, whether with the "three-decker" or earlier.

Mr. Leonard Stokes, in proposing a vote of thanks to Mr. Baker, said he could not quite agree with that gentleman's views about church restoration. Mr. Baker had told them how he had restored several churches which seemed almost hopeless, and how after a good deal of trouble he had found out their whole history. But did Mr. Baker consider that, supposing any of his hearers went down to these restored churches, they would be able to find out their history, however much trouble they spent upon them? Had not Mr. Baker rather destroyed some of the history of those churches by restoring them so thoroughly? A few pounds per foot super. was spent over the whole churoh, the result being that though there was an admirable building, the history of it was more or less lost. Indeed, might it not be well in such cases to stipulate with the architect to write a

history of the building, including an account of the restoration. He believed that in restoring a church its value was considerably lessened from an artistic and archaeological point of view, because the restoration was so admirably effected that the difficulty was to tell "of other from which." He was glad to hear the Chairman say a word for the "three-decker," which was undoubtedly a part of history. He agreed with the Society for the Protection of Ancient Buildings in thinking that restoration was much over-done. In dealing with an old church, as much of the old work as possible should be left, and he admired Mr. Baker's spirit in throwing up a job when he had firmly made up his mind as to the nature of the restoration, to which his client would not agree.

Mr. H. W. Pratt said he had studied the church work in South Wales, but his impression of North Wales was that there was very little architecture to sketch. It was, therefore, agreeable to learn from Mr. Baker that there was some interesting work to be found in that part of the Principality. Referring to the long narrow oblong churches, he would like to ask how, in cases where they possessed rood-screens and lofts, without signs of external staircases, access was obtained to the lofts? He would also like to know if any of the village churches still existing in North Wales had a separate chancel, or were built in one plan? Mr. Baker had given reason to show that the roof-work had been executed at a much later date than that of the type of design, but that would seem to show that the Welsh people had been much behind the English people. With regard to the question of restoration, Mr. Baker had shown in the buildings he had dealt with, that although he had acted in a very conservative spirit, he had also acted in a most rational manner. To retain "three-deckers," and leave the history of a church to speak for itself, in restoring, would be impracticable, while in restoration such as Mr. Baker advocated, by the mere fact of using the old materials and fittings, it was possible for the architect to write the history of the church in stone and wood, instead of on paper. He seconded the vote of thanks.

Mr. A. C. Balmer Booth said that Mr. Baker had frequently mentioned oak roofs, but he would like to know if he had found chestnut used anywhere? At one time chestnut and oak were the two timbers used, deal not being obtainable then.

Mr. T. E. Pryce (Hon. Sec.) did not quite agree with Mr. Stokes in his remarks upon restoration, as a church covered with plaster and so on would not easily tell its history. Mr. Baker had shown them that there was a great deal to sketch in Wales. Wrexham Church, in particular, was a very fine edifice, but many of the small village churches were well worth inspection. Wales had also a great deal of half-timber domestic work to show, all along the Border. It was an undoubted fact that a great many of the rood-screens were destroyed in the time of the Commonwealth, and in his own native town of Welshpool the rood-screen, which had a reputation for beauty all over the country-side, was burned by Middleton's soldiers, while similar destruction went on in others. The date assigned by Mr. Baker to the common type of roofs in Wales seemed later than their form and detail here out. Guilsfield, diagrams from which hung upon the walls, possessed a roof of this type, with a rich and beautifully carved wooden ceiling below, evidently an addition at a later period than the erection of the outer roof, itself of much earlier workmanship than the time of Queen Mary. The approach to the rood-screens in some of the small churches was from outside the church altogether. At Llanegryn, near Towyn, this was the case, and access to the loft over its magnificent screen is still obtained in the same way, though a later piece of work now encloses the entrance.

The vote of thanks was then put, and carried by acclamation.

Mr. Baker, in replying, said that he did not wish specialism to be confined to one or two, but that the subject of church restoration should be taken up by the architectural bodies, which might confer their diplomas on students who had distinguished themselves in that course of study. If that were done the clergy would then know where to apply. Under the Commonwealth there was undoubtedly great destruction, and it was well known that the

old plate was destroyed, as new plate had to be afterwards supplied. He could not, however, agree with the Chairman that there was so much damage done in the time of Henry VIII., when art was more respected than during the Commonwealth. The Jacobean work in Wales was, he believed, long behind the time when it was used in England. He had been asked whether the "three-decker" should be left or not. His idea was that matters of church arrangement should be left in a great measure to the clergy who were responsible for the ritual; but, on the other hand, he sometimes found it necessary to use his influence to prevent the clergy from being hampered by ideas of ecclesiastical correctness, for instance, in preventing a pulpit being put on the north, which was supposed to be the correct side, when half the congregation could not see or hear the preacher. It was, therefore, the right of the clergyman to say how he would like his church arranged, and it was the province of the architect to carry out his wishes in such a way as not to destroy the historical interest of the building. Thus, while the clergyman had the right to make the history of the nineteenth century, the architect had the right to preserve the past history to the utmost of his power. Because the architect might be imbued with a taste for Gothic, there was no reason now-a-days that he should be voracious. Sir Gilbert Scott deplored many of the things he did at first, and the older he became the more conservative he got, so that, with more knowledge, he respected work he did not respect in his earlier days. A church restorer should therefore respect all the work he saw in a church; he should not ruthlessly destroy anything because he considered it ugly; and should not alter anything unless there was an absolute necessity for so doing. Every diocese should have a museum where all the old relics found in churches which could not be used should be deposited. Then if every architect, when he restored a church, would only write an account of the edifice, it might be inserted in the archaeological journals, or, better still, if the Institute or the Association took up the matter a sort of record might be established. A question had also been asked about the rood-screens, and he might reply that in the church at Drwenn, for instance, where the rood-screen took up two-thirds of the space, there was a stone staircase slightly projecting in the thickness of the wall. Some of the churches he had referred to possessed a separate chancel. With regard to the use of chestnut, he had found many practical carpenters who had difficulty in detecting it. When new it was easy to detect the difference between chestnut and oak, but that was not the case when the timber was of great age.

#### LECTURES AT CARPENTERS' HALL.

##### ENGLISH CARPENTERS AND FOREIGN COMPETITION.

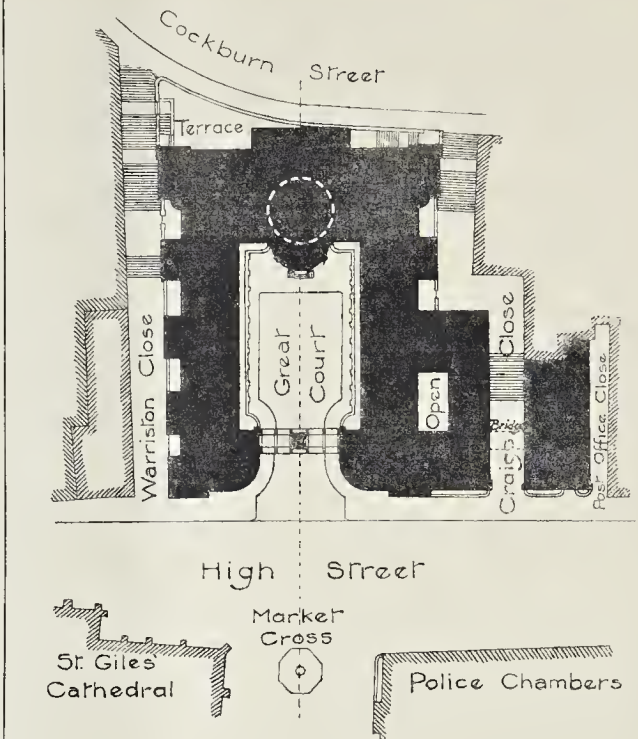
THIS was the subject of the first of this year's course of free lectures to artisans and others connected with the building trades, and it was treated very fully by Mr. Banister Fletcher, who had a large audience, on the 2nd inst.

The lecturer quoted at some length from recent Blue Books on the Depression of Trade, and then read the following pithy and pertinent remarks, which really sum up the whole subject, by Mr. F. Dashwood, Secretary of the Clerks of Works' Association:—

"The importation of foreign joinery, which has been steadily increasing for some years past, must seriously affect the home producers. Take one single article,—doors. For each door imported,—and there are thousands sent into this country every year,—it means the loss of one day's work to an Englishman. I more particularly mention doors, as that was the earliest branch of joinery imported which was extensively used. This extensive use of foreign joinery is little known outside the trade. The purchasers and tenants of houses are rarely able to distinguish the difference between English and foreign, and care but little whether it is the one or the other. The question arises, which is the better of the two? There is, I think, no question as to which is the cheaper, as the great sale of the foreign article to those acute judges of cost,—the speculating builders,—quite disposes of that. Some in the trade might be inclined to think that the 'jerry' builder with his piecework contractor, having boys and young men,—called improvers,—working at a low rate of wages, could do it at least as

cheap as it could be done abroad, and then have to add to the cost of manufacture the ship freightage, the delivery from the docks to the warehouseman or agent, the agent's profit, and then the cartage to the suburban 'villa.' But it is not so, and why? The fault lies in the bad system at present in teaching the young workmen their trade, and the bad supervision,—or no supervision,—as to the quality of the work done. The foreign workman is under a proper system of supervision, is taught to do good work rapidly and to carefully study the working in of the materials with the least waste. There is no loss in capital through keeping the timber for any length of time after it is felled, for in a very short time it is passed through a quick process of artificial drying, and then into the workshop, where the drying process is still kept up, the men working in a very high temperature. The waste on material is comparatively nil, as can be proved by inspecting the panels of the doors, which are often in three and four pieces in their width, carefully glued together. This is so well done that one seldom sees a broken joint, and my reply as to which is the better is, I am sorry to say, the foreign,—that is, in comparison with the article which would be turned out by the mechanics (so called) in the employ of the speculating builder from the wood green from the timber-stack, prepared in a shed adjacent to the 'villa,' with no means of drying either before or after being framed together. I will now state the case of a better-class of joinery (hardwood). Sixteen years ago tenders were invited for fitting up with oak a town-hall in the North of England. Eight or ten firms sent in prices. The highest was that of an English contractor, 11,000*l.*; the lowest that of a Swiss firm, 6,500*l.* The details were full of work of a most elaborate character, carving profusely introduced, the doors, and framing richly moulded, with linen-fold panels, &c. The Englishmen thought it could not be done at such a low price, with all the expense of freightage, &c., the work being prepared on the banks of the Lake of Geneva. It was in due course delivered and fixed. The wood was of excellent quality, dried and prepared in the manner above described, and the workmanship gave every satisfaction. It was turned out with a good finish, but to a practical joiner there was room for fault-finding in the method of framing. This, however, was the only fault. Some three years after it was as good as when first fixed,—this being a sufficient test of its quality. Again, to take another example from the present time. A German firm prepare parquetry for flooring at Altona, near Hamburg, and can successfully compete with English contractors, having recently laid floors at several buildings in the City, viz., the Baltic Sale Rooms, the Scottish Imperial Insurance Company, the Union Bank of Australia, &c. The oak is generally German grown, but sometimes brought from Russia and Austria. The work is very simple. The floors are laid on open-jointed deal floors, the oak being about 2 ft. 6 in. long, 4 in. wide, and 1 in. thick. These pieces are laid in 'herring-bone' courses, grooved and cross-tongued all round, and secret-nailed. The battens are prepared at Latoria, being first thoroughly dried and worked to exact sizes; they are then packed in bundles and sent by ship to London and laid by Swiss and German workmen. These men are very frugal and temperate in their habits. They work much longer hours than the Englishman, working with a will, and take a great pride and interest in all they do. The oak and herring-bone parquetry floor is laid complete and twice waxed for 1*s.* 4*d.* per foot super. Why should not our English joiners do this work? The reasons are not far to seek. 1. There is no superfluous timber to pay carriage for, and no waste, the timber being prepared in most cases very near the spot on which it grew. 2. The workmen live simpler lives, and can therefore afford to work for less wages. Young English mechanics,—more particularly in London,—too much abuse their spare time. They have too little self-culture. If young mechanics would only take to their trades with a will and an interest, spending their spare time in technical schools, avoiding encraving and useless pleasures, the foreigner would soon find his way back to the Continent."

The lecturer then proceeded to quote from the Final Report of the Royal Commission on the Depression of Trade, and he said that in order to enable English workmen to maintain



The Edinburgh Municipal Buildings.—Block Plan of First Premiated Design.

their own it was necessary to strongly insist on greater technical study and application on their part. With regard to employers and manufacturers, he would say that what leeway they had made by some of them having sent abroad inferior articles, whereby the great prestige of the English manufacturer's name had been injured, must be made good by combined and continued efforts of all trades to raise and maintain the standard of British goods to its old goodness, remembering that the old adage "Honesty is the best policy" was as true to-day as when first spoken, and that the Biblical injunction, "Be honest and just in all your dealings," was meant to apply to every-day life.

The second of the present series of lectures was given on Wednesday evening last at Carpenters' Hall, London-wall. The lecturer on this occasion was Professor A. B. W. Kennedy, M.Inst.C.E., who chose as his subject "Girders and Beams," and was listened to by the largest audience that has attended any of these lectures. A report of the lecture will appear in our next.

**Fairfax House, Putney.**—We have received from the sub-committee appointed to take steps for the preservation of Fairfax House a statement which shows that their want of success is not due to any lack of effort on their part, but is solely owing to the owner insisting upon a higher sum for the purchase-money than that at which it was originally understood he would sell it for. In a few days the house will have disappeared. We gave a view of it and some details of the staircase in the *Builder* for Feb. 12 last.

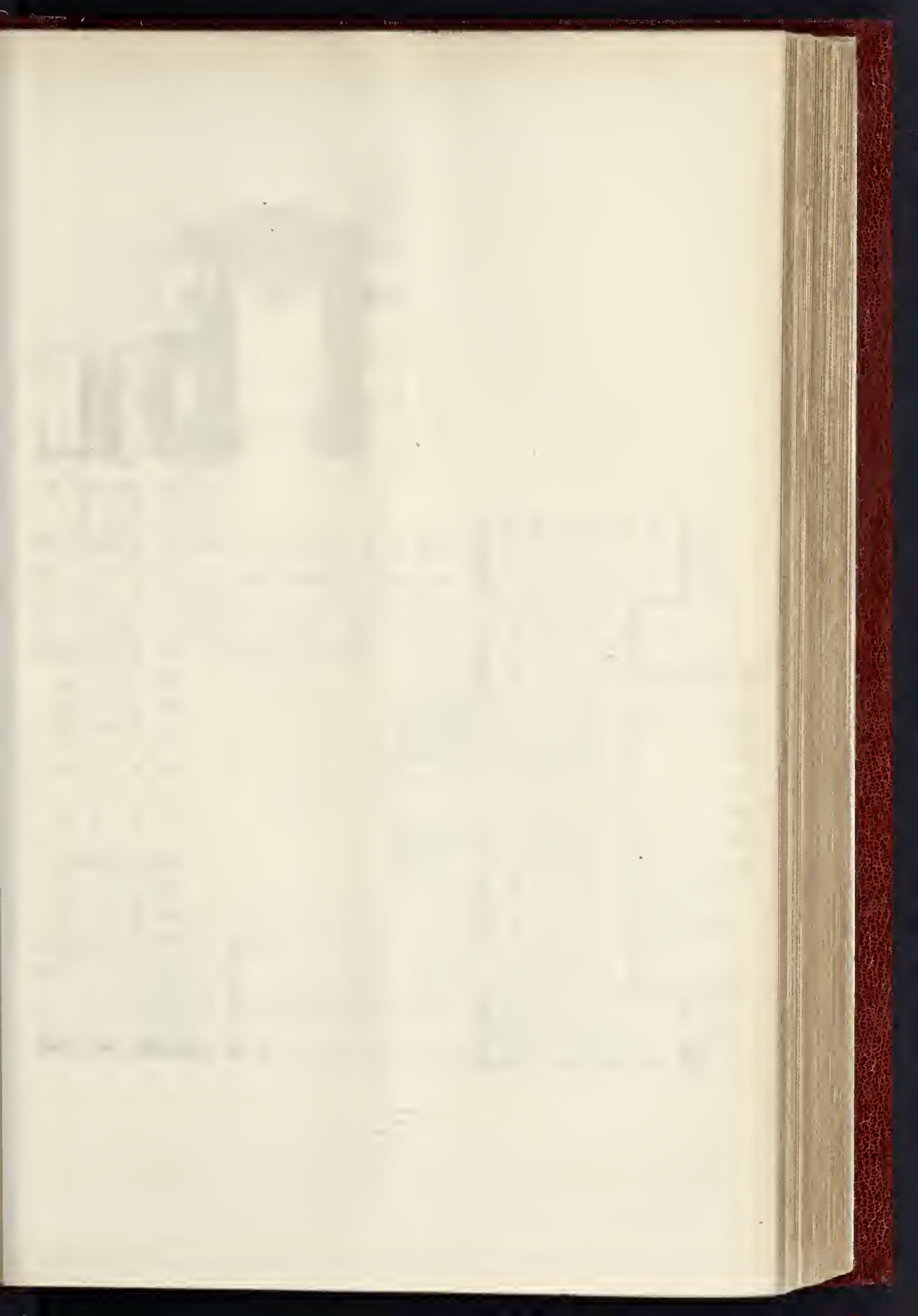
**The "Victoria Terminus," Bombay.**—The Great Indian Peninsular Railway Terminal Buildings, Bombay, erected from the designs and under the supervision of Mr. F. W. Stevens, F.R.I.B.A., A.M.I.C.E., has been named the "Victoria Terminus," in commemoration of H.M. the Queen's Jubilee, held in India on the 16th of February. These extensive buildings were illustrated in the *Builder* a few months ago.

## Illustrations.

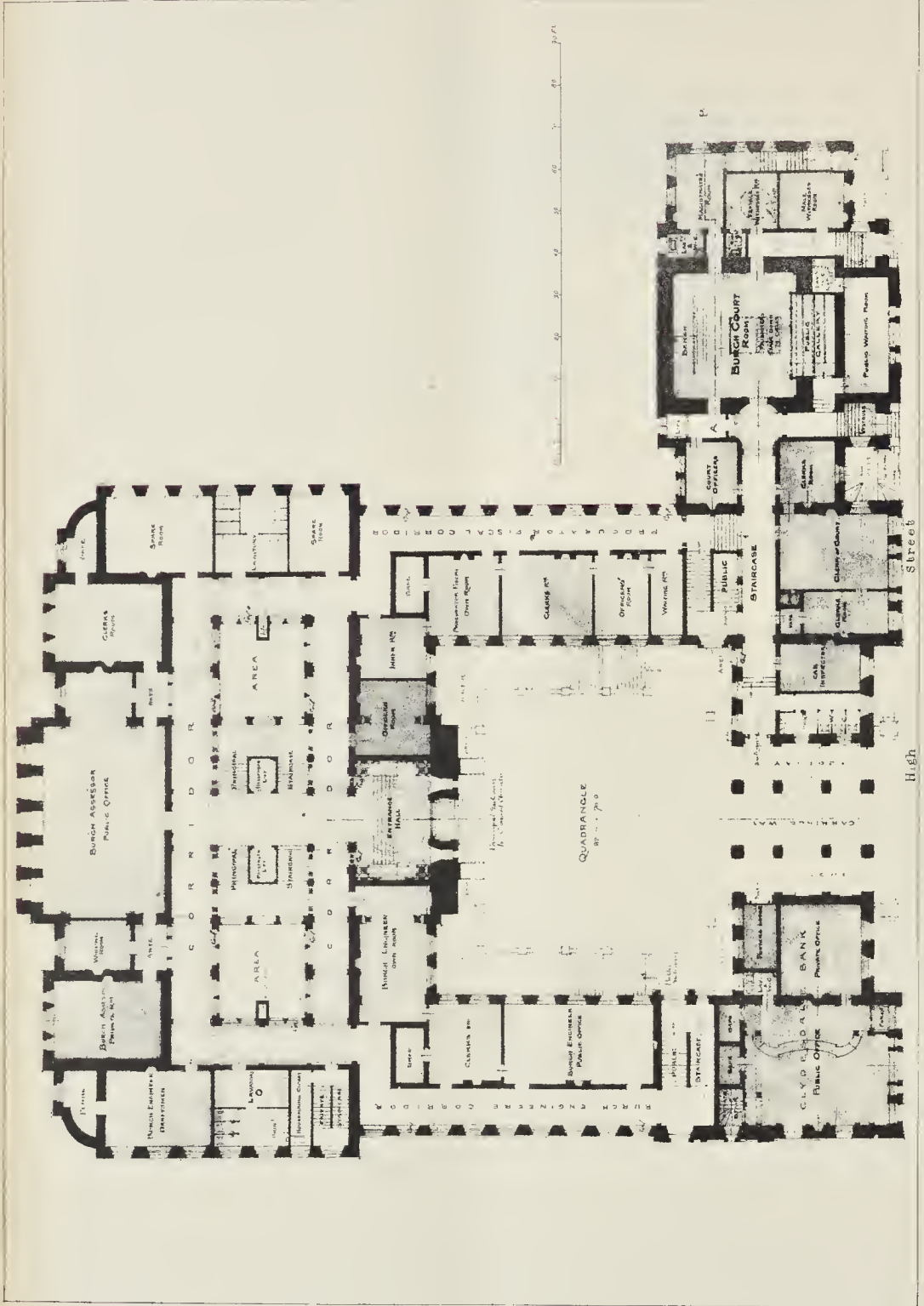
### THE PROPOSED MUNICIPAL BUILDINGS AT EDINBURGH.

THE whole of our illustrations this week are devoted to the premiated designs submitted in the Edinburgh Municipal Buildings competition. Of the design which took the first premium, that by Messrs. Leeming & Leeming, we give the elevation to the High-street, and the elevation to Cockburn-street, as well as plans of the lower ground floor and upper ground floor. Of the second premiated design, submitted by Mr. Malcolm Stark, of Glasgow, we give the elevation to Cockburn-street and the plan at the High-street level; while of the design to which the third premium was awarded, that, namely, by Messrs. J. W. Simpson & E. J. Milner Allen, we also give the elevation to Cockburn-street and the plan at the level of High-street. For further particulars regarding the designs we refer our readers to Mr. Waterhouse's report, which was recently published in our columns (see p. 330, ante) and to our own recent notices of them (see pp. 311, 341). We hope to further illustrate these designs, as well as some of the others, in future numbers.

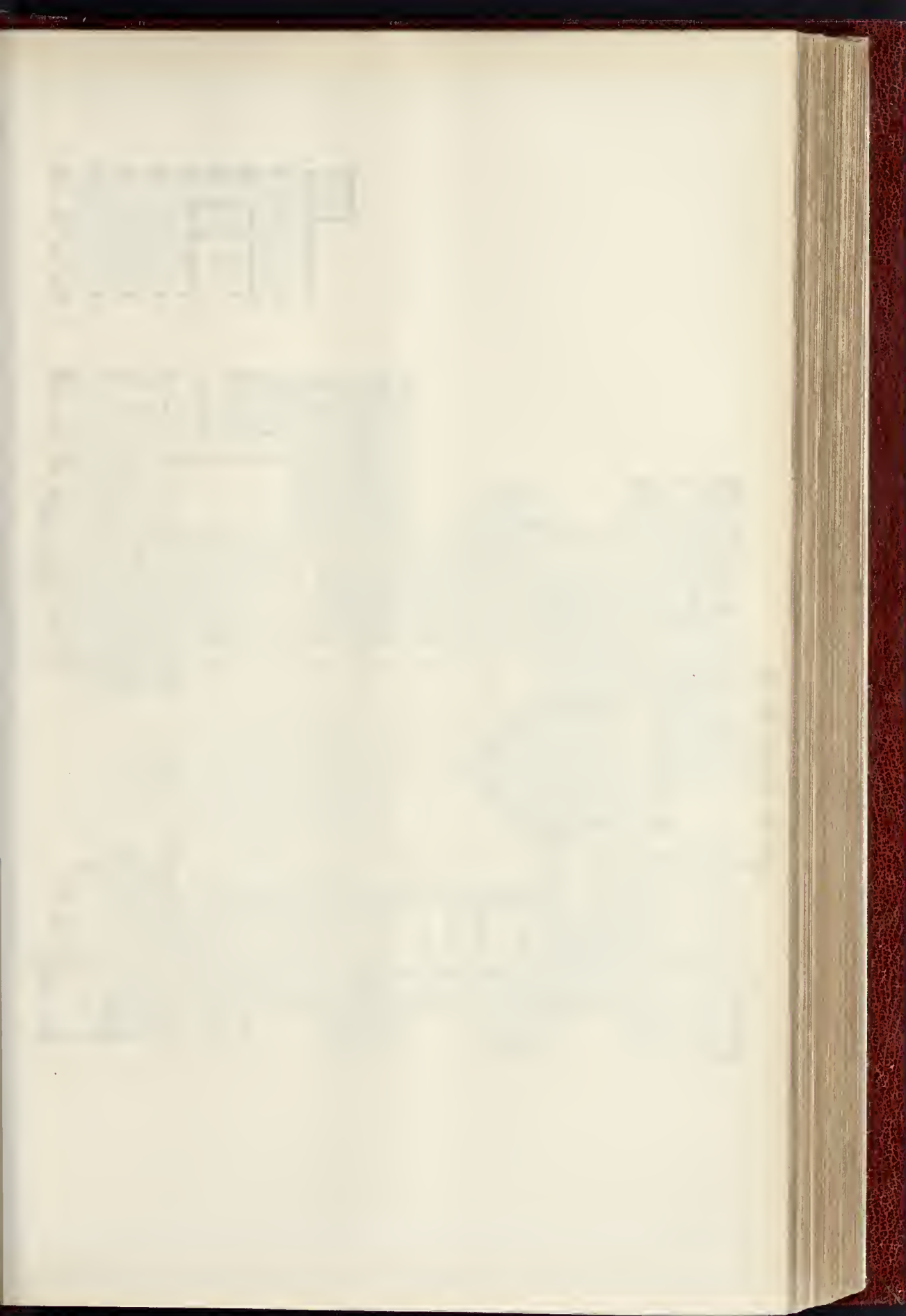
**The Late Mr. M. E. Hadfield.**—A memorial has been placed in St. Marie's (R.C.) Church, Sheffield, in the north transept, in memory of the late Mr. M. E. Hadfield, architect. It is executed in choice white alabaster, and consists of a canopied niche with the Pietà in high relief, and below, a marble slab, with inscription in raised letters. It has been designed in the style of the fourteenth century, the church itself having been planned by the late Mr. Hadfield and his partner, Mr. Weightman, after careful study of that of Heckington, in Lincolnshire, which they drew and measured early in the Revival, about 1846. Mr. Frank Torry, sculptor, a student of the Lambeth School of Art, now of Sheffield, who has twice gained the National Silver Medal for modelling from the antique, has executed the work, and Mr. C. Hadfield was the architect.



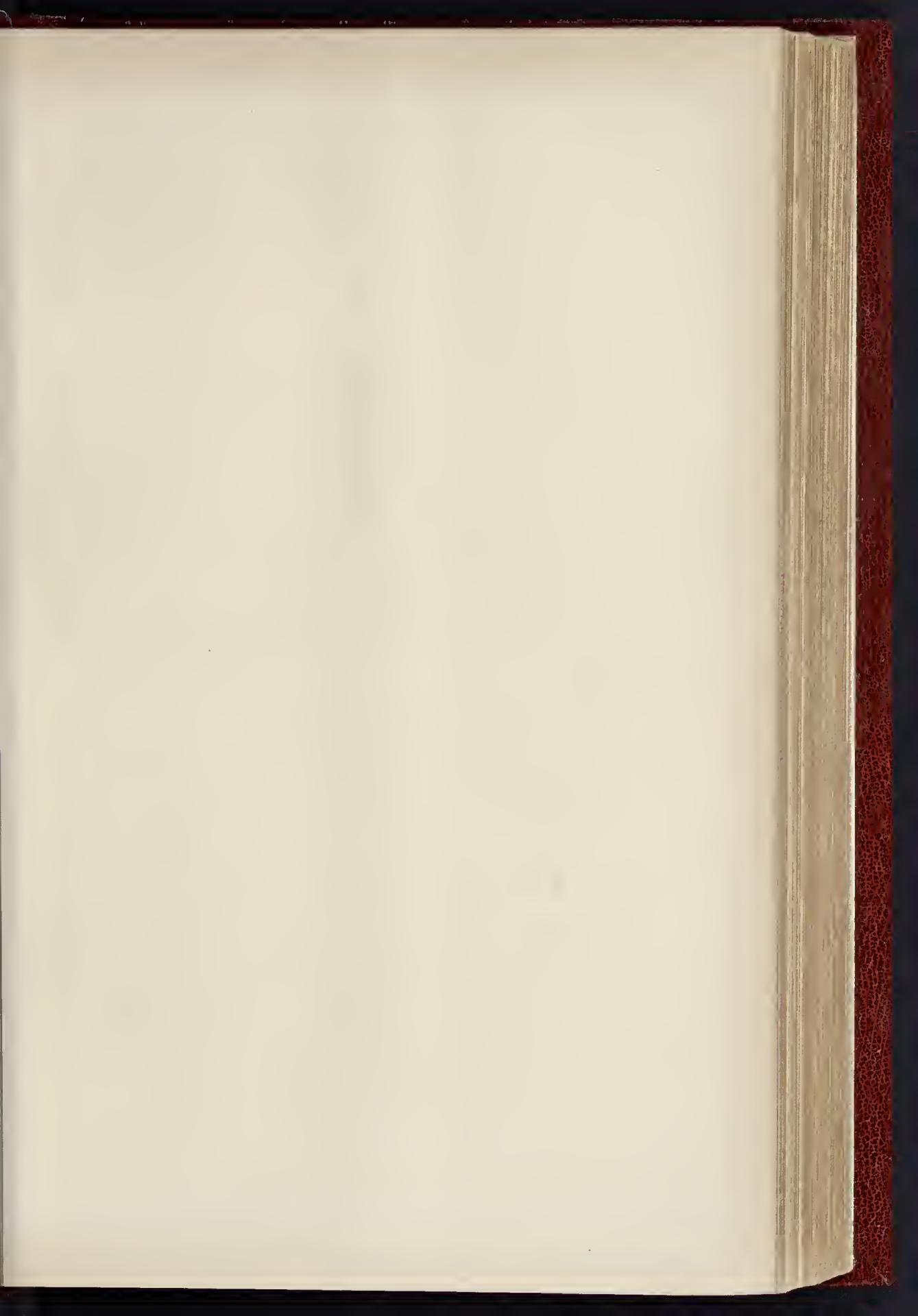
THE BUILDING, MARCH 12, 1887.













1857

EDINBURGH MUNICIPAL BUILDINGS, THIRD PREMIAT

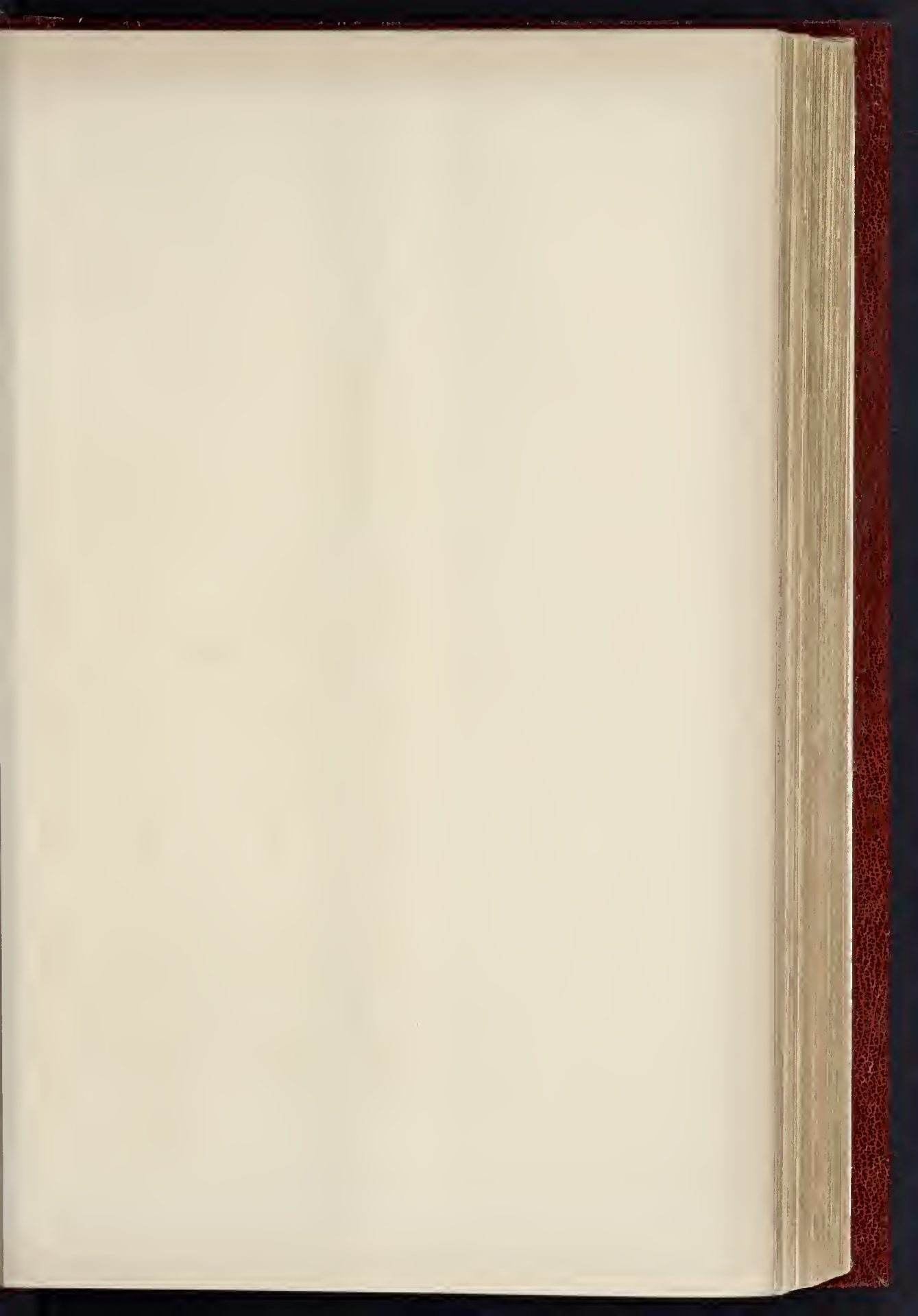
ELEVATIO



PHOT. LITHO. — PRAGUE & 29 MARTINS LAKE ANNON. HDGN. E.C.

—MESSRS J. W. SIMPSON AND E. J. MILNER ALLEN, ARCHITECTS.  
ORN STREET.

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THE BUILDER, MARCH 12, 1887.

THE BUILDER, MARCH 12, 1887.





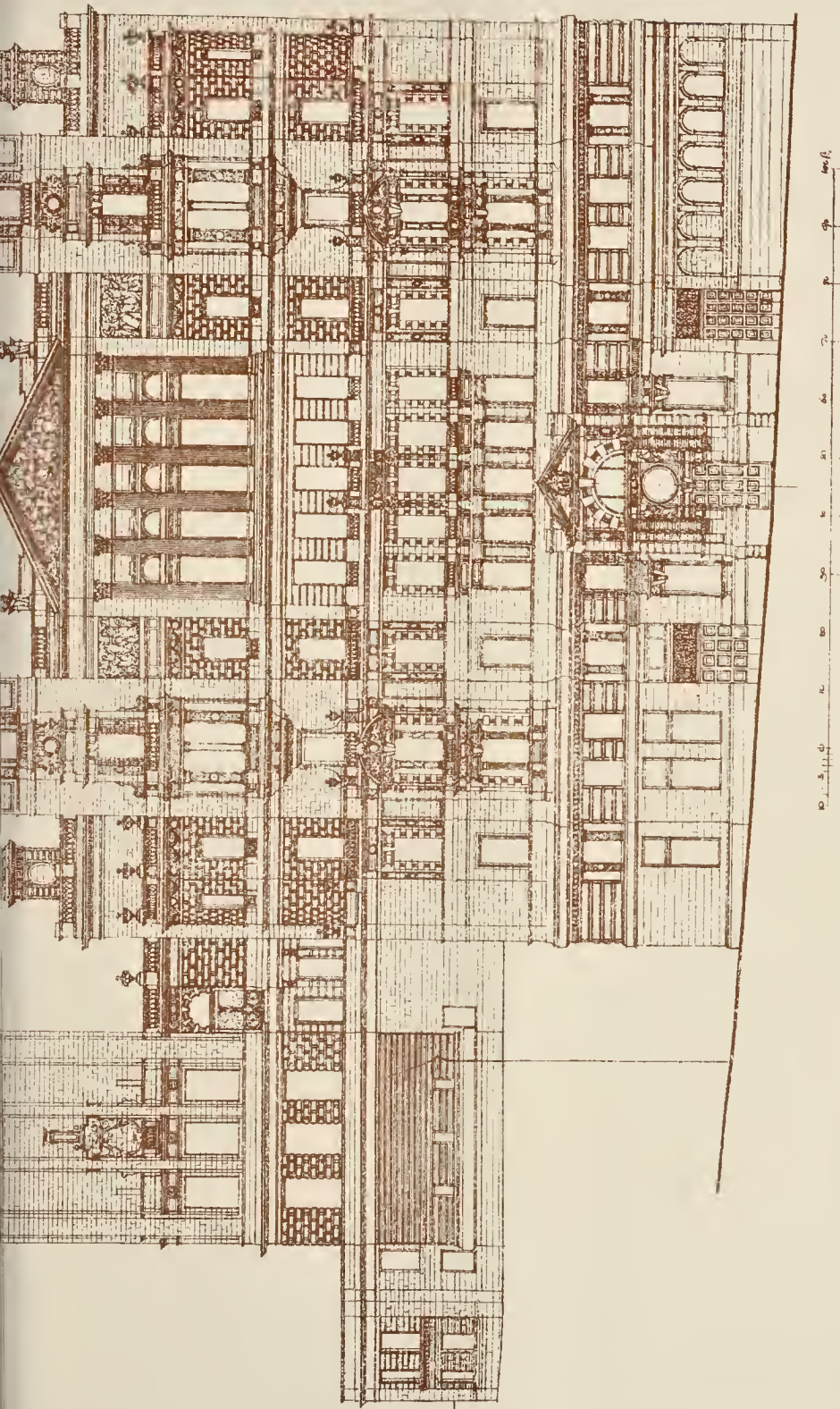
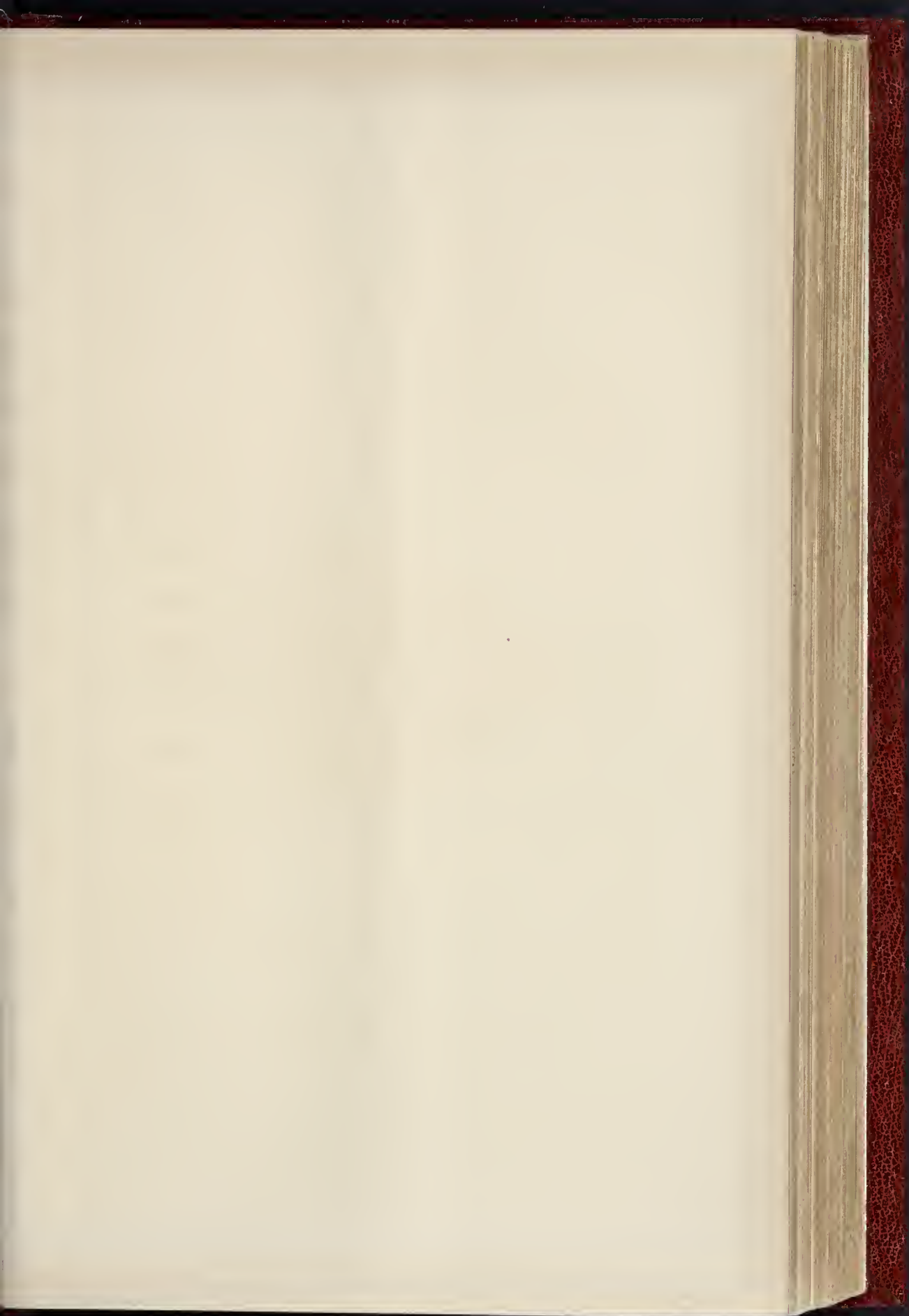
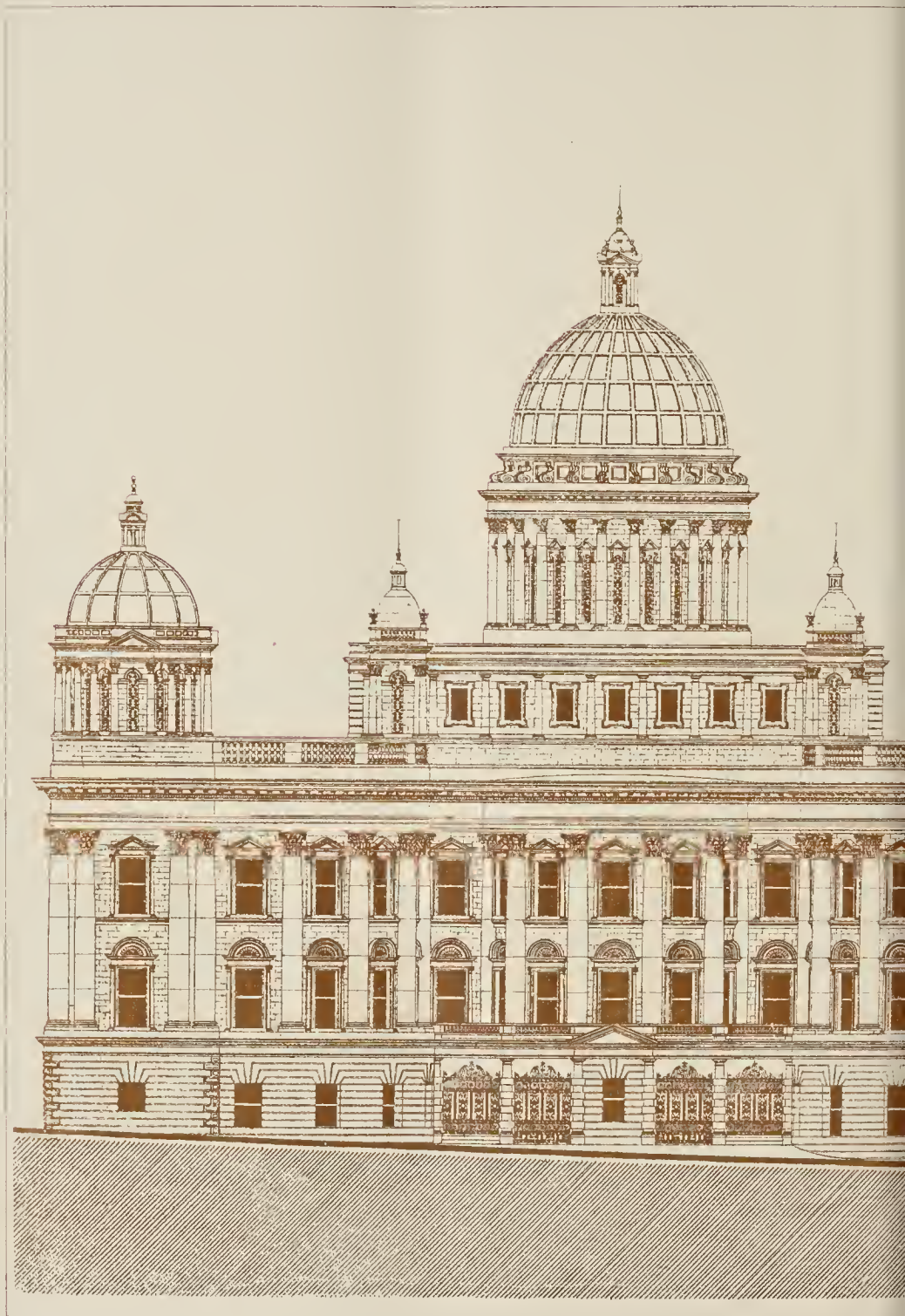


PHOTO LITHO. SPRAGUE & CO. 22, MARTIN'S LANE, LONDON, W. 1.

EDINBURGH MUNICIPAL BUILDINGS, SECOND PREMIAED DESIGN.—MR. MALCOLM STARK, ARCHITECT  
ELEVATION TO COCKBURN STREET.

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W. & A. GIBSON ARCHT. EDINBURGH

EDINBURGH MUNICIPAL BUILDINGS, FIRST-PRE  
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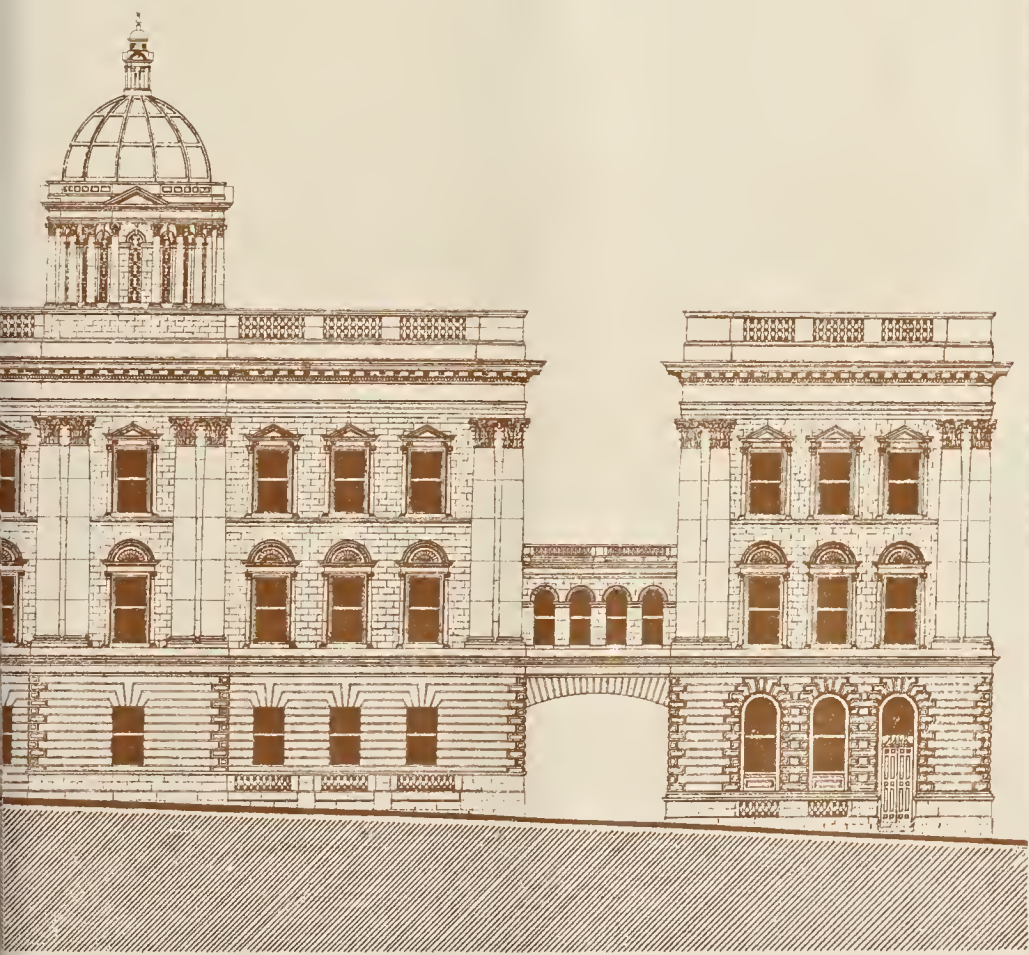
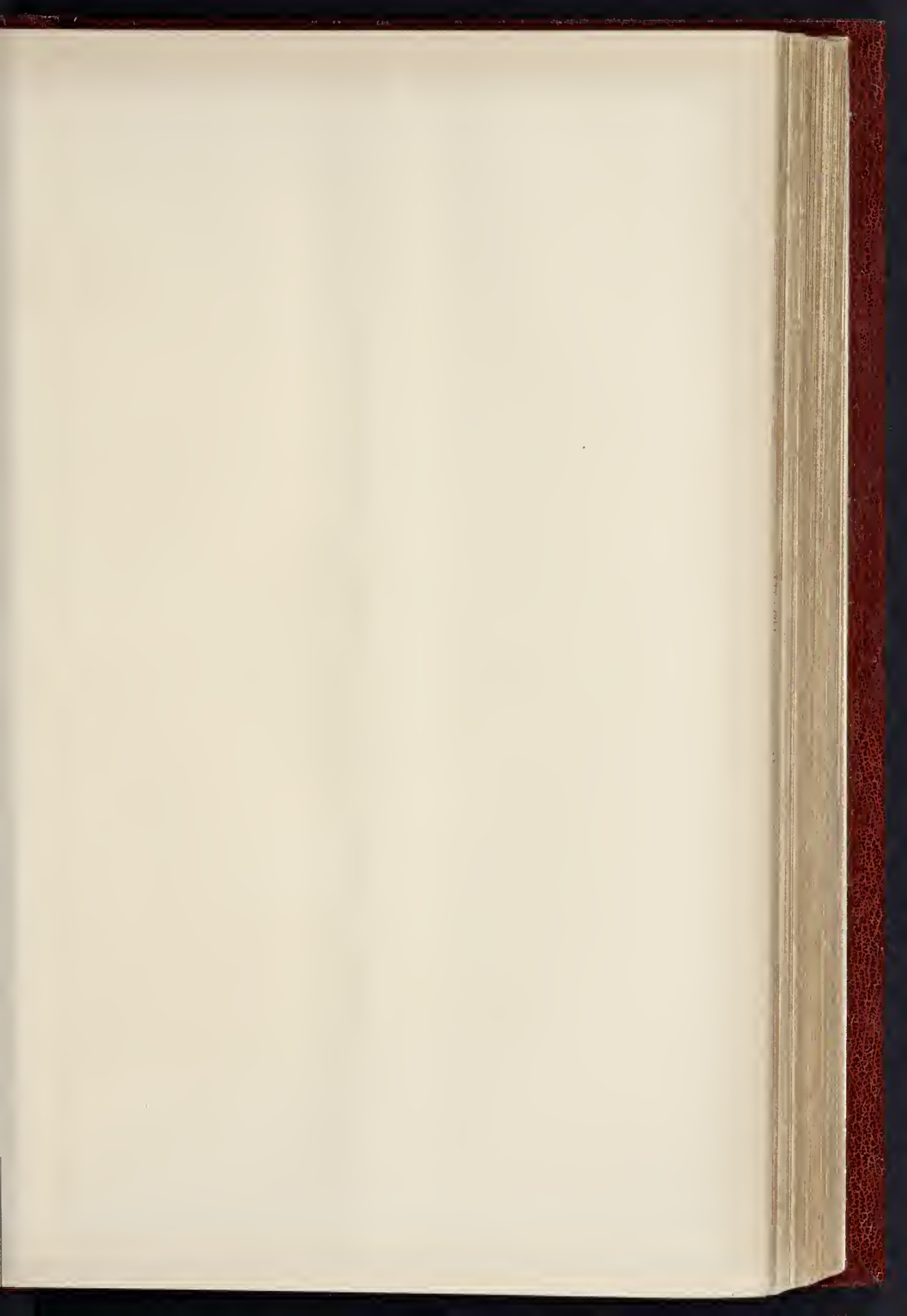


PHOTO LITHO. SPRAGUE & L. 22, MARTIN'S ALLEY, FINSBURY, LONDON, E.C.

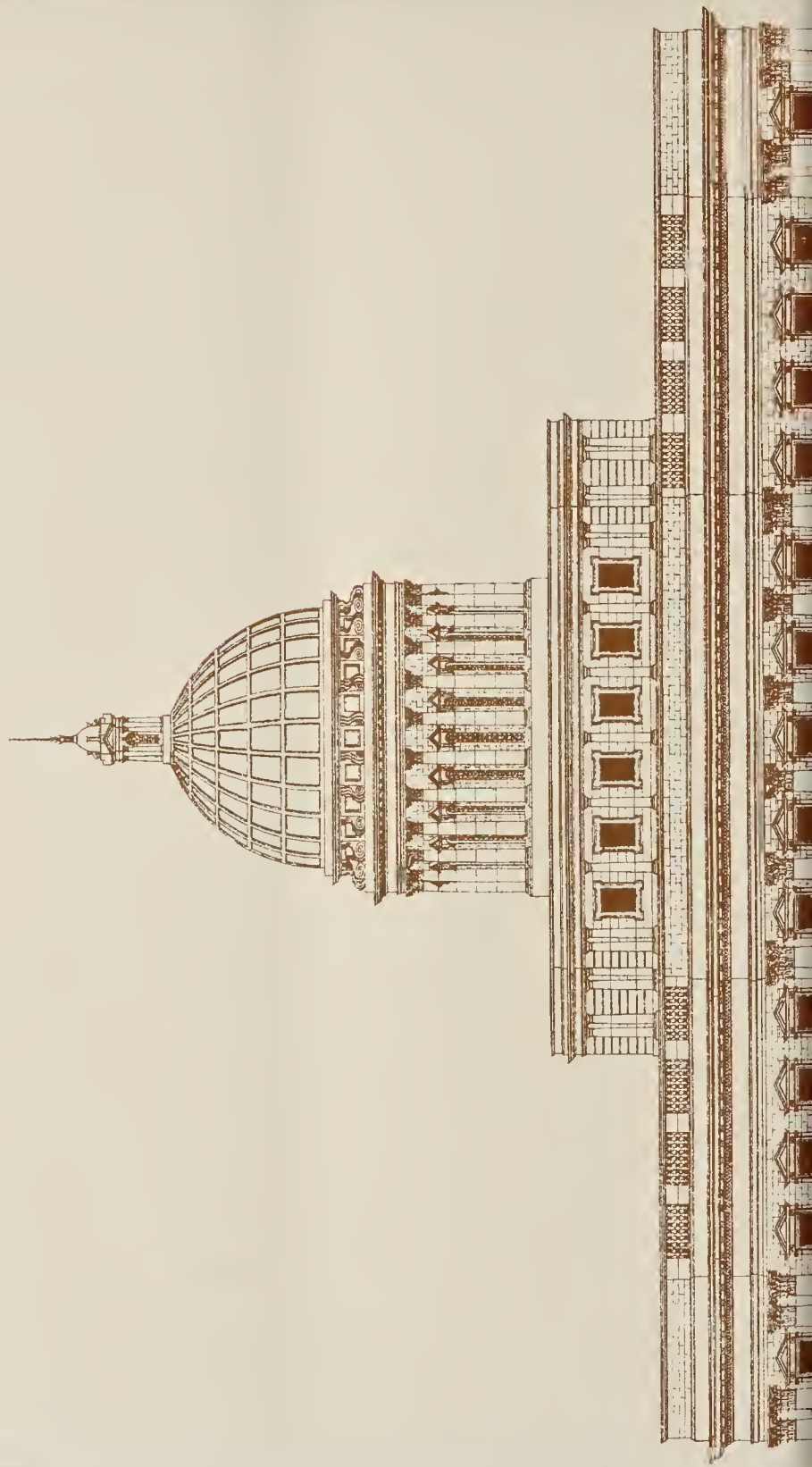
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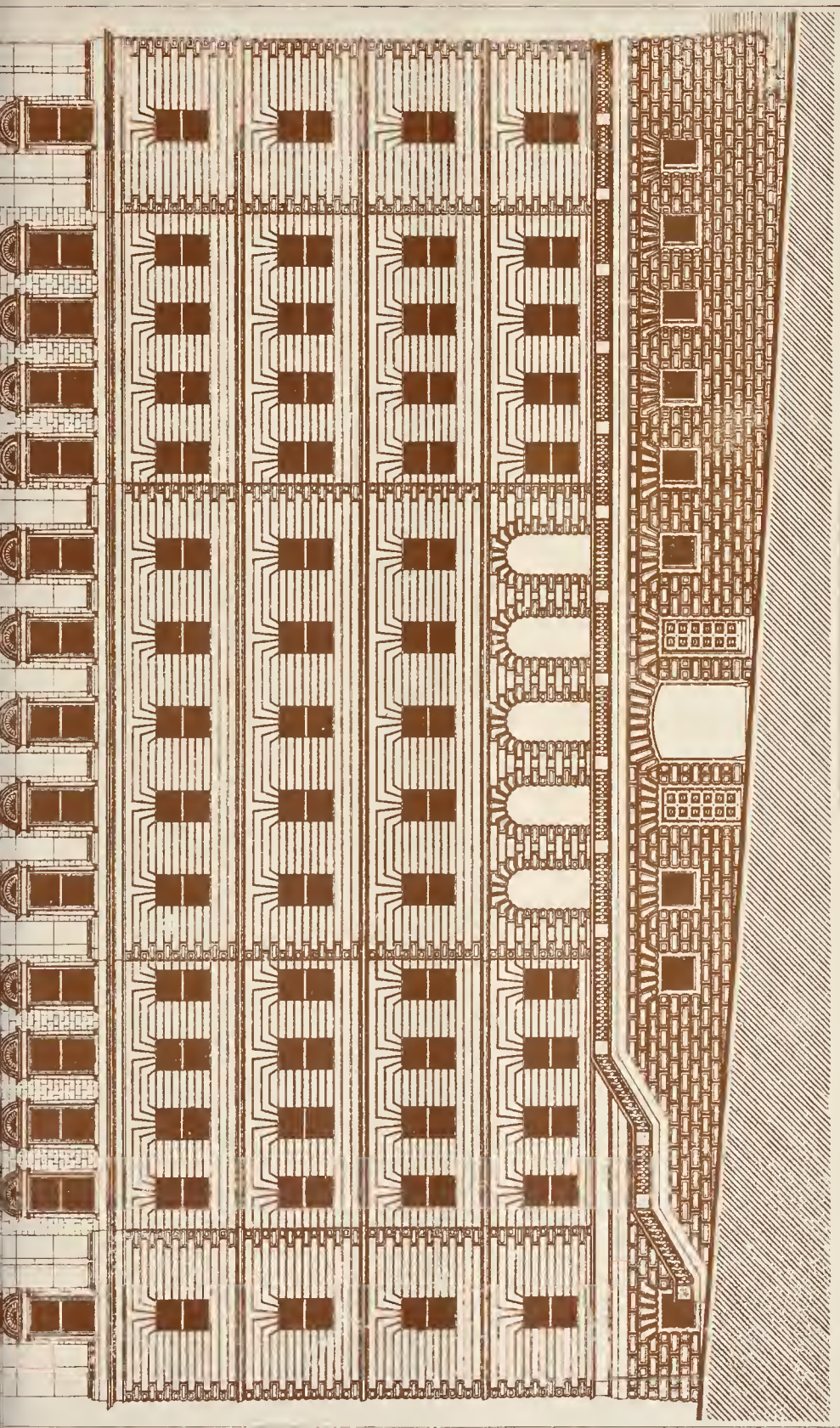
THE UNIVERSITY OF CHICAGO



THE BUILDER, MARCH 12, 1887.







EDINBURGH MUNICIPAL BUILDINGS, FIRST PREMIAED DESIGN.—MESSRS. LEEMING AND LEEMING, ARCHITECTS.  
ELEVATION TO COCKBURN STREET.

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THE UNIVERSITY OF CHICAGO PRESS



EDINBURGH MUNICIPAL BUILDINGS, THIRD PREMATED DESIGN.—MESSRS J. W. SIMPSON AND E. J. MILNER ALLEN, ARCHITECTS.

PLAN OF FLOOR AT HIGH STREET LEVEL

placed at every point where there was a change of line or gradient. The sewage was received in tanks and applied to the land by contract with a farmer. In other parts, Bailey Denton's automatic tank, Field's flush tanks, and the spongy iron filter were in operation. The closets and ashpits were dealt with on the pail system, Manchester pattern, in 2,000 out of the 7,500 houses in the district. In the five most populous townships contractors emptied the pails every ten days, freely using carbolic acid, "Sanitas," and other disinfectants supplied by the sanitary authority. Closets with covered cesspools were scavenged quarterly. The lecturer considered the frequent removal of human excreta one of the most important factors in the problem of disease-prevention. He was in favour of the pail-closet, but would prefer a weekly removal. Closets and ashpits should be at a minimum distance of 20 ft. from the dwelling-house. New buildings were erected subject to sanitary by-laws, which at first caused much friction, but were now submitted to almost without a grumble. Up to the end of last year 1,070 new buildings had been passed, the influence for good of the regulations having proved very great. The extra expense involved at the outset was amply compensated to the owner by better work and better value, and to the tenant by increased comfort and health. He counselled his brother inspectors to agitate for the general adoption of building by-laws, so that old errors might for ever be done away with. Questions of overcrowding and of slaughter-houses were also dealt with, and the lecturer said he had taken great interest in the Canal Bats Act, his report on the subject having, he believed, been of much assistance to Mr. George Smith in procuring the passing of the Act. The good done by the efforts of sanitary reformers was well illustrated by comparing the 80 per 1,000 rate of mortality in London in 1855, and the 50 per 1,000 of 1875, with the 24 per 1,000 of 1885. With science still advancing, who would dare to say what the rate would be in 1895?

The paper was exceedingly well received, and the Chairman and the several succeeding speakers highly complimented Mr. Davenport on its quality, a cordial vote of thanks being accorded.

Previously to the reading of the paper, a statement said to have been made at a recent meeting of another society, reflecting upon the character for integrity of sanitary inspectors generally, was mentioned, as a question of privilege. The matter was left in the hands of the Council.

#### THE ROYAL JUBILEE EXHIBITION, MANCHESTER.

THIS Exhibition, which has already been alluded to in our columns, bids fair to be a great success. The primary object of its promoters is to illustrate the art-progress of the British nation during the Victorian era. The Council of the Exhibition very wisely entrusted the collection of examples for the Architectural Court to the Manchester Society of Architects, who have associated with themselves representatives of various architectural societies throughout the kingdom. In response to the advertisements which appeared in the professional papers, and through the action of the above-named societies, we are informed that a very fine collection of architectural drawings of buildings erected during the past fifty years is being got together, and will be hung in a prominent position in the Exhibition. Some attempt will be made at a chronological arrangement of the drawings, and to this end examples have been promised of works by the late Sir Charles Barry, Edward Barry, C. R. Cockerell, Sir M. D. Wyatt, Thos. H. Wyatt, H. Tattersall, G. E. Street, Ed. Walters, Sir B. and S. Smirke, Sir G. G. Scott, and others; while the examples by living architects will comprise contributions from the following gentlemen:—D. Brandon, J. P. Seddon, G. Truefitt, C. Hadfield, Paley and Austin, J. Brooks, A. E. Street, C. Douglas and Scllars, Hansom, Emersou, Champneys, Pugin, Collcutt, Chas. Barry, Sir Horace Jones, Alfd. Waterhouse, T. Worthington, Mills and Murgatroyd, E. Salomans, T. D. Barry and Son, G. Grayson, T. G. Jackson, C. F. Hayward, R. Edis, J. O. Scott, B. E. Ferrey, H. B. Sang, and very many others.

Messrs. Elliott, Edminson, and Olney, of Manchester, have received orders to proceed

at once with the construction and erection of the whole of the steam and other extensive cooking appliances, also the fitting up of the several kitchens, larders, and other offices required for the dining and refreshment departments of the Exhibition.

#### OBITUARY.

Mr. M. Ogle Tarbotton, C.E.—We record with much regret the death of Mr. M. O. Tarbotton, which occurred late on Sunday evening last at his residence, The Park, Nottingham. It appears that for some time past the state of Mr. Tarbotton's health had occasioned considerable anxiety, his illness resulting (according to the *Nottingham Guardian*) from over brain work and nervous prostration. He had been an official of the Corporation nearly twenty-eight years, his appointment as Surveyor being made in 1859, the year in which the Corporation adopted the Local Government Act. Subsequently, as Chief Engineer, Mr. Tarbotton was charged with the responsibility of carrying out many important public works, notably the Industrial Exhibition held in Horse Fair Close (the site of the present University Buildings), and the new Trent Bridge which was constructed from his designs, and the works in connexion with which were carried out under his supervision. Upon the Corporation acquiring the undertakings of the Nottingham Gas Company and the Nottingham Water Company, Mr. Tarbotton relinquished the office of Borough Engineer, in which he was succeeded by Mr. Arthur Brown, and was appointed engineer to the Gas and Water Committees and consulting engineer to the Corporation. He was also engineer to the Sewage Farm Committee. Mr. Tarbotton was frequently called as a witness before Parliamentary Committees, and as a specialist in questions connected with gas, water, and sewage, his advice was much sought. He was a member of the Institution of Civil Engineers, a Fellow of the Geological Society, and a Fellow of the Royal Meteorological Society. It is only quite recently that he read a thoughtful paper at the Parkes Museum on "Engineering and Architecture in Relation to Sanitary Science," the substance of which we printed in the *Builder* for Feb. 12.

#### IMPORTANT CASE UNDER THE METROPOLITAN BUILDING ACT.

BOVILL v. GIBBS AND INBER.

THIS case, which is of considerable importance to builders, came before Mr. Justice Denman and Mr. Justice Mathew, in the Queen's Bench Divisional Court, on the 23rd ult., by way of special case. It appeared that on the 1st of February, 1886, Mr. Bovill, the District Surveyor of St. Pancras, North, summoned Messrs. Gibbs & Inber, builders, at the Highgate Petty Sessions, for erecting a dwelling-house and shop with an insufficient open space in the rear thereof, as provided by the 14th section of the Metropolitan Management and Building Acts Amendment Act, 1852 (45 Vict., cap. 14). On the 1st of April, 1885, the District Surveyor received notice from the builders that they were about to erect in High-street, Highgate, three shops, and they commenced to build one shop early in April, 1885. On the 1st of August, 1885, the District Surveyor gave the builders notice under the Metropolitan Building Act, 1855, that the open space in the rear of one of the proposed buildings was of insufficient area, and not in accordance with sec. 14 of 45 Vict., cap. 14. The builders, prior to the receipt of this notice, had erected and covered in the shop in question. On the hearing of the summons the builders contended that the district surveyor was out of time in taking proceedings, because the six months' limitation during which he should take proceedings ran from the month of April, 1885, when their notice was given, and the building commenced. On behalf of the district surveyor it was contended that the offence was a continuing one, and that even if it were not continuous, the time did not commence to run until forty-eight hours after the 4th of August, the day when the builders received notice from him. The Magistrates, being of opinion that the builders were right in their view of the law, dismissed the summons for not being taken out in time, but consented to state a case for the opinion of the superior court, the question for the opinion of the court being whether the summons was taken out in time.

Mr. Tickell appeared for the appellant, and Mr. Lane for the respondents. Mr. Justice Denman, in giving judgment, said that the offence was making default in complying with the District Surveyor's notice, and not the erection of the building. He therefore allowed the appeal, and remitted this case to the magistrates to convict.

#### QUARRY-WORKED STONE.

SIR,—I trust you will again grant me space in defence of quarry-worked stone.

First, in reply to "G. C. W." [p. 331]. From his remarks it is very evident he has never seen stone whilst being worked at the quarry,—hence he is altogether erroneous in stating the cause of the cheapness of quarry-worked stone "is not far to seek, to a practical man, as a quarry-owner uses fresh-quarried stuff, which is, of course, soft and unseasoned." Allow me to state that the real cause is, the first cost of the material at the quarries is much less than when delivered in London or elsewhere, and the quarry-owner escapes the payment of railway carriage on waste, which is generally a considerable item on rough blocks. He is also satisfied with the profit only upon his worked stone, instead of a profit on block, as a farmer does on the worked stone, although this second profit must be obtained by men working it in other places than the quarry.

Then with reference to his remarks as to "newly-quarried stone being used instead of well-seasoned stone" he is far from correct. In this place, the working of stone was commenced with the sole object of working up a grade or seasoned stone, which was rarely accumulating on account of buyers in London and country, as a whole, refusing *in toto* to purchase anything but the softest and most newly-quarried stone, and it always has been that the vendors of the softest stone (never mind its fitness or otherwise) always had, and have, the greatest demand for their stone.

The curse of the stone trade has been through people away from the quarries using the wrong stone,—choosing that which works the easiest, regardless of its durability, and hence it is we find Beer stone being used for Portland, Dumfries stone for Mansfield stone, and the like, all on account of their being in each instance the softer, and consequently the less durable stone, being much more cheaply worked on the increase. I think if architects and builders only had their stone worked at the quarries, they would insure, at least, having the stone which was specified, and I hesitate not to say the stone used would be that most thoroughly seasoned.

Then, also, another benefit is reaped from the fact that, by doing away with the profit on the raw material and the profits of intermediate men, the right stone (not Beer or Dumfries palmed off, as I declared is done) would be obtained as cheaply as the baser or less suitable stone.

Secondly, in reply to "G. R. J." [p. 331], I think the foregoing facts enough to convince any architect of the utmost necessity of having stone worked at the quarries. And, seeing that such is continually and considerably on the increase, I think we may rightly conclude they are alive to the tricks that have been played them, and that in future we may reckon upon seeing the major portion of the stone worked at the quarries, and our stone buildings in future being better constructed, and much more durable, than those of latter-year construction have been since the introduction of these unworthy practices.

A QUARRY OWNER.

Portland.

SIR,—In the correspondence on "Masons' Wages," I notice "G. C. W." [p. 331, ante] says,— "A quarry-owner uses fresh-quarried stuff, which is, of course, soft and unseasoned. It is obvious that, he it limestone, gritstone, or freestone [sic], it should be well seasoned before being wrought; if it is not so, it cannot be expected to resist the London atmosphere." Allow me to enter my most emphatic protest against the assertion that stone should be seasoned before it be wrought. I have for years past been trying my utmost to dispose of this false but too prevalent opinion. Our old master builders almost invariably took their stone from the quarry nearest to their building, and worked it as soon as quarried, and the result is that it has stood well. For instance, Ancaster stone, not to mention a host of others, is said to stand well in its own locality, but to be unfit for the London atmosphere. Now, the reason it has stood well in the churches and other buildings in its own neighbourhood is simply because it was worked when it was soft and unseasoned. If any one doubts this, let him go to some old church, say of the thirteenth century, where he finds the stone thoroughly "well seasoned," and as sharp as when it left the masons' hand, and let him re-work the face of it, and I care not whether it be in the country or in London, he will assuredly find that in two or three years it will utterly decay. If he prefer a more modern example, let him send for a block of "summer-dried stone," such as we see advertised, and, if he get it, he will find the outer face very hard and non-absorbent, but the interior, when cut, will be found much softer, and will never become so hard as the outside. This is a simple fact well known to every mason. The lesson to be learned is equally simple. If you want to use stone properly, work it as soon after being quarried as possible. Season it *after*, not before, it is wrought; and stone which stands well in its own locality will stand practically equally well in the London atmosphere. Nature has provided a protection, but if we choose to deprive stone of this, she will not repeat the process, and we must suffer for our ignorance.

In three churches I am building in London, the stone has been worked at the quarries by Messrs. Randell & Saunders, of Corsham, and by Mr. Robert Lindley, of Mansfield and Ampeter, and both have admirably carried out the work entrusted to them. The slight defects occasionally caused in transit they have ever been ready to remedy, and I may say the same with regard to Continental firms who are supplying me with marble. Well-seasoned stone may be a treasure to the jerry-builder "running up" houses in mid-winter, but should be carefully avoided by every architect who values his reputation. Stone should be cleaned down as the work proceeds, if at all, and never scraped after long exposure to the air.

HUGH ROUMIE GOUGH.

Regent-street, Feb. 28.

WASTE WATER FOR FLUSHING WATER CLOSETS.

SIR,—My letter on the above subject, which appeared in your issue of the 26th ult. (p. 352, ante), appears to have interested your readers to some considerable extent, as I have received communications from Leeds, Stratford, London, Brighouse, Brighton, Darford (Kent), Slough, and Raabon, soliciting further information. If you will kindly insert the following in your next, you will save me much trouble, and, at the same time, convey the information required.

Several attempts have been made to utilise the waste water from slop-stones, sinks, lavatories, &c., for flushing purposes, but, perhaps, with one exception, they have met with very little, if any, success.

One arrangement which, I believe, is in use in some towns, is to convey the waste water from the sink, &c., direct into the trap of the water-closet, which thus supposes to effectually flush. This arrangement cannot, however, I think, be considered to be successful from a hygienic point of view, as it frequently happens that after a deposit has been made it will have to remain in the trap until sufficient water has been passed down the sink to carry it away, which may easily be some hours; and then the quantity and force may not be sufficient to thoroughly cleanse the trap.

The prevailing idea has, however, been to bring about an automatic flushing of the closet by conveying waste water from the slop-stone into a receptacle or tumbler, constructed in such a manner that, when full, it should discharge its contents direct into, or perhaps a little above, the trap of the water-closet, and immediately afterwards right itself, or, in other words, return to its original position for the reception of subsequent discharge from the sink. This arrangement has not, however, to my personal knowledge, met with approval, on account, I suppose, of the delicacy of adjustment of the apparatus and the accumulation of sediment at the bottom of the tumbler, which together renders it inoperative.

The exception referred to is a recent introduction in this neighbourhood, and the mode of operation may be described as follows:—The waste water is conveyed from the sink, &c., into a tumbler, contained in a chamber or box situated a little above the trap of the closet, and which, when charged, remains so until actuated by a handle and connexion somewhat similar in construction to those of ordinary water-closets. On pulling the handle, the contents of the tumbler, which may be of a capacity of four gallons, more or less, are discharged, with some impetus, into the trap of the closet, which it flushes most effectually. When the tumbler has become charged, the surplus water overflows at the top into the outlet of the chamber or box, and thence through the trap into the drain. It will be observed that this constant flow of, say, 100 gallons of water per day through the closet trap, has a most salutary effect.

With respect to the cost of construction of water-closets on this principle, as compared with those generally in use, I may say there is a saving of 40 per cent.

In addition to the saving in the first cost of erection, it will be interesting to ascertain the amount which may be saved by using waste water in place of town's water. To do this we will assume we have a large town, having, amongst other arrangements 10,000 water-closets, which, we will suppose, serve 50,000 inhabitants, five persons to each closet. Allowing that each person uses the closet twice in every twenty-four hours, and taking two gallons of water for each flush, 200,000 gallons of water per day would be required, or 73,000,000 gallons per year; this quantity at the low rate of 9d. per 1,000 gallons would amount to 2,737,104s.

In addition to these figures we should also take into consideration the reduced expenditure brought about by the reduction of the volume of sewage, which, if treated by the precipitation process, would amount to 300l. per year.

JAS. T. PEARSON.

Doroging Engineer's Office, Burnley.  
\*S\* Our correspondent does not make it apparent how this system of flushing would answer where and when the waste water thrown on the sink or slop-stone is not sufficiently large or constant in volume to keep the "tumbler" always full and ready to discharge. We presume, however, that when the waste water runs short the "tumbler" could be replenished by turning on the draw-off tap over the sink for a moment.

NON-ACCEPTANCE OF LOWEST TENDER.

SIR,—We are the unlucky victims of another instance of the unjust application of the usual clause in bills of quantities:—"The lowest or any tender not necessarily accepted."

The facts are these:—We were invited by the architect, under whom we are constantly doing a large quantity of work to tender for the erection of a saw-mill, &c., for the Improved Wood Block Pavement Company, at East Greenwich, and out of eleven builders we were the lowest by 30l. The Company, notwithstanding the competition was thus by invitation, set aside our tender in favour of the next lowest, that of Mr. Stubbs, their usual excavating and concrete contractor.

The Company's explanation, in reply to our protest and request for remuneration, is that "they were very particular to state in the invitation that the lowest or any tender may not be accepted" (which, however, is incorrect, although on the bill of quantities it was so stated). We think that this case is just such a one where the clause quoted operates unjustly, and therefore ask your kind insertion of this, as we think that the more these cases are made public the less will be the chance of their recurrence.

F. & H. F. HIGGS.

Loughborough Junction, March 3.

BUILDERS' DEPOSITS.

SIR,—Will you kindly allow me, through your valuable paper, to ask the seventeen builders who tendered for residence at Claygate, Surrey, and which you published in your issue of February 5th, if they had returned to them the 10s. deposit for quantities, and if not, why not?

SNEEL & Co.

Maidenhead, March 5.

WALKERN CHURCH, HERTS.

SIR,—When at this church a short time back, I was much grieved to see that the old newel stairs leading up to the bells had given place to a modern set of steps. The old stairway stood inside, under the tower, and was a curious piece of fifteenth-century oak framing. The church was admirably restored about three years ago by Mr. H. H. Gough, and the stairs then were left by him in excellent condition.

S. B. CHITTENDEN.

Stevenage, March 8.

The Student's Column.

FIELD WORK AND INSTRUMENTS.—XI.

Surveying Instruments.

IX.—THE THEODOLITE (continued).

THE telescope, as shown in figs. 3 and 4, is mounted to turn both upon a vertical and a horizontal axis, so that when the theodolite is in perfect adjustment it is not necessary for the objects which are ranged by the instrument to be either in the same vertical or in the same horizontal plane. To the underneath of the bottom horizontal plate or limb of the instrument, marked P, is attached a hollow body-piece, having a solid conical axis working within it, upon which the top horizontal plate or stage, marked O, is fixed. Both of these work concentrically within a jacket, which forms the connecting-piece to the parallel plates, as shown in fig. 3. The upper parallel plate is attached by a screwed end to this jacket, and the lower parallel plate is connected by a half-ball-and-socket-joint, the bearing being maintained by three or four elevating screws, which are marked U and Z. All the wearing surfaces are turned and bored so as to fit accurately, and the concentric pieces are secured by a washer and set screw, which is shown beneath the half-ball-and-socket joint. The parallel plates are held in a relative position to one another, in figs. 3 and 4, by means of a stop-block, within which one of the screws is placed, and the fine thread requisite for minutely adjusting the plates is provided with elongated nuts, which are bushed into the upper plate.

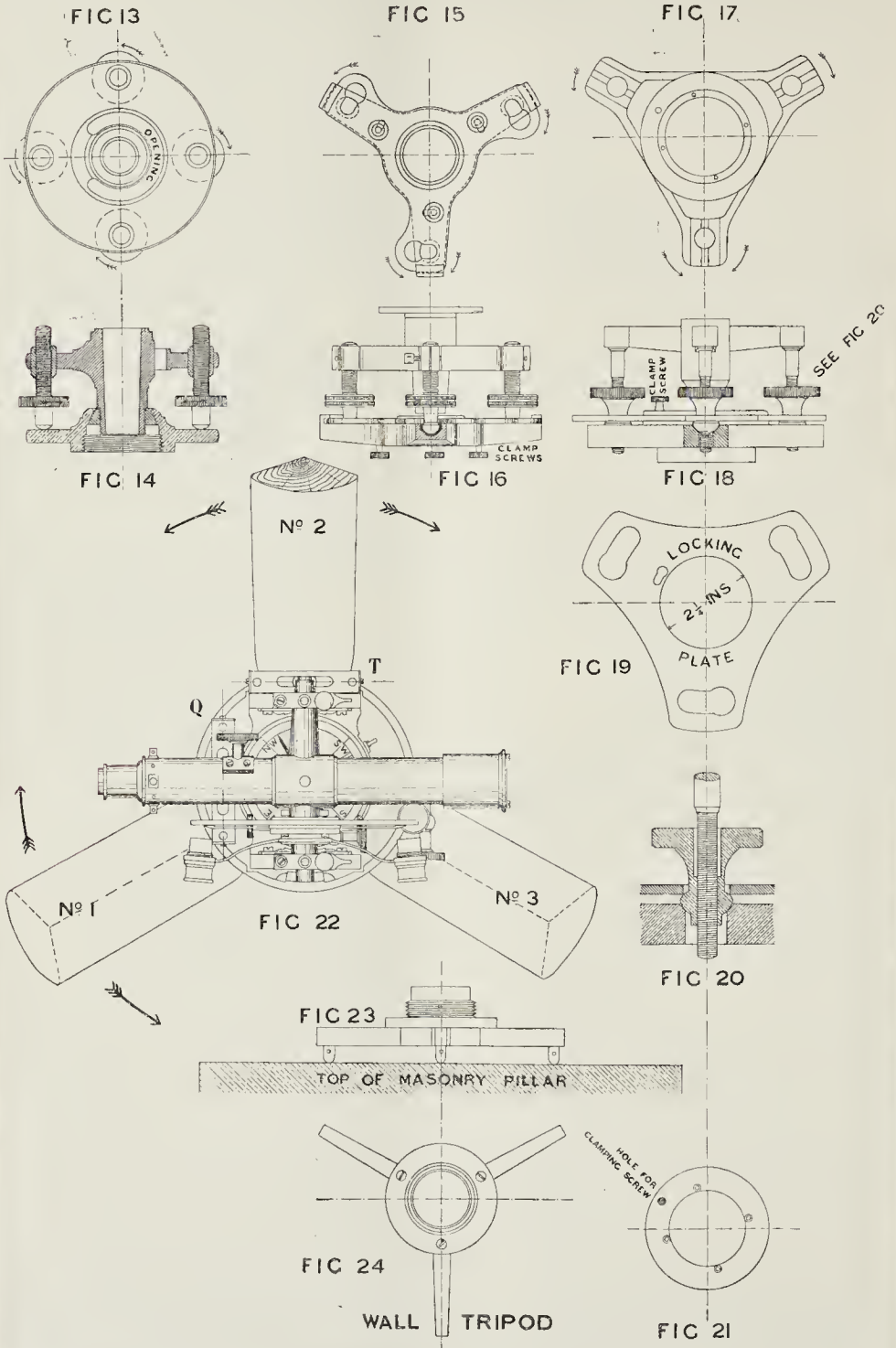
The screws marked U and Z have large milled heads provided for turning them. It must be remembered that in a four-screw combination of parallel plates the centre lines of opposite screws cross one another at right angles in plan. In adjusting the parallel plates, as shown in figs. 3, 4, 13, and 14, two opposite screws are held between the thumb and first finger of each hand, and are turned simultaneously in contrary ways one to the other, so that by moving the corresponding screws U, U, or Z, Z, both round towards the centre of the parallel plates, or both out from the centre of the plates, the upper plate is by this action lowered upon one side and raised upon the other. These screws should always work easily. If one of them

appears hard to turn, it indicates that this screw is being unduly strained, and that it must not be further tightened until the opposite screw has been slightly loosened or slackened.

The delicacy obtained in the process of levelling, by the fineness of the pitch given to the threads of the elevating screws, is further increased in the three-screw arrangement of parallel plates, shown in figs 15 to 18, by the comparative greater distance from the vertical axis of the instrument at which these screws are worked. The parallel plates here form a triach, having three radiating arms or branches, near the outer extremities of which the connecting adjustment screws are placed. The upper plate is about 1/4 in. thick, with a vertical flange carried round its edge, and at the projecting extremities of each arm solid bosses of a suitable depth are cast, which are tapped to receive the threads of the elevating screws. In fig. 16 each screw terminates in a semicircular ball, which rests in a socket upon the lower parallel plate, and is secured by a locking plate, which is clamped by tightening one or more of the three set screws. Thus a uniform motion is obtained without indenting the lower parallel plate on which the screws rest. In a four-screw combination of parallel plates they are, on this account, often made to bear upon small thin pieces of leather, glued to the top of the lower plate, under each screw. In order to avoid heading the central connecting portion when adjusting the parallel plates by means of their elevating screws, a slot shown in the section (fig. 14), and marked "opening" in the plan (fig. 13), has sometimes been introduced into the upper plate. With a four-screw arrangement of parallel plates care must be taken that all four screws bear upon the lower plate or the instrument cannot be expected to work steadily. If one screw be moved more than the other, one of them is apt to be raised off its bearing plate, and the upper portion carrying the limb and stage will then rest upon the three remaining screws and be liable to rock. Hence both hands are necessary to be applied in adjusting the opposite screws, but with a three-screw arrangement of parallel plates the screws may be adjusted with one hand. The disposition to rock is also obviated, as the instrument requires at least three points to rest upon, and the elevating screws form the only attachment when locked between the tripod head and the instrument. In the arrangement of a three screw combination of parallel plates shown in figs 17 and 18, it will be observed that any tendency to vibrate in working the instrument is kept below the locking plate, and that the locking plate, a plan of which is shown in fig. 19, assists to maintain the rigidity of the parallel plate connexion. Fig. 20 illustrates the detail attachment of one of the vertical screws, and fig. 21 shows the washer plate for securing the locking plate in position by means of the clamp screw. To counteract any wearing away that may occur after some time in the screw portion of the projecting arms to the upper plate, a vertical slit is generally made in the end of each arm and a side capstan-headed screw provided to each for clamping the joint.

In order to set up the theodolite, the lower parallel plate is screwed to a tripod head or centering stand, and the parallel plate screws are adjusted at the outset, so as to bring the upper and lower plates parallel to one another. The instrument is then so placed with its vertical axis plumb over a station point, that only a very slight range of obliquity to the parallel plates may be requisite when finally adjusting the hmbles to the centre of their run. Skill in working these screws can only be acquired by practice. They should be hand-tight, but never forced, otherwise their threads will soon be destroyed, and the perfect action of the instrument impaired. On the other hand, slack screws are as prejudicial to the working of the instrument as tight screws are dangerous to the mechanism. Fig. 22 shows a plan of a theodolite mounted upon a tripod stand. In the case of a four-screw combination of parallel plates, the levels marked Q and T are first turned parallel to the diagonal direction of two opposite parallel plate-screws. In the case of a three-screw arrangement of parallel plates, one level is set parallel to the direction of two adjacent parallel plate-screws, and then the other level will be parallel to a line at right angles to the line which joins these two screws,

# THE THEODOLITE





and which passes through the other screw. This will be evident upon comparing the centre lines which cross one another at right angles in figs. 13, 15, and 17. Having done this, the next thing is to set these bubbles approximately in the centre of their run by extending the legs of the tripod marked as No. 1, No. 2, and No. 3 in fig. 22, taking care at the same time so to finally place the instrument that the plumb-bob which is suspended from a hook or chain under the head of the instrument hangs freely exactly over the centre of the fixed station. To effect this it will be found the best plan in practice to consider one leg of the tripod fixed, and while keeping the eye both on the station point and the bubbles, to work with the other two legs, taking hold of one with the left hand and the other with the right hand. Supposing that the leg marked No. 3 has been selected as the fixed one, the bubble marked Q is adjusted to the centre of its run by moving the leg marked No. 1 in the direction indicated by the arrows, and the bubble marked T by the leg marked No. 2. In thus adjusting the legs, care must be taken to lift each leg only just clear of the ground, no more, otherwise the level of the other bubble will be considerably affected thereby. The process must be repeated, first as regards one bubble, by means of its corresponding leg, and then with the other bubble by means of the other leg, until both bubbles appear level. Then, observing that the plumb-bob remains over the station point, press the legs gently but firmly in the ground, and finally adjust the levels Q and T by means of the parallel plate-screws.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

3,123, Locks and Latches. H. Rothery.  
This invention consists chiefly of a combination of latch and bolt, which may be used separately. A tubular extension is arranged at the top of the lock into which a bolt is fitted; this may be drawn forward or backward or may be moved by the mechanism of the lock. It is actuated by a spring and may be fastened in its position either drawn forward or backward by a pin inserted through the door to retain it.  
3,941, Door Knobs and Handles. W. G. Macvite.  
According to this invention, two squares are used in the connexion of the spindle to the knob; the spindle is square, and a brass cap fits on to it. This cap is fastened with a set screw, and when pushed or screwed home fastens the knob and spindle together.  
4,101, Chimney Tops. S. B. Bamford.  
The chimney-top which is the subject of this invention has a clear passage for smoke, and for the sweep's brush. It has also a vane with a rotating jacket so arranged that, in whatever direction the wind is, it produces an upward current of air in the chimney. No cowl is employed, but the jacket has several slits in it, which assist the updraught.

4,331, Roofing and Flushing Tiles. G. H. Couch.  
The object of this invention is to produce a strong and light form of tile so as to more effectually resist the effects of wind and weather than those now employed. This is done by grooving in diagonal lines, and by a groove and tongue, which locks the tiles one with the other.  
4,439, Cowl and Ventilator. J. A. Sharp.  
According to this invention, a double funnel is used,—a trumpet-shaped funnel, designed to be fitted at the small end in a chimney, and surmounted by a second funnel bell-shaped. The form of these prevents the passage of a down-draught, while a free passage is maintained for the updraught.  
14,384, Ventilation, &c. S. S. Robson.  
Below the ventilating opening the chimney is contracted. This will cause a strong current of air to pass through the ventilator, whether the chimney is heated by a fire or not, and there is no danger of smoke coming into the room through the aperture.  
17,016, Windows. C. Flagstad.  
According to this invention, the sashes are hung with hinged pivots and sliding blocks, so that the window-sashes may at will be set open in the middle or to one side of the window-opening. They open and shut with greatest ease, and are free from rattling. The windows can be cleaned from inside, and may be left open at the top without danger to children. Instead of the windows opening in the ordinary manner they project into the room in the form of a *bay*. They have special devices for locking and raising. The invention is of Norwegian origin.

NEW APPLICATIONS FOR PATENTS.  
Feb. 25.—2,912, J. Barber, Slove Grates.—2,913, D. Cowan, Coaking Ranges.—2,923, J. Kershaw, Machines for Coaking Mouldings.—2,957, T. White, Decoration of Tiles, Panels, &c.—2,962, H. Lewis, Hand or Foot Power Saw Benches.  
Feb. 26.—3,035, W. Pierce, Latches.—3,064, D. Graham, Pneumatic Apparatus for Buildings.  
Feb. 28.—3,073, J. Knowles & Sons, Window Sash Fastener.—3,107, H. Hunt, Bath and Lavatory Fixings.  
March 1.—3,115, R. Groot, Fastening Knobs to Spindles.—3,116, W. Clapham, Joiners' Clamps or Cramps.—3,120, E. Taylor, Attaching Door and other Knobs to Spindles.—3,121, T. Cudlipp, Stoves, Ranges, Grates, &c.—3,156, G. Capewell, Nail Extractors.—3,168, Trickett & Noad, Hydraulic Cements, Limes, Mortars, or Coconetes.  
March 2.—3,209, W. Hurdall, Paints for Iron-works, &c.—3,216, W. Wall, Door Bolt and Automatic Indicator.—3,220, H. Wethered, Regulator for Waste Closets.  
March 3.—3,256, G. Jeffery, Roofing Cloth.—3,269, Ellis & Trippitt, Appliance for Preventing Draughts, Dust, and Wet passing through the Bottoms of Doors, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.  
1,111, J. Colbran, Fireplaces.—1,336, R. Cozeds, Door Handles and Spindles.—1,954, G. Smith, Door Fasteners and Locks.—2,291, Young & Moss, Ventilating Apparatus.—2,423, Sir G. Chubb and Others, Locks and Door Fastenings.—17,130, A. Mack, Artificial Boards, Slabs, Mouldings, &c., for Building Purposes.—268, Oshay and Lamal, Drain-Traps.—440, G. Butler, Window-sash Fasteners.—698, O. Elphick, Water-waste Preventers.—939, J. Jeffreys, Ventilators.—1,016, Hurdle and Miles, Ventilators.—1,708, Roberts and Osborne, Automatic Syphon Flushing Cisterns.—1,759, C. Ford, Surface Pipes for Walls, Ceilings, Floors, &c.—1,812, J. Martin, Draught-Preventer.—1,927, R. Scott, Decorating Detachable Wall and Ceiling Surfaces.—2,112, J. Harris, Water-closets and Ventilating their Soil-pipes.—2,160, Middleton and Drow, Flushing Water-closets.—2,223, W. Fryer, Combined Door Spring and Check.—2,231, J. and T. McCallum, Ventilation of Sewers and Drains.

COMPLETE SPECIFICATIONS ACCEPTED.  
Open to Opposition for Two Months.  
5,689, N. Locke, Self-locking Bolts for Doors.—5,916, Bott and Homer, Door Knobs or Handles, and Attaching same to Spindles.—6,019, R. Hall, Gas Brackets.—6,221, C. Williams, Fireproof Floors.—6,309, J. Reid, Lavatory Basins, Baths, Water-closets, &c.—8,624, J. Bennison, Chimney-pots.—8,822, M. Dement, Heating and Ventilating Apparatus.—8,957, S. Keoch and Wodson, Case Kiln for Bricks, &c.—11,170, J. Watson, Ventilators.—14,668, J. Watson, Ventilators.—14,922, J. West, Water-closets.—375, E. Sayers, Sash-fastener Scurvies.—1,470, J. Moore, Balls.—1,483, W. Johnson, Sash, Axle, and other Pulleys.—5,697, H. Weirich, Ground Brushes for Painting.—5,974, A. Boul, Manufacture of Cement.—962, W. Thornston, Fastenings for Doors.—1,441, Braithwaite and Kirk, Bent Plates for Floors, Bridges, Columns, and Buildings.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

FEBRUARY 21.  
By E. J. CALDERNER.  
Honremouth—7, 8, and 9, Wootton-gardens, 7½ years, ground-rent 39l. £1,900

FEBRUARY 26.  
By G. A. WILKINSON.  
Battersee—Ground-rents of 59l. 16s., reversion in 65 years ..... 2,060  
Kensish Town—27 and 29, Clerence-road, 49 years, ground-rent 9l. .... 400  
Camberwell—15, 16, and 17, Washhall-road, 76 years, ground-rent 139l. 10s. .... 890

By A. JACKSON.  
Oxford-street—The lease of No. 202, term 10 years ..... 1,685  
By C. CHANDLER & CO.  
Rayleigh—Five freehold cottages in Church-street ..... 265

MARCH 1.  
By Messrs. WILMOTT.  
Herrow-road—10, Portall-road, 91 years, ground-rent 7l. .... 350

By A. WATSON.  
East Dulwich—57, Gadsud-road, 83 years, ground-rent 6l. 6s. .... 310

By E. J. CALDERNER.  
Winebester—43, Southgate street, 17 years, ground-rent ..... 469

MARCH 2.  
By GEO. GOTTSCHMIDT, SON, & CO.  
Belgravis—69, Chesters-square, end stabling, 37 years, ground-rent 26l. .... 3,151

By PROTHROCK & MORRIS.  
Sneeshook—Holy Bush House and grounds, freehold ..... 2,200

By H. HAIRES & SON.  
Clapton—71 Downe-road, freehold ..... 2,490

MARCH 3.  
By BRADLEY & CO.  
Paddington—An improved ground-rent of 58l. a year, term 66 years ..... 1,231

By RETKOLDS & EASON.  
Shoreditch—73, High-street, freehold ..... 2,560  
A block of freehold property in Boundary-street

Walham-green—31, Banits-road, 93 years, ground-rent 5l. .... 2,300

By PACKERS, TYNABLES, & CO.  
Hamptstead-road—No. 100, and 41, George-street, freehold ..... 1,660

Islington, Essex-road—A ground-rent of 12l., term 25 years ..... 135

By MARLER & BENNETT.  
Delston—2, Regent-st.-w., 58 years, ground-rent 3l. .... 310  
Horsney—68 and 70, St. Mary's-hill, freehold ..... 411  
7, Harringay-terrace, 50 years, ground-rent 4l. .... 330

By G. BRITNEY.  
Sydenham—The residence called Fernwood, 74 years, ground-rent 45l. 4s. 6d. .... 3,129

By NEWSON & HARDING.  
Highbury—35, Highbury-place, freehold ..... 1,400  
Totenham Court-road—12, Fitz-street, copyhold ..... 1,100

Tufnell Park—25, Corinne-road, 81 years, ground-rent 5l. 5s. .... 250

Clerkenwell—137, St. John-street, 36 years, ground-rent 5l. .... 415  
Horsney—10 to 18 even, Sunnyside-road, freehold, 2,205  
King's-cross—5, 6, and 7, North-avenue, 47 years, ground-rent 3l. 10s. .... 395  
Highbury—194, Highbury-hill, 89 years, ground-rent 6l. .... 320  
Horsney—78, Myddleton-road, freehold ..... 235

By WORRFOUL & HAWKERN.  
Dover—45, Castle-street, freehold ..... 425  
69 and 83, Malton Diet-road, 73 years, ground-rent 6l. 6s. .... 869  
Lower-row—Freehold cottage and bakehouse ..... 200  
Stroud-street—The lease of the Gun Hotel, term 5 years ..... 150

MARCH 4.  
By W. B. HALLETT.  
Highbury-hill—49, term 77 years, ground-rent 12l. Peage—Life interest in 75, 79, 85, and 89, Galfield-road, and a policy for 800l., life aged 35 years. .... 700

By BARR & SONS.  
Clerkenwell, Ray-street—The lease and goodwill of the White Swan ..... 890  
Dalston, Albion-square—The Albion Hall, 52 years, ground-rent 60l. .... 1,195  
Canning Town—30 to 44 even, Hemsworth-street, 78 years, ground-rent 22l. .... 800

By HORNCASTLE & PEMBER.  
City—7, St. Mary Axe, 16 years, ground-rent 160l. .... 570

By T. B. WESTCOTT.  
Camden-town—125, Camden-street, 52 years, ground-rent 6l. .... 635  
Hempstead—8, Goldhurst-terrace, 91 years, ground-rent 8l. .... 485

By C. & H. WHITE.  
Lambeth—48 to 60 even, Clashmore-street, copyhold ..... 1,250  
111 to 121 odd, Tyers-street, and 2, Miller's lane, copyhold ..... 550  
Kennington—19 to 29, and 37, 39, and 41, White Hart-street, 44 years, ground-rent 20l.; and ground-rents of 6l. 10s., same term; and five policies ..... 1,863  
Peckham—Ground-rents of 24l. a year, reversion in 63 years ..... 600  
Lambeth—4 and 5, Lemon-place, freehold; and 1, 2, 3, 6, 7, and 8, Lemon-place, 60 years, ground-rent 30l. .... 625  
Kennington—29, Prince's-square, 24 years, ground-rent 5l. 12s. 6d. .... 410  
Wandsworth-road—108, 110, and 112, term 22 years, ground-rent 25l. .... 460  
Clapham—16, 20, and 22, Courland-grove, 28 years, ground-rent 11l. 6s. .... 749  
Camberwell-green—10 to 18 even, Brishane-street, 77 years, ground-rent 15l. .... 450

MEETINGS.

SATURDAY, MARCH 12.  
South Kensington Museum.—Mr. Whitworth Wallis on "Pompeian Architecture and Art." 1. 15 to 3 p.m.  
Edinburgh Architectural Association.—Visit to Liberton Tower, Inch House, &c.

MONDAY, MARCH 13.  
Royal Institute of British Architects.—(1) Election of Royal Gold Medalist. (2) Professor Kerr on "Some Observations on the Architects' Functions in Relation to Building Contracts." 8 p.m.  
Society for the Encouragement of Arts, Manufacturers, and Commerce.—Adjourned discussion on Mr. William P. Marshall's paper on "Railway Brakes." 8 p.m.  
Society of Antiquaries of Scotland (Edinburgh).—3 p.m.

TUESDAY, MARCH 15.  
Society of Arts (Applied Art Section).—Mr. Alfred Phillips on "The Application of Gems to the Art of the Goldsmith." 8 p.m.  
Institution of Civil Engineers.—Colonel E. Maitland, R.A., on "The Treatment of Gun-Steel." 8 p.m.  
Statistical Society.—Mr. T. H. Elliott on "The Annual Taxes on Property and Income." 7 45 p.m.  
Birmingham Architectural Association.—Address by the Vice-President, Mr. John Coitton. 7.30 p.m.

WEDNESDAY, MARCH 16.  
Carpenter's Hall, London Wall (Free Lectures to Builders and Artisans).—Mr. Francis Chanters, F.R.I.B.A., on "Joinery." 8 p.m.  
British Archaeological Association.—(1) Dr. Woodhouse on "Memorials in Fulham Churchyard." (2) Rev. S. M. Mayhew on "Roman Sculptures found in London." 8 p.m.  
Civil and Mechanical Engineers' Society.—Mr. Herbert D. Appleton, F.R.I.B.A., on "Rural Sanitary Authorities." 7 p.m.  
Royal Meteorological Society.—Two papers, and Exhibition of Instruments. 7 p.m.  
Society of Arts.—Mr. Percy Fitzgerald on "Machinery and Appliances used on the Stage." 8 p.m.

THURSDAY, MARCH 17.  
Parkes Museum of Hygiene.—Dr. E. F. Willoughby on "George Varrostrapp, Sanitarian and Philanthropist." 8 p.m.  
Society for the Encouragement of the Fine Arts.—Mr. J. W. Bradley on "Women, in the History of Illuminated Books." 8 p.m.  
Edinburgh Architectural Association.—Mr. W. Scott Dalgleish on "Thronetjem Cathedral." 8 p.m.

FRIDAY, MARCH 19.

**Architectural Association.**—Mr. H. Lovegrove on "Architect and Contractor," 7.30.  
**Institution of Civil Engineers (Students' Meeting).**—7.30 p.m.

SATURDAY, MARCH 19.

**Architectural Association.**—Visit to the National Gallery and the Houses of Parliament, 2.30 p.m. (See advertisement.)  
**South Kensington Museum.**—Mr. Whitworth Wallis on "Pompeian Architecture and Art." II. 5.15 p.m.

### Miscellaneous.

**The College of Preceptors.**—We are informed that the New College Building in Bloomsbury-square will be opened by H.R.H. the Prince of Wales and H.R.H. the Princess of Wales, on Thursday, the 31st March.

**Society of Engineers.**—At a meeting of this Society, held on the 7th inst. at the Westminster Town Hall, Professor Henry Robinson, President, in the chair, a paper was read on "Bridge Floors: their Design, Weight, and Cost," by Mr. Edmund Olander, A.M.I.C.E. After showing the importance of the subject, and that it had not hitherto been specifically treated, the author described the various forms of flooring based on cross girder construction, analysed their strengths, and pointed out the variance in weight and cost between different examples. The great weight of some, owing to unnecessary thickness of ballast, and in many instances a too extravagant use of the materials of which the structures were composed, was shown to involve waste of iron in the girders of the bridges to enable them to carry the undue load. The floorings noticed were those of timber alone, of timber on cross girders, and of cross girders with rail-bearers. Passing on to the modern system of trough floors, he analysed the strength and cost of nine different forms, and discussed the important question of the length over which the moving load should be considered to be spread. In connexion with this he gave the details of two tests by dead weight, which had been carried out under his direction, and which demonstrated the strength of the new forms. He showed also that they were more economical as well as more durable than the old systems. The results of all his calculations were collected in a comparative summary, giving numerous details, and the paper was illustrated by a large number of diagrams and drawings.

**Sale of the late Sir John Kell's London Leaseholds.**—On Wednesday Messrs. Fares-brother, Ellis, Clark, & Co. offered for sale, at the Auction Mart, the London leasehold properties of the late Sir John Kell, the eminent builder and contractor, of the well-known firm of Kell & Lucas. The several properties submitted are all situated at the West End, and comprise a mansion in St. James's-square, at the corner of King-street, arranged in suites of residential chambers, held for an unexpired term of fifty-seven years, at a ground-rent of 100*l.* per annum; also five dwelling-houses in Margaret-street, Cavendish-square, on the Portland Estate; a set of stabling in Grosvenor-square; the lease of No. 80, Eaton-square, and improved ground-rents in Eaton-square, amounting to 104*l.* per annum. Sir John Whittaker Ellis, M.P., conducted the sale. The set of stabling at the rear of Grosvenor-square, under-leased for a term of twenty-one years from December, 1881, at a rent of 150*l.* per annum, was sold for 2,525*l.* The leasehold properties in Margaret-street, Cavendish-square, were submitted in six lots. They were described as held from the Duke of Portland for an unexpired term of eighteen years, at an aggregate ground-rent of 135*l.* per annum, and under-leased to capital tenants at rents amounting to 595*l.* per annum. They were sold at prices amounting together to 6,000*l.* The biddings for the mansion in St. James's-square commenced with an offer of 9,000*l.*, and 15,600*l.* having been reached without any further advance the property was withdrawn. The Eaton-square property was submitted in three lots. An improved ground-rent of 48*l.* per annum, on 65, Eaton-square, held for an unexpired term of thirty-seven years, was sold for 730*l.*; and a similar improved ground-rent of 60*l.* per annum on the adjoining house realised 950*l.* The town mansion, No. 80, Eaton-square, adjoining the residence of the Duke of Bedford, held by under-lease from Mr. Cubitt for an unexpired term of thirty-two years, at a ground-rent of 64*l.* per annum, was withdrawn at 10,600*l.*

**Progress of the Preston New Docks and River Works.**—Mr. Walker, the contractor for the new docks and for the improvement of the river Ribble at Preston, now going forward, has about 1,000 hands at work, and very active progress is being made with the undertaking. The works in connexion with the docks are in a very advanced state. The south wall of the 40-acre dock is nearly completed, whilst other portions of the structure are being actively pushed forward. As regards the deepening of the channel of the river to a depth of from 26 ft. to 30 ft., this section of the undertaking is being proceeded with. The plans involve the deepening of the channel to the extent of twelve miles in length, in the direction of the Irish Sea, and this is being carried out by powerful dredgers. Upwards of 1,000 cubic yards of material are removed by the dredgers weekly. The material consists chiefly of clay and boulder stones, some of the latter being of great size. It is stated that a few weeks ago one of these boulders, weighing three tons, was taken from the bed of the river and placed on the deck of the dredger. In anticipation of the completion and opening of the docks some of the great railway companies are taking steps for securing communication with them for the coal and other traffic. The London and North-Western Company have already a branch railway from their line at Preston to the Ribble, and a staff of surveyors in the employ of the Company has lately been busily engaged in preparing surveys and plans of intended new lines connecting with the docks, and that considerable extensions are about to be carried out by the railway company in order to provide facilities for the shipping traffic from the docks. The Manchester, Sheffield, and Lincolnshire Company are also taking similar steps for connecting their system with the docks by means of their Wigan and Preston Junction Railway, which is about to be commenced.

**British Archaeological Association.**—At the meeting of this Association on the 3rd inst. Mr. Thos. Morgan, F.S.A., in the chair, the Rev. S. M. Mayhew exhibited a variety of antiquities recently found in various parts of the City, the most remarkable being a sculptured bust, in marble, of a young Roman lady, found at Walbrook. The material is marble, and the features are of great beauty. Some burnt Samian ware was found at the same time, while at a lower level and at no great distance a flint instrument was discovered, one of the few prehistoric relics which have been met with in London. Mr. Cecil Brent, F.S.A., exhibited some curious Merovingian bronze personal ornaments, similar in general character to some of early Saxon date found in England. Mr. Round exhibited a unique impression of the seal of Warwick, the King Maker, which, with the warrant to which it is attached, the latter bearing Warwick's autograph, was recently found in a loft over a stable, at the seat of a relative of Mr. Round's, in Essex. Mr. Earle Way produced some Roman pottery found in Southwark, and Mr. Loftus Brock, F.S.A., described a very early vase found at Cyprus. The first paper was on the Roman Villa, at Yatton, Somerset, by the Chairman. The villa stood on very low-lying ground below the level of the present bed of the River Yeal, only about 50 ft. distant. The rooms which have been excavated have curious relation to two parallel walls which have been traced up to the modern river bank. There are two pavements of very elegant designs, much injured, one of which has a floriated cross in the centre. The second paper was by Mons. Rössler, on recent discoveries at Fécamp. Several discoveries of Roman pottery have been made, many of the objects being of great beauty. The tomb of a young Roman lady has also been found, the date being about A.D. 400. The epitaph of William, third Abbot of Fécamp, was described. It is a curious example of the use of Roman numerals, the date being 1107. The paper was read in English by the author. The Rev. Dr. Hoopell described a curious Roman balance, in perfect condition, of bronze, which has recently been found at Catterick, Yorkshire.

**New Malden Sewerage.**—The Local Board of New Malden have decided to carry out a scheme of sewerage designed by Mr. Lockwood Howard, C.E., and have accepted the tender of Messrs. B. Cooke & Co., of Battersea, the contract amount being about 13,000*l.*, subject to the sanction of the Local Government Board being obtained.

**Sale of Brickfields and Building Land near Tilbury.**—On the 4th inst. Messrs. Baker & Sons offered for sale, at the Auction Mart, a freehold property at Corringham, near Tilbury, covering an area of 136 acres, and comprising the "Tilbury Brickfields," occupying nearly 55 acres, and the Brickhouse Farm, 81 acres in extent. The property was offered in two lots, the first lot submitted being the Tilbury Brickfields. It was stated that brick earth and sand of the best quality abounded on the estate. Included in the sale were the workshops and several other buildings incidental to the working of a brickfield. The auctioneer stated that the land had, until recently, been in the occupation of the Tilbury Brickfields Company, and that having in view the proximity of the estate to the Tilbury Docks, and the extensive building operations which were taking place in the neighbourhood, a company would always find a ready sale for bricks and tiles manufactured by them. The conditions provided that certain carpenters' shops and moulding sheds, also a quantity of machinery and other plant, would have to be taken by the purchaser at a valuation. The biddings commenced at 2,000*l.*, and the property was ultimately sold for 3,625*l.* The Brick Hoase Farm, of 81 acres, was next submitted. It was sold for 2,500*l.*, the total proceeds of the estate, including the brickfields, being 6,125*l.*

**Cemetery Chapel, Edmonton.**—The new cemetery chapel, in connexion with the Church of England in the Edmonton Cemetery, was consecrated on Monday, the 21st ultimo, by the Bishop of Bedford. The Nonconformist chapel is connected with it by a gateway surmounted by a wooden fêche. The style generally is fifteenth-century Gothic. The walls are of brick faced with Kentish rag, the dressings of Smisdon's Monk's Park stone. The windows are throughout of lead quarry glazing, by Mr. W. Ramsey, of Farringdon-street, E.C. The hot-air stoves were supplied by Messrs. W. Poore & Co., of Cheapside. In a detached building, water-closets, &c., are provided, also mortuary and tool-house. Mr. W. Hickinbotham was the contractor, and Mr. T. Peto Ward clerk of the works. The cemetery was provided by the Edmonton Local Board.

**Monument to the late Dean of Chester.** A brass in memory of the late Dean Howson has been fixed to the wall of the north aisle of the choir of Chester Cathedral. The brass is contained in a sunken panel of Runcorn stone with carved Early English border, and bears the following inscription:—"To the memory of John Saul Howson, D.D., late scholar of Trinity College, Cambridge, and from 1867 to 1885 Dean of this Cathedral Church, which, mainly by his devoted efforts, was during those years recovered from decay to a state of beauty and fitness for the worship of God and for the ministry of the Word. Ob. Dec. 15, 1885. 'Crux est potestas Dei.'" The design is by Mr. Blomfield, of London.—*Times.*

**The East Sussex and West Hants Infirmary, Chichester.** was re-opened on Tuesday, after having been closed in sections for three months, during the renewal and re-modelling of the sanitary arrangements and drainage of the building, at a cost of about 1,000*l.* The work has been designed and carried out by Mr. Mark H. Judge, A.R.I.B.A., and on Tuesday Mr. Judge went through the whole of the work with the committee and governors of the institution, explaining in detail the arrangements, including a new system of sub-irrigation drains which has been substituted for the cesspools, which had hitherto existed. Several members of the staff were also present, and all expressed their satisfaction at the great improvements that had been effected.

**Pompeii, Pompeian Architecture and Art.**—The Department of Science and Art announce that three lectures on this subject will be delivered by Mr. Whitworth Wallis, F.R.G.S., in the Lecture Theatre of the South Kensington Museum on Saturday afternoons, the 12th, 19th, and 26th of March, at 5.15 o'clock. Each lecture will be illustrated by plans and views shown by the oxy-hydrogen light.

**The Prudential Assurance Company.**—The summary of the thirty-eighth annual report of this company, which appears in our advertisement columns, contains figures which testify to the remarkable development of its business, particularly in what is known as the "Industrial Branch."

PRICES CURRENT OF MATERIALS.

Table listing prices for various timber and material types such as Greenheart, Teak, Fir, Spruce, etc., with columns for quantity and price.

TIMBER (continued).

Table listing prices for various timber types including Iron-bar, British, Best selected, etc., with columns for quantity and price.

CHELSEA.—For sanitary and decorative alterations

and additions at 33, Cadogan-place, for the Hon. Mrs. Goulburn—

Table listing contractors and their fees for Chelsea alterations, including Godfrey, Giles & Co., Grosvenor-square, etc.

FOREST-GATE.—For the erection of two cottages at

corner of Canal-road and Latimer-road, for Mr. W. H. Watson. Mr. James E. Wesley, architect, Forest-gate—

Table listing contractors and their fees for Forest-gate cottages, including J. W. Wyles, A. W. Nicholls, W. Parsons, etc.

FULHAM.—For reconstructing the drainage of the

Western Hospital, Seagrave-road, Fulham, for the Metropolitan Asylums Board. Messrs. A. & C. Harton, architects, 15, Leadenhall-street. Quantities not supplied—

Table listing contractors and their fees for Fulham drainage, including J. Knight, Westminister, Saunders, Fulham, etc.

HORNSEY.—For the construction of new stoneware

pipe sewers, for the drainage of the northern portion of the District of Hornsey, for the Hornsey Local Board. Mr. T. De Courcy Meade, engineer and surveyor—

Table listing contractors and their fees for Hornsey pipe sewers, including Rowles & Co., Westminister, Danmore, Crouch-end, etc.

KENSINGTON.—For carrying out additions and

alterations to house, 14, Kensington Palace-gardens, for Mr. H. J. Solomon. Messrs. Joseph & Smith, architects—

Table listing contractors and their fees for Kensington alterations, including Horne, Patrick & Son, Heape, Patman & Fotheringham, etc.

KILBURN.—For repairing works, &c., to 36, 38, 40, 44,

50, 55, 57, 59, 61, 63, 71, Victoria-road, Kilburn. Mr. Delius Joseph, architect, Basinghall-street—

Table listing contractors and their fees for Kilburn repairs, including Kilby & Gayford, B. E. Nightingale, J. W. Falke, etc.

LONDON.—For alterations to the sanitary arrange-

ments at 60, Chester-square, for Col. Clayhills. Mr. T. W. Rhodes, architect, Cornhill—

Table listing contractors and their fees for London sanitary alterations, including Winsor & Co., Buckingham Palace-road, etc.

LONDON.—For Portland stone front to 28, 30, 32, and

34, Jewin-crescent. Mr. Delius Joseph, architect, Basinghall-street—

Table listing contractors and their fees for London stone front, including Gilbert Seal, George Herridge, etc.

LONDON.—For building new water-closets, &c., and

for general repairs to 107, 109, 171, 173, and 175, Hampstead-road, for Mr. W. Wilson. Messrs. Thos. Chantfield Clarke & Son, architects—

Table listing contractors and their fees for London water-closets, including Heaps, Muston & Son, A. Westley & Co., etc.

LONDON.—For carrying out alterations and repairs to

premises, 292, High Holborn, for Mr. W. Baker. Mr. C. Eelily, architect—

Table listing contractors and their fees for London premises repairs, including Heaps, Smith & Sons, Morton, etc.

PLAISTOW.—For Wesleyan Sunday schools, Plaistow.

Mr. J. H. Carte, architect. Quantities supplied—

Table listing contractors and their fees for Plaistow Sunday schools, including Maddison, A. Reed, etc.

RICHMOND.—For railings, gates, &c., at the Richmond

Hill Public Pleasure Gardens. Mr. Walter Brooke, A.M.I.C.E., Town Surveyor—

Table listing contractors and their fees for Richmond railings, including Thomas Brown & Co., Birmingham, etc.

ROTHERHITHE.—For rebuilding house in Adam-

street, Rotherhithe, for Mr. J. McLean. [No other Tenders were sent in.]

Table listing contractors and their fees for Rotherhithe house, including A. White & Co., etc.

STOKE NEWINGTON.—For erecting house and

stables, in Manor-road. Quantities supplied. Mr. Jno. Hamilton, architect, Bishopsgate-street—

Table listing contractors and their fees for Stoke Newington house, including Harper, Weeks, etc.

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitoms of Advertisements in this Number.

CONTRACTS.

Table listing various construction contracts, including works at Hendon Local Board, St. George-in-the-East, etc., with columns for nature of work, contractor, architect, and date.

PUBLIC APPOINTMENTS.

Table listing public appointments, including Parish Surveyor, Clerk of Works, Liverpool Vestry, etc., with columns for nature of appointment, advertiser, salary, and date.

TENDERS.

BERMONDSEY.—For erecting stabling, with warehouse floors over, in Rothsey-street, and sundry alterations and repairs to adjoining premises, 23, Bermondsey New-road, for Mr. J. E. Armfield. Mr. Edward Crosse, architect, Bermondsey-square. Quantities not supplied—

Table listing tenders for Bermondsey works, including B. Kipps, Longland, W. Sheppard, etc.

BROADSTAIRS.—For alterations and additions to

York Gate House, Broadstairs, Kent, for Dr. Jackson. Mr. Fras. L. Picher, architect. Quantities supplied—

Table listing tenders for Broadstairs works, including Lockwood, Westgate, Martin, Harcourt, etc.

CHATHAM.—For the construction of roads, with

surface-water drainage on the Sicketts-hill Estate of the National Liberal Land Company, Limited. Mr. George Pooley, surveyor, Charing-cross—

Table listing tenders for Chatham roads, including Stephen Kavanagh, Surbiton, William Nicholls, etc.

**SOUTHAMPTON.**—For warehouse extension, Queen's-buildings, Southampton, for Mr. Edwin Jones. Mr. James Lemon, F.R.I.B.A., architect:—  
 Hinton & Bone ..... £4,683 0 0  
 Stevens & Sons ..... 4,639 0 0  
 Bull, Sons, & Co. .... 4,669 0 0  
 H. J. Sanders (accepted) .. 3,583 0 0  
 [All of Southampton.]

**STONEY STRATFORD (Bucks).**—For new house and shop, High street, Stoney Stratford, for Mr. Arthur Hall:—  
 White, Stoney Stratford ..... 849 0 0  
 Green Bros., Northampton ..... 750 0 0  
 Wingrove, Northampton ..... 717 6 0  
 Mitchell, Northampton ..... 655 0 0  
 Worell, Wolverton ..... 650 0 0  
 Wilson & Roberts, \* Accepted. 634 10 0

**SUNDERLAND.**—For proposed hospital for infectious diseases, for the Borough of Sunderland. Architect, Mr. R. S. Rounthwaite, Borough Engineer. Quantities by Mr. G. D. Irwin, Sunderland:—  
 G. R. Hodgson, Sunderland ..... £14,651 19 0  
 J. H. Thorp & Son, Leeds ..... 13,417 0 0  
 G. Swan, Sunderland ..... 13,363 0 0  
 Craven & Umpheby, Leeds ..... 13,229 0 0  
 C. Myers, Leeds ..... 14,820 0 0  
 S. Warburton, Manchester ..... 14,300 0 0  
 Walter Scott, Sunderland ..... 14,219 0 0  
 E. H. & G. Allison, Sunderland ..... 13,600 0 0  
 Thos. Lonsden Jarrold-on-Tyne ..... 13,808 0 0  
 Joseph Elliott, North Shields ..... 13,827 0 0  
 T. P. Shafco, \* Sunderland ..... 13,796 1 8  
 Geo. D. Uglas, Sunderland ..... 13,425 19 11  
 W. & R. Blackett, Bishop Auckland ..... 12,954 0 0  
 G. & F. Hildrey, Sunderland (with-drawn) ..... 11,290 0 0  
 \* Accepted.  
 † Amended to 13,454.

**SUSSEX.**—For additions to the shooting box, Horeham Hurst, Sussex. Mr. H. Percy Mouncton, architect, Wulbrook:—  
 T. S. Todd, Beahill-on-Sea ..... £993 0 0  
 Alcorn & Sons, Shipbourne, Kent ..... 829 12 8  
 Gorwell & Son, Eastbourne ..... 816 0 0  
 D. Ashdown, Horeham-road (accepted) 841 10 0  
 Stabling.  
 D. Ashdown, Horeham-road (accepted) £250 0 0  
 Entrance Lodge.  
 D. Ashdown, Horeham-road (accepted) £110 0 0

**WORTHING.**—For the erection of new offices and Board-room at Worthing, for the Worthing Local Board. Mr. Walter Horne, surveyor:—  
 J. Reynolds, Brighton ..... £2,195 0 0  
 S. Sabej & Son, Islington ..... 1,994 0 0  
 J. Crooke & Son, Northampton ..... 1,887 0 0  
 J. Wernham, Plumstead ..... 1,855 0 0  
 C. Cornwall & Son, Eastbourne ..... 1,861 0 0  
 J. Roberts, South Norwood ..... 1,851 0 0  
 Rowland Bros., Horsham ..... 1,840 0 0  
 A. Purrell, Littlehampton ..... 1,829 0 0  
 P. Peters, Horeham ..... 1,773 0 0  
 J. Longley, Crawley ..... 1,750 0 0  
 A. J. Wright, Broadwater ..... 1,638 19 0  
 W. H. Sawie, Worthing (accepted) .. 1,623 0 0

**SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than **Four p.m. on THURSDAYS.**

**TO CORRESPONDENTS.**

Registered Telegraphic Address, "THE BUILDER, LONDON."

RECEIVED.—A. O. D.—R. F.—H. G.—J. S. (next week).—E. K.—M. H. J.—W. S. L. (thanks).—J. P.—W. B.—J. D., Jun.—W. L. C.—(see Mr. Pearson's letter).—K. J. B.—G. E. W. (we do not know).—F. J.—C. A. M.

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

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors. We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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# The Builder.

Vol. LII. No. 2392.

SATURDAY, MARCH 19, 1887

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### The Building Trades in Morocco.



THE Moors resist the encroachments of civilisation by all the means in their power. They feel they cannot compete against the energy and the scientific knowledge of the European.

But, in spite of the diplomacy arrayed against them, Europeans daily obtain a firmer footing in Morocco. The incalculable wealth of this country, lying within six days' sail of England and three to four days from Marseilles, would long since have been brought into the world's markets but for the exceptional political difficulties that stand in the way. It must be borne in mind that the coast line extending from Cape Spartel to Ceuta is as important for the maintenance of British communications with the East as the neutrality of the Suez Canal.

From Tangier to Tarifa the Straits of Gibraltar are only fourteen miles in width. Any great Power in possession of the coast line on either side of Tangier, and acting in consort with the Spaniards on the opposite shore, could effectually block the Straits of Gibraltar. Access to the Mediterranean thus rendered impossible, the Suez Canal becomes useless. With modern artillery the heights of Algeciras dominate the bay and harbour of Gibraltar, and there is not the slightest doubt but that to make our position secure, from a military point of view, England must also hold Tangier. But England is not at all anxious to burden herself with more colonies, particularly as, in this case, both Spain and France, and, perhaps Italy also, consider they have a prior claim. The policy of England has, therefore, consisted in using every effort to keep other nations out of Morocco. So long as Tangier is held by the Moors, who possess neither fleet nor artillery, there will be no difficulty in passing through the Straits of Gibraltar.

Such is the political situation, and its bearing on commercial interests is absolutely paramount. The Moors have been quick to profit by it, and, in skilfully playing off the jealousies of one nation against the other, have managed to exclude one and all. Hence the valuable deposits of copper, lead, antimony, iron, and coal remain untouched in the rich soil of the Empire of Morocco. Vast tracts of fertile land are still uncultivated. Plentiful harvests of corn are at times allowed to rot on the ground because there are no roads, and it is not worth while to bring the grain down to the coast for foreign exportation. On the other hand, if we

picture to ourselves what will happen the day the barriers raised by Moorish exclusivism fall to the ground, any one who has a knowledge of the country will at once appreciate the far-reaching possibilities of such an event. In the meanwhile the gradual pressure of each legation, seeking to forward the interests of those traders and others in Morocco who belong to its nationality, has hrought about some improvements. Prohibitory tariffs and the refusal of the Moorish authorities to grant any concessions for the working of mines, &c., have not prevented the steady increase of the European population in Morocco. In spite of all, there is a considerable trade, and of all forms of human endeavour it is, perhaps, in the building trade that the greatest activity has been displayed.

To the architect and the builder Morocco is a country of peculiar interest, while it is a veritable paradise to the artist. From all parts of the world painters come to study in a land where every house, every corner, every street, every group of people, is a picture in itself. Even Venice does not provide a better school for painting from life and nature. Then, when we remember the great triumphs of the Moors in Spain, it is only natural that the home from whence they invaded and half conquered Europe should attract and interest all thoughtful students of history, art, and architecture. Unfortunately, the Moor of today serves principally to illustrate how great may be the fall of a powerful nation. But little remains of his former prowess in science, arts, and manufacture. The Moor seems, on the contrary, to have relapsed into the barbarism from which he emerged during the tenth century. For the moment, therefore, we will leave the Moor and the ruins of his former greatness, and deal only with the condition of the building trade in Morocco.

So far as the interior is concerned, little or no alteration has taken place. Practically speaking, there are no European inhabitants, and the Moors build as they have built from time immemorial. Some of the most recent constructions at Fez, Mequinez, and elsewhere, are equal in their artistic beauty to anything done within the last century or two. There are still artists who seek to perpetuate the great traditions; and, even at Tangier, the new gateway of the Marina elicited the admiration of every visitor. It is in the towns along the coast, however, and especially at Tangier, that innovations have been made. The European colony has brought over its workmen and its methods of building, and thus a great change, but not always a progress, has been achieved. Many have sought, and wisely, to combine Moorish style with some European improvements. But those who have,

on the contrary, constructed houses resembling in every respect European dwellings, have, in some measure, not only spoiled the picturesque aspect of the sites they occupy; they have also built houses that are not suited to the climate. At Tangier, it is true, the climate is so temperate that this error is not a grave consideration; but lower down the coast, and in the interior, the consequences would be severely felt. Tangier is swept by fresh breezes from the Mediterranean on one side, and from the Atlantic on the other, while the hot winds from the south are cooled in passing over the eternal snows of the Atlas Mountains. Thus this most favoured spot is destined to become, at no distant date, a favourite health resort for all who seek to avoid Northern winters. Already a great number of people go there exclusively for their health, and the benefit they derive from the climate is likely to induce many others to follow their example. Consequently, new and better houses will be required every year, and already a great change may be noted in the beautiful environments of Tangier.

As a special privilege, Europeans have been allowed to purchase land in the neighbourhood of the town. At first, however, they found it no easy matter to build houses such as they cared to inhabit. The material required had to be brought from considerable distances; and, in the absence of competition, very high prices were charged. Now, however, the building trades are better organised, and the cost for material has fallen within the last three years something like thirty per cent. This one fact alone shows how great and sudden is the development of Tangier as a residential town for Europeans. The fall in prices, of course, is the result of efforts in various directions, but Swedish enterprise has, perhaps, taken the lead in this evolution. There is now in Tangier a large assortment of ready-made doors, windows, &c., imported direct from Sweden. Dealers find it cheaper and less trouble to buy this ready-made joinery than to employ Moorish and Jewish carpenters. Thus the latter are thrown out of employment, though the consumer does not benefit to the full by the change. It is the middle-man who, for the present, pockets the lion's share of the economy realised. The general all-round price for each opening, whether door or window, is eight dollars, or 17. 12s.

The iron used for building is, for the most part, imported from Belgium, and costs about 12s. the 100 kilogrammes. The stones are cut out in a very primitive manner from a mountain some two miles distant, and brought to town on the backs of small donkeys. These stones are very irregular in shape, of a greyish colour, and somewhat hard, considering that

they are composed of a mixture of sand and chalk. The charge for the stones delivered in town is four shillings the cubic metre. If a line could be laid down, trucks substituted for the Barbary donkeys, and if blasting powder were used instead of merely cutting the stones out, the cost would, of course, be very greatly reduced. The marble employed is generally imported from Italy, and can be obtained for the same price as in Spain. But the tiles or *carroaux* of Marseilles are in much greater demand for flooring. These are brought over by the Transatlantic and Pacquet line of steamers, and occasionally by a sailing vessel. Bricks also come from France, and are sold at the rate of six dollars the thousand.

There are some very excellent woods in Morocco used for cabinet-making and for building. The best is the Arar (*Callitris quadrivalvis*), a finely-grained, somewhat fragrant, and heavy wood. It can resist the action of water, but has many knots, and is therefore somewhat difficult to work. Vast forests of this wood exist in the neighbourhood of Mogador. From the inaccessible Reef country another sort of wood is obtained, sometimes called Latis, but more generally known as the reef wood. It is hard, and gives off a fragrant and strong odour. Evidently it possesses considerable antiseptic properties, for vermin will not settle upon it. Unfortunately this wood cannot be obtained for joists or rafters of more than about 9 ft. in length, and this accounts for the long narrow shape of so many rooms in Tangier. The climate, combined with the uncleanly habits of many of the inhabitants, facilitates the growth of vermin and explains the popularity of this wood. To the same reason may be ascribed the total absence of wall-paper in Tangier. Whitewash, plain or mixed with glue, is universally used, and it has certainly the advantage of not harbouring insects. In spite of the special qualities which distinguish the native woods, the importations from Sweden are beating them out of the market. A most enterprising firm, Messrs. Sundt, Toussaint, & Co., of Stockholm, have chartered a special steamer to visit all the ports of Morocco. At Tangier they have opened a large *dépôt*, where everything required for building is to be found. Formerly, when Swedish pine had to be bought from the Gibraltar merchants, the average price was 14 dollars for 168 feet run of deals measuring 3 in. by 9 in. Now that these deals come direct to Tangier from Sweden the price has fallen to 12 dollars, or 2l. 8s. Not content with this, Messrs. Sundt & Toussaint are about to open steam saw-mills near Tangier, and also propose to manufacture bricks in the neighbourhood. They further intend to import ready-made wooden houses from Sweden, which can be taken to pieces and put up again wherever convenient.

The supply of labour is plentiful. Good carpenters receive from 3s. 3d. to 4s. a day. They are Spaniards, Moors, and Jews. With the exception of two very clever but somewhat expensive carpenters, the Spanish are the worst workers, and the Jews the best. The Moors do not know their trade thoroughly, but are a little cheaper, and suffice for ordinary work. Thus may now be found at Tangier all that is necessary for building, with one all-important exception, there is no architect. Certainly the work to be done at present would be but a small inducement for an architect to establish himself in the town; but enough has been said to show that his business might grow in time, and any one with a delicate chest, sentenced by his medical advisers to winter abroad, might combine a little business with healthy relaxation in such a place as Tangier. Actually, a person who desires to build must make his own plan, and, even then, it is of little use. The Moorish mason looks to a piece of wood and a string rather than to a design, to tell him where he must lay his stones, and most of the planning is done on the ground itself. The result is sometimes peculiar, but tradition and custom help where knowledge and system are failing, and it is only the advent of an increasing European colony that will render the presence of an architect necessary. Perhaps some enter-

prising member of the profession may think it worth while to take time by the forelock and secure a good footing in Tangier before political and commercial progress have finally beaten down existing barriers, and completely thrown open the country.

#### REPORT ON THE PATENT OFFICE.

THE Departmental Committee who were appointed more than twelve months ago to inquire into the duties, organisation, and arrangements of the Patent Office have just presented their Report to the Board of Trade. Having practically confined themselves to the system which now obtains of examining the specifications lodged by would-be patentees, they are unanimously of opinion that certain clauses *ad hoc* of the Act of 1883 should be repealed. The statutory provisions in question had been inserted in the Bill when it was in Committee, at the instance of certain Members who claimed to represent the interests of inventors. They demanded that if an application has been made, but before a patent has been sealed, another application is made bearing the same or a similar title, the examiner should report to the Comptroller whether the specification appears to him to comprise the same invention as the earliest (*sic*) application. If the report be in the affirmative, the Comptroller is bound to advise the applicants accordingly. The amount of scrutiny and correspondence hereby involved may be estimated from the fact that on an average 16,000 applications are deposited yearly, as compared with the 6,000 under the former Act, and when, as the Comptroller says, a man might lodge the same patent twenty times a day and all would be taken without question. It appears, moreover, that these 16,000 specifications are dealt with in their provisional and completed forms at a rate of about fifteen a week to each examiner.

The Committee are agreed in concluding that this course of examination by search and comparison has not only failed of its purpose, but "has been rather mischievous than otherwise. Complaints have been made on the one side that notices are frequently given under the Act when the applications are not really for identical inventions, and on the other that the office has frequently omitted to give notice when the inventions were in fact identical. . . . The failure has resulted in truth from difficulties inherent in the very nature of the case." They are further of opinion that the revision of the assistant examiners' work by the principals is carried to an extent which "is greater than the necessities of the case require, and that there is in this respect room for economy in the working of the office." The ten or twelve officials thus set free should be transferred to the Indexing and Abridging Department, a branch whose duties are of admittedly the utmost value and utility, but which has fallen considerably into arrears. Here, indeed, we might profit in emulating the conditions that prevail in America.

In introducing the existing Act of 1883, the Government took considerable *kudos* to themselves for the regard and encouragement which they meant to extend to the not infrequently inappreciative inventor. But, in effect, the reduction of fees is, we do not say altogether illusory, yet less in substance than appearance. The applicants' payments go to support a very costly course of procedure, for which the Legislature must take responsibility; *in Vos vobis, Georges Dandin!* Nevertheless, the system is one for which the general public are not, and as matters at present stand could hardly be, very grateful. According to an estimate cited by the Deputy-Comptroller in his evidence, the cost of examining 14,000 provisional specifications is about 5,500l. a year. Now of these one half are in practice abandoned. "Of the whole 14,000, in 22 per cent. there is some question raised. In about 13 per cent. questions are raised with regard to fair description, which is a point that requires skilled men to determine." He goes on to say that an initial fee of 10s., instead of 20s., would cover the whole office expenses in dealing with provisional specifications.

The authorities at the Patent Office are confessedly in favour of the making of applications in all cases, and they are actually preferred in three cases out of four, through the medium of a "patent agent." It is impossible not to see that there is one unfortunate individual of whom everybody, all round, fights shy. We mean the economical, or, as it more often happens, the poor inventor. Patent agents, of course, are loudly wroth against his shifts and incapacities. At the Office the bad specifications are laid to his charge; and, *teste* the Comptroller, "it is clear that nine times out of ten, it is impossible for the poor inventor to draw up his own specification in English." So this is undertaken for him, much to the agents' complaint. Mr. Inury, President of the Institute of Patent Agents, tells an amusing story which goes to illustrate that in this direction even an official, albeit highly trained in scientific acquirements, may have something yet to learn. But since, as would appear, the two chief officers of the examining branch are largely occupied in receiving members of the public, we can only hope that an equitable share of their time so employed is bestowed less in controversial matters than in aiding those who need advice or guidance. Whilst some witnesses pressed for the proposed monopoly, the Committee do not recommend that a register of duly accredited or qualified agents be set up for the expressed purpose of binding the Patent Office to deal only either with the inventor himself or with an agent whose name is inscribed on the roll. At the same time they suggest that advantage would be found to lie in determining a standard of qualification for the title and practice of patent agent. They advocate the establishment of such a roll for general purposes, admission thereupon being made both possible and easy for all persons properly qualified, with an enactment for penalising any one who, not being on the register, shall outwardly assume the style or diploma of patent agent. The serious losses occasionally suffered on the part of inventors at the hands of negligent or unscrupulous agents might probably by some such scheme be reduced to a minimum. Amongst the witnesses called before the Committee were Professor Sir William Thomson, F.R.S.; Admiral Selwyn, Vice-President of the Inventors' Institute; Mr. Arthur Paget, on behalf of the Institution of Mechanical Engineers; Mr. S. J. Mackie; and Mr. H. Trueman Wood, Secretary to the Society of Arts.

#### NOTES.

THE Railway and Canal Traffic Bill was read a second time in the House of Lords on Monday, after a judicial and critical discussion on its main provisions. Lord Stanley of Preston spoke in a somewhat apologetic strain with regard to some of the clauses which have provoked criticism, regretting, for instance, the removal of the present Chief Commissioner (Sir F. Peel), which is a necessary effect of the provision requiring that that post be held by one possessing high legal qualifications. He also acknowledged that the measure entailed great responsibilities upon the Board of Trade, for which he had no special liking; but maintained that he had made a virtue of necessity, as the work must be done by some one. Lord Ebury, speaking for the railway companies, considered that the complaints against them would dwindle down to nothing if referred to a Select Committee, and that it was unreasonable that they should be interfered with in the management of their own concerns to the extent proposed. His arguments proceeded, however, upon assumptions as to unfair uses being made of the provisions of the Act which are most unlikely to be justified. "If, by arbitrary interference with the managers of the railway companies," urged his lordship, "the Board of Trade strove to reduce the rates below a remunerative point, he feared, in spite of what had been said, that they would come very near to confiscation. If they impeded commerce, or put shackles upon industrial enterprise, they struck a blow at that freedom

of action which was the life and soul of commercial success." The Act being essentially intended to promote industrial undertakings and commerce generally,—an end no one would dream of attaining by ruining the railways,—it is very certain that there is not much foundation for Lord Brabourne's apprehensions. Lord Bramwell spoke in a resigned sort of tone, deprecating the Bill as an unjustifiable attack upon the railway companies; and, although absolving its promoter from any intention of plundering, evidently looks upon it as belonging to a class of impending measures of a confiscatory nature. Other speakers dwelt upon the consumers' interest in the proposed legislation, and Lord Stanley stated that he has endeavoured to keep in mind that, in the matter of preferential rates, the rights of this class are the paramount consideration; thus, apparently, putting both the companies and the traders into the background, and looking at the interests of the community at large.

WE have received a copy of the memorial in favour of the exhibition of the Liverpool Cathedral designs in London, with the list of signatures appended to it. This includes some good and well-known names, but a very large proportion also of names unknown to fame. Those who are apparently considered the great guns are printed first, and the rank-and-file follow alphabetically,—a piece of rather questionable taste. We observe that the preamble commences, "We, the undersigned, as architects, venture to request," &c., but among the first column of names we find Mr. Alma Tadema, Mr. Arncliffe, Mr. Calder Marshall, Mr. Holiday, and others, who are certainly not "architects." As we have before said, we should be very glad to see the plans exhibited in London; but, inasmuch as the obvious object of those who have promoted the memorial (we do not say of all those who have signed it) is to upset the assessor's award, we have no sympathy with the motive of it, nor with the spirit in which it has been carried out.

THE supplementary Charter asked for by the Royal Institute of British Architects has been granted, the disingenuous opposition got up against it by a clique of persons who had their own purposes to serve having probably produced no effect whatever, except to bring out a number of special petitions in favour of the Institute from the leading provincial architectural societies. We may have further comment to make on the subject.

WE are glad to hear that the vacant Professorship of Architecture at the Royal Academy is at last filled up by the appointment of Mr. George Aitchison, A.R.A., to that responsible position. As is well known, Mr. Aitchison combines practical and artistic knowledge in a degree which renders him peculiarly fitted for such a position in connexion with the Royal Academy.

IN terms of an Act passed two years ago, the London and South-Western Railway Company are about to construct the suburban line which they took over from its original promoters,—the Wimbledon and West Metropolitan Company. The new line will connect the South-Western Company's main line station at Wimbledon and the Putney Bridge Station, in Fulham parish, of the Metropolitan District Railway. Starting from a junction on their Tooting and Hayden's-lane loop line, it will pass by Garratt and Earlsfield to a station in Wimbledon Park, and thence to Southfields,—thus serving the large population which of late years has settled southwards of Wandsworth. From Southfields Station the railway will be carried across their Richmond, Staines, and Windsor branch, and proceed in a north-westerly direction to Putney. Here is to be built an iron bridge, of five arches, across the Thames, thus effecting a junction with the District Railway's present terminus by the bridge-foot on the river's left bank. To provide for the anticipated great increase of traffic, it is proposed to make an extensive enlargement of the District junction station at South Kensington. The route we indicate should

furnish a useful and fairly direct means of communication between those portions of western London that are separated by the river, as avoiding the long circuit through Clapham Junction.

FROM the report which was adopted at their meeting on the 5th March it appears that the Council of the Royal United Service Institution must soon relinquish their present premises in Whitehall-yard. Formerly a residence of Sir Charles Stuart, our ambassador to the French Court, a grandson of John, third Earl of Bute, who was elevated Baron Stuart de Rothesay in 1828, and died, without male issue, in 1845, this house stands between what was the Confectionary of Whitehall Palace and the site of Fife House. Whilst successive War and Admiralty Ministers have frequently eulogised its supreme advantages and capabilities, this Institution has been suffered, nevertheless, to support itself as best it could. A Government grant, certainly, of 600*l.* a year was obtained in 1864, yet this meagre sum is more than exhausted in the necessary costs of maintenance, which include over 210*l.* for rent of Stuart House, with 165*l.* for rates and taxes. The members' subscriptions and fees, together with some trifling legacies, rank as a set-off against annual expenses calculated to exceed 4,500*l.* The museum and library are already overcrowded, but not with visitors. The contents of the former, indeed, are less familiar than they should be to the general public, who seem to awaken to the museum's existence only in times of polemical strife. The topographical department is rich in cognate exhibits, maps, surveys, and charts. Here are some interesting relics of Nelson, Franklin, and Napoleon; models of Sebastopol and of Linz with its camp, as also Captain Siborne's painfully elaborated reproduction, with figures, of the field of Waterloo, to a scale of 9 ft. to the mile. Having cost its author upwards of 4,000*l.*, this unique work was purchased for the Institution by subscription. A corresponding model of the fight in Trafalgar Bay is hidden away in a dark attic of Greenwich Hospital.

A STATEMENT recently made in a mining journal, simple as it is in itself, is nevertheless deserving of more than a passing thought. It was to the effect that at a Glamorganshire colliery near Pontypridd, called the Albion, the great four-foot seam had been successfully reached, this being, according to the writer, almost the last unworked ground in the South Wales smokeless coal basin, and, in a certain sense, the beginning of the end of that splendid field. For some time past we have not had any panic as to the duration of coal in Great Britain, though, on the other hand, there does not appear to have been any serious attempt at reducing the consumption, save that which necessarily arises from depressed trade and restricted manufactures. Hitherto most of our coal-fields have arrived within a computable limit of exhaustion, but the South Wales field, from its comparative newness of working and the great depth of its measures, has always seemed to be a great reserve, outlasting all others. And so it probably will, for by the time that it is necessary, there will be an almost certain extension of depth at which the coal may be worked. Still, the statement has rather an ominous sound about it, and when we consider that nearly all of the Welsh waste measures and many of the steam coal measures on the north crop are worked out, it ought to set our scientific economists thinking.

IT requires but scant powers of observation to notice that many of the railway bridges which cross our suburban main and bye-roads were never intended to meet the circumstances of the development, in the near future, of rural lanes and grass fields into thickly populated areas. The railway engineer naturally enough confines his attention to the engineering requirements of the line which he is constructing, and he may be satisfied with, and the empowering

Bill may be passed for, the erection of bridges only 25 ft. or 30 ft. wide over lanes or bye-roads which in a short time become the principal roads in the neighbourhood. It is therefore one of the very obvious duties of Local Authorities to examine carefully any Railway Bill affecting their district, and see that in the fixing of the width of the bridges proposed to be erected over roads, due consideration has been given to the probabilities of the future development of the surrounding district. A Local Board in the western suburbs has just achieved a decided success in this direction. The Bill being promoted in Parliament for the construction of the new line to Ealing provided, in many cases, for the erection of only 25-ft. bridges; but the Local Authority in question called a public meeting of the inhabitants, and obtained consent to incur the expense necessary to secure a *locus standi* to oppose. The result is that the promoting Company have very effectively disarmed opposition from this quarter by agreeing to erect bridges 50 ft. wide in almost every case where this width has been sought.

A VALUABLE City property will soon be in the market. The Trustees of the Wesleyan Centenary Hall and Mission House, No. 17, Bishopsgate-street Within, are resolved to sell, by private treaty or at auction, this their freehold estate, and its site extending over more than 8,000 sq. superficial, being one for which they refused 200,000*l.* some years since. The Missionary Society's House was built in 1842 as a depot for the missionaries' foreign outfits; the Hall in 1839, at the celebration of the first centenary of Methodism. A fresh site for a new hall has just been secured on the Victoria Embankment, and it is confidently expected that the cost of the ground and projected buildings will be amply covered by the sale of the property at Bishopsgate.

FEW subjects have given rise to more legal disputes than covenants in deeds not to exercise a particular trade in a manner detrimental to one party to the agreement. In Davies Brothers & Co. v. Davies, Mr. Justice Kekewich has lately had to decide on the meaning of such a covenant. The retiring partner agreed "not to trade, act, or deal in any way so as to either directly or indirectly affect the said Edward Davies and Edward Albert Davies." The question to be decided was whether this covenant was so vague as to be against public policy. The plaintiff carried on trade in galvanised iron-ware at Wolverhampton and London. The Judge held that the covenant was not too vague to be enforced, nor against public policy, and restrained the defendant from carrying on business in Middlesex. Owing to modern facilities of communication the tendency of the law is to treat these covenants in such a way as to give them great scope. Thus, any one who retires from a firm should be careful to have local limits fixed by agreement within which he may not trade. If he leaves the matter open he may find his area of trade very small indeed.

A NEW engineering scheme, of considerable importance to our Indian commerce and shipping, is being put forward with every appearance of success, the more so as it has received the approving sign-manual of Sir John Coode. It will be seen by referring to the map that between the north point of Ceylon and the south-eastern termination of India is the island of Ramasserim, only separated from the Indian coast by a very narrow waterway, kept permeable at a great expense by the Madras Government, and yet only available for small coasters. Large vessels and steamers sailing to Madras and Calcutta in the Bay of Bengal cannot use this waterway of the Gulf of Manar, and are consequently obliged to go all round Ceylon, a distance of many hundred miles, and then sail due north to Calcutta. The proposal, therefore, is to cut a broad ship canal through the island of Ramasserim, and thus open the way

to Palk Straits and the Coromandel Coast, obviating the necessity of the long Ceylon route. There are plenty of reasons why the India Government, and particularly the Madras, should sympathise with the scheme, as the latter would thus rid themselves of the obligation to keep up the unsatisfactory waterway at present existing. The railways of the South of India are also favourable to the scheme, as doubtless it will soon result in the establishment of a large canal port on the mainland just opposite the island.

FROM the *Berliner Philologische Wochenschrift* (March, No. 10) we learn that a remarkably fine new group from the Pergamene fragments has just been successfully put together. Fifty pieces have gone to the making of it. The composition represents a goddess in long floating drapery, advancing from the right, to deal a deathblow to a giant, who has already fallen. She is just plunging her sword into his thigh. He tries in vain to ward off the blows. The giant ends in two snake coils, and these are in part furnished with fishy scales; the snake-heads seem to be bisecting at the goddess, and one of the snakes has set its teeth in the robe of the goddess. The group has been provisionally placed next to that with the goddess hurling the snake-bound jar (die Schlangentöpfungsfertig). The goddess wears an ivy wreath, faint traces of which are preserved. It seems possible she may be Ariadne, in which case she must have fought close to the Dionysos group. When the small size of some of the fragments is considered, the group must be allowed to be a masterpiece of restoration, and reflects great credit on the industry and ingenuity of the two sculptors, Freres and Possenti. It is expected that very shortly the smaller frieze, with the Telephos adventures, will be so far reconstructed as to be set up in its entirety.

ARCHAEOLOGISTS and art-students alike will be glad to hear that the editors of the new *Classical Review* (just published by Mr. Nutt) have decided to give regularly a report of the acquisitions to the British Museum. The first instalment in the present number is by Mr. Cecil Smith, and he prefaces the report by a brief but very interesting notice of the present prospects of archaeology in relation to the Museum collections. He hopes, and we think justly, that the issue of the *Classical Review* will do much to stir up an interest among the general educated public in our annual national acquisitions. Hitherto those who have desired news of this sort had to consult the Parliamentary Blue Book where the official report appeared, or,—low be it said,—they had to seek for information in a German periodical, the *Archäologische Zeitung*, which gave an abstract of the report.

WE cannot say Mr. Cecil Smith's account is altogether encouraging. He tells us of the "melancholy fact that the grant for purchases has of late been steadily decreasing in inverse ratio to the growing difficulty experienced in obtaining works of Greek and Roman art from abroad. Not only is the export of antiquities everywhere either jealously restricted or absolutely forbidden, but English excavators, except in one or two isolated instances, can no longer obtain even reasonable terms in which to conduct scientific research." Saddest of all, even on our own ground, Cyprus,—a feeble field,—our impetuous condition is a hopeless bar." Some of us, if our leanings are rather towards art than archaeology, will say we have had enough of Cyprus, with its endless hybrid Greco-Assyrio-Egypto-Phœnician statuettes. Any one so minded should ask to see the three "gems of the first water" which Politis-Chrysohou has just sent to the British Museum,—the silver ring with the golden fly,—the lovely alabaster painted in polychrome (P)asiades, and, perhaps most fascinating of all, the lekythos, decorated with a subject so far unique, the slaying of the Sphinx by Œdipus (we adopt the spelling of the

*Classical Review*, though for an old friend like Œdipus it seems a little severe). If henceforth people do not go to see the new treasures of the Museum it can be only because they do not care.

IN regard to the correspondence upon Quarry-worked Stone which has found place in our columns the last few weeks, we believe that the remarks of "A Quarry Owner" (pp. 302 and 410) are in the main correct. The principal cause of quarry-worked stone being cheaper than when it is elsewhere worked is the saving of carriage of waste material, bad blocks, &c. At the same time, the reasons adduced by "G. C. W." (p. 331), also influence, though in a much lesser degree, the cheaper production of quarry-worked stone. The causes, however, would probably vary with the differences in the methods of carrying on business of respective quarry owners. With reference to Mr. H. E. Gough's remarks (p. 410) on the desirability of using unseasoned stone—if he restricts his observations to such stones as are chemically so constituted as to be capable of producing a protective crust, he is so far correct. It is obvious that all stones cannot do this. When this crust is formed it should not be removed; and, as he rightly observes, it should "never be scraped after long exposure to the air." But we cannot agree with him that "stone which stands well in its own locality will stand practically equally well in the London atmosphere," even though it be seasoned after it is wrought. This may be the case in many instances, but the general statement should rather be put the other way about. The different compositions of the country and London atmospheres unquestionably produce widely different effects on certain classes of stone, so that a general rule cannot be laid down. An intimate knowledge of the characters presented by different kinds of stone is essential to the proper selection of the material.

A DEPUTATION of the heritors, or landowners, of the parish of Dunblane presented a memorial to the First Commissioner of Works, on March 8, to ask the assistance of the Treasury to carry out a proposed restoration of the nave, aisles, and chancel of Dunblane Cathedral, Perthshire, at an estimated cost of from 14,000*l.* to 16,000*l.*, according to the materials used. The Cathedral, which is well known to tourists, is a picturesque ruin, standing on the east side of the river Allan, in the broad valley which separates the Grampian mountains from the chain of the Ochils. The choir, however, which has no aisles, is used as the parish church. The building is the property of the Crown, and the deputation to Mr. Plunket suggested that the entire restoration and re-roofing of the nave and aisles would be an appropriate memorial of the Queen's Jubilee. It was stated that a partial restoration of the choir, which has been used as a parish church for some time, was effected about fifteen years ago, at a cost of 3,000*l.*, and that an immediate expenditure of at least 600*l.* was necessary for the preservation of this part of the fabric. It was further stated that the landowners had undertaken to assess themselves in the amount which would be required to provide a new parish church, which was estimated at 3,500*l.* (a sum which would appear scarcely adequate for the purpose), provided that the Crown would agree to the Cathedral being used hereafter as the parish church, and that one of the parishioners had offered to guarantee 6,500*l.*; but whether this sum was in addition to the 3,600*l.* provided by the heritors is not clear. Mr. Plunket, in reply to the deputation, stated that the Government were anxious for the preservation of the Cathedral, and promised to inquire if there would be any difficulty in the Treasury undertaking the maintenance of the fabric after its restoration. If the Government are really anxious for the "preservation," in the true sense, of the Cathedral, they must be very cautious what they do in the way of its "restoration."

\* Two views of the Cathedral were published in the *Builder* for Nov. 21, 1835.

THE works exhibited in Messrs. Arthur Tooth & Son's spring "exhibition of high-class pictures" are not all what we should call "high class," but they include some very good works. Unfortunately some of the best in execution are among the least attractive in feeling; witness Jacquet's "Chanson d'Amour" (38), a painting of most remarkable technical finish, but utterly vulgar in character and motive. One of Gallegos' brilliantly-painted church festival subjects, "Rehearsing the Easter Anthem" (43) suggests the same criticism; the varied expressions of the faces of the monks and the choir-boys are admirably studied; but the tone of the whole is harsh and *criarde*, as painting, and it suggests the idea of being painted with a sneer in the painter's mind, so to speak. M. Enginè de Blaas exhibits an admirable Venetian flower-girl, which most visitors will at first sight attribute to Mr. Fildes; Mr. Leader, Herr Heffner, and Mr. Halswelle exhibit landscapes with their usual hard finish and brilliant effectiveness and more than their usual mannerism. A painting of foxes by Rosa Bonheur (87) should be looked at, as well as other and smaller works. Mr. Goodall's picture of Christ and the child, which has been for some time on view at the same galleries, we have not before referred to. There is evidently a serious attempt on the part of the painter to give an ideal conception of Christ, and there is a noble character in the head, but such as is not suitable, in our thinking, to the special incident and situation portrayed. We should rather have thought of Christ with His look and attention fixed on the child whom He had called to Him, instead of this abstracted gaze directed into space. Much of the talk made about the picture is the offspring of religious sentiment rather than intellectual judgment; and we strongly object to the bad taste, not to say impertinence, of affixing to the catalogue a "gushing" laudatory letter from a well-known ecclesiastic, as if people were to follow his lead, and be influenced by his praise. What is it to us what Canon Duckworth thinks of the picture as a representation of Christ? This kind of thing is on the increase in picture-galleries; it is merely an attempt to impose an opinion on ignorant persons who have no opinion of their own, and it ought to be stopped.

THE collection of bronzes to be seen at Messrs. Bellman & Ivey's galleries in Piccadilly includes, besides some good reproductions in bronze of recent French sculpture, a considerable number of small bronzes by Russian artists, mostly of a highly realistic type, battle-field and hunting-field scenes, &c. A good many of these show remarkable truth of action and force of modelling, especially in the treatment of horses, bears, and other animals. The groups by Professor Lieberich are specially to be noted.

THE sketches by Mr. Wimperis, now on view at Messrs. Dowdeswell's, and said to be "principally from the New Forest and its neighbourhood," exhibit all the breadth of style and the true and characteristic water-colour treatment to which we have been accustomed in the works of this excellent water-colour artist; but we must be allowed to say that they certainly recall very little of the character of the country from which they profess to be taken, and that where the New Forest landscape is recognisable in general character, the colour effect of it is not realised. The New Forest is a tract of landscape full of colour; Mr. Wimperis gives it to us translated into dark and neutral tones. We have always admired his work when regarded as what may be termed abstract landscape; but when we compare it in this case with the special landscape supposed to be represented, one cannot help feeling that there may be too much "breadth" and elimination of detail.

MR. DAVID MURRAY exhibits at the Fine Art Society's rooms a collection of sketches made in Picardy. This is another of the exhibitions which shows how much



more favourable to one's estimate of an artist's powers a sketch exhibition may be than a finished painting. None of Mr. Murray's oil paintings at the Academy exhibitions have presented as much of interest or as much of real open air effect as this collection of sketches. There is rather too much of an appearance of imitating Corot about many of them, which may be partly accounted for by the fact that this was Corot's country, and that similar causes tend to produce similar effects; so Mr. Murray's friends say; but we rather think Corot showed him the way. There is great variety in the character and treatment of the sketches, however; some aim at topographical accuracy, others have a more poetic aim; many gain an extra attraction from the local characteristics which they exhibit; the decoratively-treated iron cross set up in the midst of the fields; the "Fête des Morts" (65) and "A House of Sorrow" (76) showing the Picardian funeral observances; "The Reed Reaper" (44), in huge, and it is to be hoped waterproof, boots, plashing through the marsh after his work. The collection is well worth a visit, both from the artistic and the topographical point of view.

THE question as to the treatment of the entrance to St. Martin's-lane will certainly not be satisfactorily solved by the removal of the steps in front of the portico. Little will be gained in width of roadway unless the foot pavement is removed also; and then where are the foot-passengers to go? One inconvenience will give place to another, and the front of St. Martin's will be seriously damaged in its architectural effect. The narrowness of the roadway at this point is an inconvenience, but not a very serious one to put up with for a time. When the façade of the National Gallery is rebuilt in a manner worthy of the site and of the importance of the institution, then the lines of the new façade can be modified to allow of the widening of the roadway. We had better wait for that event than hopelessly spoil the architectural effect of St. Martin's Church, which, with all its faults, is one of the best and most dignified buildings of its class and date.

DR. HENRY BENNET'S letter from Mentone, in Thursday's *Times*, confirms what a previous correspondent of that journal had remarked in regard to other situations affected by the recent deplorable earthquake, that the houses brought down were mostly such as had, so to speak, no right to expect to stand against an earthquake, or even without one. Dr. Bennet says—

"One hundred and twenty-five houses have been condemned by the surveyors, most of them tumble-down erections of the olden town, in the last stage of decay, many hundreds of years old, huddled together in Medieval Italian style, and only wanting a push to bring them down, like houses of cards. In the modern part of Mentone of late years, houses have been rather scamped than built, as in the outskirts of London and Paris, not in freestone, as of old, with wide solid foundations, but of lath, plaster, and stucco, with mortar made with the dust of the road instead of pure river or rock sand. Not one well-built stone house has fallen, to my knowledge. This dire catastrophe will teach builders on the Riviera to return to the old time honoured solid Mediterranean style of building, with wide stone foundations and thick stone walls, and to give up lath, plaster, rubble mortar, and stucco as the principal materials of the house."

Dr. Bennet adds that one practical result of the earthquake will probably be that "the old picturesque houses on the Riviera, which travellers visit with such pleasure and curiosity, will have to be pulled down and replaced by modern buildings. They have become from age a mere heap of rubbish, a blot on the creation, a danger to their inhabitants. Several of these houses have been condemned to destruction by the Italian authorities." We have no doubt, however, that the "Society for the Protection of Ancient Buildings" will issue an appeal against their removal. It will be just the kind of thing they will enjoy.

How a Marble Statue is made.—Mr. J. A. P. Macbride gave a lecture on this subject in the Dulwich Schoolroom on Monday last. The chair was taken by Mr. A. H. Gilkes, the Master of Dulwich College.

#### THE FORGE, ST. CLEMENT DANES, FICQUETT'S CROFT; AND THE NEW BANKRUPTCY OFFICES SITE.

"TENANTS and occupiers of a certain tenement, called the Forge, in the parish of St. Clement Danes, in the county of Middlesex, come forth and do you service!" Thus, year after year, is proclamation made before the Queen's Remembrancer at the Royal Courts of Justice, and as often does the City Solicitor respond by counting six horseshoes and sixty-one nails, whereupon the Queen's Remembrancer declares, "Good number." This quaint ceremony, immediately following upon the rendering and cutting of two faggots for the waste ground called the "Moors" in Shropshire, is symbolical of certain rent service due from the Corporation to the Crown in respect of a forge formerly held by them in St. Clement Danes, London, and which, having been pulled down in a riot, *temp.* Richard II., was not restored. Until the passing of an Act in 1859, these two "services" were wont to be discharged on the annual presentation of the sheriffs at the Exchequer Court, Westminster. There is question, though, whether the second function will not shortly fall into abeyance, since the (by some) supposed site of the forge will probably be taken over by the Crown.

For by a Government measure, which was introduced in the House by Mr. Plunket on Tuesday, the 15th inst., it is proposed to enable the Commissioners of Her Majesty's Works and Public Buildings to acquire certain lands and buildings in St. Clement Danes parish for new offices in connexion with the Bankruptcy Court, at present in Portugal-street, or for such other public service as the Treasury may prescribe. The property to be acquired lies south-west and south-east of King's College Hospital, having Carey-street to its north-east with Clement's and New Inns to the west, and extending southwards as far as the vacant space alongside of the Royal Courts of Justice. Owing to sundry demolitions that have been made here from time to time during the past three or four years much of the site is laid bare. The development of the Government scheme will again complete the building over of a once open space which was known as Fickett's Field or Croft, and also as the Campus Templariorum or Templars' Field. That space, of about eleven acres, is mentioned in the Liber Johannis Stillingfleet, compiled in the year 1484,\* in connexion with Gerard's Hall as follows:—"Willielmus Cotterell (12 cent.) dedit aulam vocatam Gisour's Hall in civitate Londoni in parochia S. Mildredæ cum aliis diversis tenementis et redditibus in Fletestrete, et pasturam vocatam Fickettfield." In his second edition, 1850, Peter Cunningham quotes (without date) another, and what he declares to be the earliest extant, grant. There we learn that the ground served "Pro Saltationibus Turamentis, alisque Exercitiis Equitum Militumque Regni nostri Angliæ presertim vero Equitum Sancti Johannis Hierosolimitan." It has been plausibly conjectured that the Forge was established at this spot for the farriers who were employed in shoeing the combatants' horses and in repairing their armour or weapons. We say combatants advisedly, for it is not easy to predicate whether the field was exclusively reserved, if indeed, it was so reserved at all, for the Knights Templar or the Knights of the English langue, or language, of the Hospitaliers of St. John. If the forge was destroyed for good by Wat Tyler's men it disappeared in the year 1381. Just sixty-eight years before that date Bertrand the Goth, Pope Clement V., had decreed at the Council of Vienne the despoilment and dispersal of the Knights Templar. In the year following (1313) King Edward II. gave to Aymer de Valence, Earl of Pembroke, "the whole place and houses called the New Temple at London, with the ground called Fickett's Croft . . . that belonged to the Templars" (Stow, Thome's edit., p. 149). That property then passed to Hugh le Despenser, the younger, on whose attainder, 1326, it was given over to the Priory of St. John of Jerusalem at Clerkenwell. In or about the year 1341 the hospitaliers demised their New Temple property to the two existing Societies of Professors and Students of the Laws of England. Under date 1376, we find mention of the Fickett's, or Fyckett's, field as a place wherein the clerks of the Chancery,

apprentices and students of the law, and the citizens of London daily exercise their common walks and diports. In 1535 Robert Sherborne, Bishop of Chichester, demises for ninety-nine years, at 10 marks per annum, to William Sulliard (who received an absolute conveyance in 1536 from Bishop Sampson) "all that great messuage called Lincolli's Inn . . . together with the way through Field Gate . . . to hold to them . . . by the service therefore due . . . to wit, of the Lord Prior of St. John of Jerusalem." The field, doubtless, gave its name to this gate, which then stood in Chancery-lane, over against the Domus Conversorum or the Rolls. The way through the Field Gate, and the field itself, are cited in various subsequent sales and conveyances, and orders of the Lincoln's Inn benchers, to the end of the sixteenth century.\* Meanwhile the priory possessions went to the Crown at the Dissolution, and with them Fickett's Field. Since this name is sometimes spelt as Fitchett, we may recall that the Black Friars, removing from High Holborn to near Baynard's Castle, were granted, for building materials, the ruins of Mount Fitchett Tower there.

A grant of nearly all this ground by King Henry VIII. to one Anthony Stringer has been preserved. We can further trace its subsequent proprietors down to Henry Serle, or Serle, who in 1600 "died intestate, much in debt, and his lands all mortgaged."† Most of the topographical works on London say that the present New-square (*antiquè* Serle-court, or Serle's-square), completed soon after Serle's death, was built on open ground formerly styled Little Lincoln's Fields or Fickett's Croft. The building area is so named in articles of agreement between Serle and the Society of Lincoln's Inn, 1682. But according to a plan in Parton's account of St. Giles-in-the-Fields parish, and to the Ordnance Survey, that area was once part of the Coney Garth or Cotterell Garden, Lincoln's Inn. In these maps the Croft is marked as lying to the south and west, comprising at this date part of the Courts of Justice site, together with Portugal, Serle, and Carey streets, and the southern portion of King's College Hospital.

The ground that lies next south-east of the Vestry-hall, and contiguous to the hospital site, is proposed to be taken for purposes of the Bill under review. Jackanapes-lane, now Carey-street, an early home during the period 1816-1820 of Sir Henry Taylor, author of "Philip Van Artevelde," was re-named after Sir George Carey. In her memoirs, Lady Fanshawe speaks of taking a house there of Sir George Carey for the year 1656. All, excepting a very small length of the southern side, was pulled down for the New Courts of Justice, whilst part of the northern side, to the west, between Carey and Serle streets, has been rebuilt as New Court. In the South Kensington Museum may be seen a mantelpiece, with a mirror or picture frame above, from a house here; and also a door-case and door in carved deal, of early eighteenth-century work, from No. 18, at the corner of old New-court. There was a good doorway too in the house, last used as a dining-house, and adjoining to the soup-kitchen, which stood at the north-eastern corner of Yeat's-court; and one yet remains by the opening into Grange-court.

Whilst the actual position of the forge cannot now be ascertained, it is significant to observe that in its immediate neighbourhood were a Three Horse-shoe tavern in Milford-lane, of wood, and pulled down in 1831; and two Horse-shoe courts. Of these latter one still survives in the shape of the foot-way that leads out of Clement's Inn into Yate's, or Yeat's, court, which latter communicates with the south-western bend of Carey-street. The new buildings will close this thoroughfare, and will further obliterate almost all that is yet standing of Clement's-lane, and of the once fine old house (an early home of Mrs. Keeley, the actress) along the southern side of Grange-court, next south of King's College Hospital.

Turing, however, from the past, a consideration of more practical importance to the modern wayfarer presents itself. The Clement's Inngate at the end of the Horse-shoe passage is closed at an early hour every evening. The foot-traveller from Lincoln's Inn westward to the Strand is then obliged to pursue his course either

\* *Teste Purton Cooper's* privately printed (but incomplete) volume, 1840, embodying Will. Melmoth's "Great Importance of a Religious Life."

† "Autobiography of Sir John Bramston," quoted by Cunningham, *id supra*.

\* *De Nominibus Fundatorum, Hosp. S. Johannis Jerusalem in Anglia.* See the "Monast. Angliæ," vol. vi., p. 832, edit. 1817-50.

by way of Clement's Inn-passage or further through the devians and far from agreeable by-ways of Clare Market. For road traffic accommodation is even more poorly provided; and all vehicles have perforce to go by way of the ridiculously re-named Sardinia and Kemble streets. In our paper of November 18, 1882, we published Mr. Charles Forster Hayward's proposal for constructing fresh communications between Holborn and the Strand. That gentleman's scheme embodies two streets opening from the Strand at St. Mary's and St. Clement Danes' churches, and to meet in a circus at the angle of Sheffield and Portamouth streets. Failing this, a less ambitious alternative is feasible. It has been suggested\* that a thoroughfare be made to join the western end of Portugal-street and the Strand. Such a street would necessarily have to mount the incline which is now marked by the flights of steps alongside of the Courts of Justice. It would there pass over ground that is already held by the Commissioners of Works. At the same time, it is clearly patent that the new Bankruptcy Offices will only render the need more imperative for readier means of access from the one quarter to the other than is at present to be found.†

#### THE SOUTH AFRICAN RAILWAY SCHEME.

AFRICA is promising to succeed America as the scene of big railway enterprises. When the Black Continent has once started building great railways, we may expect some very fine feats of engineering. Already there is a scheme started which opens up a grand vista to the imagination, and promises to bring the Cape into direct railway communication with the Portuguese frontier and Delagoa Bay. The scheme owes its origin to the sudden and unexpected discovery of enormous mineral wealth in the Transvaal. As far back as 1884, President Kruger, when at Amsterdam, gave a concession to a Dutch syndicate for a railway from the Portuguese frontier of the Transvaal to Naelspruit, a town in Boerland, which was to be ultimately continued to Pretoria. This concession, which was an exceedingly advantageous one, was passed and confirmed by the Boer Parliament or Volksraad. The railway was to be seventy miles long; the Dutch were to be allowed fifteen years in which to make it, and at the end of that time fresh terms were to be made for the continuation of the line to Pretoria. The route the railway was to take was based on a survey made by a Portuguese engineer, Colonel Machado, which made a considerable circuit to the north in order to take in the undeveloped Leydenburg gold-fields. Two conditions were imposed on the Dutch syndicate. The first was that the company should be fully established within twelve months of the concession, and the second was that the company should deposit 18,000*l.* caution money with the Transvaal Government. Neither of these conditions was fulfilled, and so the concession became void.

In the meantime the discovery of the De Kaap gold-fields and of the existence of coal near Pretoria, altered the complexion of affairs. In April, 1886, 1,735,000 acres had been thrown open to the public by Government as gold-fields, and De Kaap was soon over-run by English. These felt very keenly the want of a railway, and set on foot a project of their own. This new line was to run straight from the Portuguese frontier to the De Kaap gold-fields, without going north to Leydenburg at all, and was to be continued through more gold-fields,—as yet undeveloped,—and a very rich coal district to Pretoria, the capital of the Transvaal, whence it was undoubtedly the intention of the promoters to connect the line with Kimberley, and thus bring the Transvaal into direct communication with the railway system of South Africa. The English had their money ready, and the scheme was submitted to the Volksraad and fully discussed. Here, however, national and political feelings came into play. The Dutch are jealous of the rapid growth of the English population in Boerland, and very distrustful of anything likely to bring them into close communication with their old enemies at the Cape.

\* Vide a letter in the *Times* of December 7, 1884.

† Since the foregoing was written the writer has received a communication from the Office of Works, from which it appears that St. Clement Danes parish pay to the Corporation a small quit-rent in respect of a house (7 a wharf) in Milford-lane, &c., south of the Strand; and that, as far as indeed, as the Office is aware, the proposed line would not seem to cover that of the old Forge.

The President, therefore, tried to obtain an extension of six months to the concession granted the old Dutch syndicate to enable them practically to copy the new plan. This was granted, and a kind of commercial missionary has been sent over to Holland to preach the gospel of the new railway and try to get the Dutch to help it with their money. If he should prove unsuccessful in his endeavours it is quite possible that he may come over here to raise the money in the English market. It is, however, very undesirable that the Dutch should have the making of the railway, as they have stipulated for fifteen years to make 70 miles of railway. Besides, as the railway will be principally used by the English gold-diggers and colonists, these do not like the prospect of seeing the line in the hands of the slow and routine-loving Dutch. They also argue, and with truth, that English engineers have more experience of building railways in new countries, and would not require thirty years to make a line of only 140 miles' length, nor would English engineers be likely to spend so much money over the enterprise as the Dutch. There is, therefore, a considerable prospect of a speedy commencement of the line is somewhat remote; nevertheless, a railway must soon be built, for things cannot long continue as they are, the inconvenience and expense of bullock transit being so great.

The Portuguese Government are, moreover, building a line from Delagoa Bay to the Transvaal frontier, and it is not probable that this railway when completed will be allowed to remain unconnected with Pretoria. As soon as the line to Pretoria has been constructed, the line from thence to Kimberley must follow, and the Black Continent will in a great measure be at last opened up. So great a scheme is dazzling to the imagination, and must make the mouths of engineers and contractors water with hope and expectation. We sincerely trust they will not be disappointed. A line such as the one we have sketched out will give an enormous impulse to African trade, and be an incalculable boon to all connected with it.

#### THE GLASGOW "SUBWAY."

A SCHEME of locomotion for which a reasonably appropriate name has yet to be invented is that contemplated by the "Glasgow Subway" Bill, the third reading of which was on the 14th inst. passed by the Lords' Committee. It is neither a railway of the ordinary type worked by independent locomotives and trains, nor yet a rope-tracked line on any system hitherto tried. It admits of up and down trains passing and re-passing each other constantly, and yet it is only of single-line width and is expected to be built on a scale of corresponding economy. The "subway" is designed to supply an acknowledged want in Glasgow,—speedy transit from the city to the western and north-western suburbs, an area left unaffected by the underground railway recently completed. The "subway" project is the product of the ingenuity of Mr. Simpson, C.E., Glasgow (the engineer for the finished underground railway just mentioned), and the promoters are confined to a few who have examined the novel idea closely, and come to a thorough belief in the inventor and his scheme. The cost of the line is stated at between 200,000*l.* and 300,000*l.*, and the length of it will be fully two miles, exclusively in tunnelling, and for the most part following the course of the main street arteries to north-westward and west. Commencing in St. Enoch's-square, in front of the Glasgow and South Western and Midland termini, and proceeding by Buchanan-street, New City-road, and Great Western-road, it finds its western termination at Victoria Cross, in the select residential quarter of Hillhead and Kelvinside. There are eight stations, including the two terminals, the distance between each of these being the same throughout, viz., 700 yards. A stationary engine works an endless rope, stretching its double length from end to end, and supported on raised pulleys on either side just outside the outer rail. On this rope, at exact distances of 700 yards also, are strung the seven light trains which are to perform the service. Though a track of only 12 ft. wide by 12 ft. high, and thus of single dimensions only, as ordinarily estimated, it is fitted with distinct up and down rails, these occupying almost the same ground within the tunnel, but

separating entirely at the stations. The station spaces are of double-line width, exclusive of up and down platforms; and it is at these extra widths the up and down trains, which seem as if constantly threatening intersection, are made to pass each other. The locomotion is by jerks, as it were, of 700 yards each; and at each stoppage only three of the intermediate stations and one of the terminals are touched, all the others being empty. At the conclusion of the next move of 700 yards the reverse is the condition, of course, and so on regularly over the working day so long as no hitch arises. The most interesting feature, it will be seen, is the method of getting trains past each other, the stations in this particular fulfilling two most important functions. The whole affair, indeed, from terminus to terminus, is one compactly connected machine, and perhaps the most unpromising feature in the outlook of the project arises from this, because any accident or miscalculation, however trifling *per se*, will suffice to throw the entire arrangement out of gear. The line is incapable of co-operation with other railways, in the ordinary sense, and once constructed it will be next to impossible to enlarge it, however desirable that might become, without reconstruction on a scale almost equal to building anew. The proposal has provoked much local criticism, and the opposition arrayed against it, including the City Corporation and the tramway proprietors, is rather formidable, although the promoters profess themselves sanguine of pushing their Bill through the remaining stages in the Commons.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS:

##### THE NEW SUPPLEMENTAL CHARTER.

At a special general meeting of the members of this Institute, held on Monday evening last, Mr. Edward T'Anson, F.C.S., President, in the chair, the minutes of the special general meeting held on Monday, the 17th of January, were read and signed as correct.

The President asked for the attention of the meeting while the Hon. Secretary made a statement in regard to the application for the grant of a Supplemental Charter.

The Hon. Secretary.—Mr. President and Gentlemen: It will be in the recollection of some, if not of all present, that, after an amount of consideration which may fairly be described as protractive and exhaustive, the special general meeting which was held April 5, 1886, approved and passed, subject to certain amendments and alterations, the draft of the extension of our Charter, which had previously been prepared by the Council. Those alterations and amendments necessarily and naturally took some time to arrange, but after consultation with our solicitors, and after taking the opinion of distinguished counsel, we succeeded in presenting the draft Charter to the Privy Council on Aug. 24. Most of you are aware that opposing petitions were thereupon lodged with the Privy Council by two bodies, who, in spite of their short-lived existence, appear to have thought that they were justified in taking such unfriendly and questionable action towards this ancient and respectable corporation, thus endeavouring to thwart the laudable endeavour of the Institute to consult the welfare and promote the interests of the profession at large. This opposition resulted in petitions being submitted in support of our action from various representative societies of established reputation. The Manchester Society of Architects, the Liverpool Architectural Society, the Leeds and Yorkshire Architectural Society, the Leicester and Leicestershire Architectural Society, the Glasgow Institute of Architects, and, lastly, the Architectural Association of London, lodged with the Privy Council separate petitions praying that our Supplemental Charter might be granted. The opposing petitions were sent to us by the Privy Council, and in due course we answered them. The sequel to all this is the intimation which it is now my privilege to make to you, and which is briefly this.—That at a Council held at Windsor on Monday last, the Queen approved and signed our Charter. The matter, therefore, may be looked upon as an accomplished fact. There are certain legal details still to be completed, but these are mere matters of form, and the sooner, now, we set to work to frame and to rearrange the By-laws in accordance with the Charter, which may now be looked upon as

passed, the letter. The Council propose to take immediate steps in this direction, and I earnestly hope that this year,—the Jubilee of our beloved Queen,—which is to see so many auspicious events, may witness not only the completion of our Charter, but of the By-laws which depend upon it.

A question was asked by Mr. T. Searnske Archer concerning the obligation of members in respect of the Schedule of Professional Practice and Charges, and a conversation ensued, in which Messrs. Lucy W. Ridge, Arthur Gates, Charles Barry, Professor Kerr, E. A. Gruning, John Hehh, and the Hon. Secretary joined.

#### The Royal Gold Medal.

The By-law LXXVI., referring to the nomination and election of Royal Gold Medalists, having been read, the President read the notice convening the special general meeting, and no other candidate having been proposed, moved the following resolution, the terms of which had been previously issued to members. Whereupon it was unanimously resolved,—“That, subject to her Majesty's gracious sanction, the Royal Gold Medal for the year 1887 be presented to Mr. Ewan Christian, Past President, Architect to the Ecclesiastical Commissioners.”\*

A Paper, by Professor Kerr, Fellow, on “The Architect's Functions in Relation to Building Contracts,” was read by the author. We give an abstract of this paper hereafter. In the discussion which followed, Messrs. William Woodward, T. Searnske Archer, Edwin T. Hall, Sydney Young, Thomas Blashill, George Aitchison, A.R.A., T. M. Rickman, F.S.A., Ralph Nevill, F.S.A., and the President joined. A vote of thanks having been passed by acclamation, Professor Kerr replied, and the proceedings terminated.

### THE ARCHITECT'S FUNCTIONS IN RELATION TO BUILDING CONTRACTS.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

This was the subject of a paper read on Monday evening last, at a special meeting of the Royal Institute of British Architects by Professor Kerr, as mentioned above. Referring to the apparent desire of both architects and builders to reconsider the “Conditions of Contract,” which were adjusted by a Special Committee of the Institute and the London Builders' Society a good many years ago, both sides now complaining of their want of clearness in certain respects,—the lecturer said his object was, not to discuss those conditions, but to submit a few observations upon the less superficial aspects of the architect's difficulties, and to advocate the more formal recognition of a kind of liberality of dealing which he considered would be found to characterise the administration of the best architects, and also to meet the approval of the best lawyers. The difference between the simple contract of every-day trading, and the always highly complex building contract, was pointed out; and he laid it down that the comparatively small amount of building litigation must simply be due to the fair dealing

of architects. A building contract has for its real purpose not any necessity of science, but the relief of the proprietor from his own natural risks and uncertainties, by imposing them upon a contractor. For this he employs first the architect, and secondly the quantity surveyor; and, in strict law, it would seem that it is this purely commercial supervision of the contract that is generally regarded to be the supreme service of an architect, all else being of minor moment. The questions, therefore, which he would consider were what the proprietor expects, what the builder expects, and what the lawyers expect. At any rate, lawyers do not expect an architect to play the lawyer; his jurisdiction is to be expert in good sense, not in jurisprudence; and this especially when great lawyers are never tired of telling us that law is only the essence of common-sense,—common-sense the principle, law the mere exponent. The proprietor, then, expects two things: to get his work done economically, and to know the cost beforehand; and he pays for both. But he must not over-strain economy, or the contract may snap; to seek the advantage of an unwary reckoning is something like a fraud, and the architect ought to protest against an unsafe bargain. In expecting a conclusive estimate of cost, also, the difficulties must be duly kept in mind; for “extras” seem to spring up sometimes like weeds in a field. Then what the builder expects is profit and not loss; and, having regard to the pressure of competition tendering, he trusts to the architect for fair dealing, honourable treatment from him whatever may happen. Alluding to the daily dependence of a contractor upon the architect's almost arbitrary directions, the lecturer argued that the extraordinary complexity of the transaction lifts it quite above the common level of commercial contracts, and demands a different code of fair dealing. As for what the lawyer would say to all this, it would be that to introduce him and his ways into such business without urgent need is not fair dealing; and thus also, whenever building business has the misfortune to fall into the terrible trap of litigation, the legal agents on both sides demand the direction of architects, nominally witnesses, really advisers and advocates, without whose aid the suits are always fallacious. Turning to the very peculiar understanding whereby the architect, although the responsible agent of one of the contracting parties, acts the part of an arbitrator between the two,—a difficult point in law,—the remarkable confidence of the builder in the traditional impartiality of the architect would be manifested even when the employer was most exacting and unreasonable; and for such reasons as this the lecturer deprecated the specious affectation of some architects who say they “take their instructions from the solicitor”; for when a lawyer of high class calls in an architect it is to take his advice and defer to it, not to make him the instrument of artifice. The next point referred to was competition tendering, described as a plausible practice, whose true efficiency is obviously inversely as the complexity of the contract. In the hands of the skilful profession of Quantity Surveyors the process of estimating has been brought to considerable perfection; but the pricing by builders is not always equally scientific, which may nullify the more scientific part of the work; and another difficulty which thus arises is that felt by the architect at the end, when a badly-priced bill is sprung upon him from under seal for his valuation of deviations. Nevertheless, the acceptance of the bill of quantities as a basis of contract is to be approved; and especially with the view of relieving the builder from risks impossible to be appraised. To self-evident axiom, as it is called, that an employer is entitled to know the exact cost beforehand, the lecturer denied to be self-evident, contending that it is much more reasonable that unforeseen risks should remain with him, and nothing be put upon the contractor which the quantities cannot accurately define. As regarded the correction of errors in the quantities, there would be little chance of anything serious being wrong in the work of careful surveyors; but there was another point, and he must pronounce his opinion to be that all speculation clauses in specifications are unlawful, in saying which he believed he would be supported by sound lawyers, even of the most strictly commercial order. A bargain which it is impossible to fulfil it is inequitable to enforce; as in diplomacy, an unworkable treaty must be

revised. It is also pretty much the same thing to say, with reference to building, that a bad bargain for one side is had for both, wherefore speculative conditions are essentially unsafe. A perfect building contract, therefore, would be one in which the quantities provide for every hazard with precision, and he was disposed to think that all liberal-minded architects must be already in favour of the abolition of the system of repudiating the bills of quantities the moment the contract is signed. The question of the quality of work was then discussed, and the constant use of the phrase “the best of its kind” was affirmed to have no discriminative meaning; the only practical discrimination being a knowledge beforehand by the architect of a builder's customary work. The practice of open tendering by all comers who can offer sureties the lecturer regarded as dangerous to all parties, and especially to the architect. Then upon the question of “extras” he was of opinion that they are generally of the employer's making. It must be a necessary consequence of competition tendering to demoralise contractors; but he could give great credit to some in this respect as compared with others. The chief difficulty, however, in dealing with “extras” is not so much the dissatisfaction of the employer financially at the disappointment of his expectation of relief from his risks. The wisest course, however, is to keep him well informed of what is accruing; and when young architects are timid in this respect it is a serious mistake. “Extras” ought never to be priced at a loss; but to overprice them is not allowable. Vague general clauses, whether in specifications or contracts, the lecturer then proceeded to deprecate, on the principle that he who takes the incidental benefits ought to take the incidental risks. It is wrong to say the architect has only his client's interest to look to unless his agency either ceased or commenced with the signing of the contract. Impartiality during the execution of a contract implies the same impartiality during its negotiation. The doctrine of the “insurance” of general risks he regarded as fallacious; and he could not be sure that an unscientific item in the quantities might not be an act of negligence involving responsibility. There was no merit in these general clauses, but rather a confession of carelessness. The arbitration clause in contracts he considered to be always advisable; but the appointment of the arbitrator ought not to be made carelessly, and a stranger ought to be preferred. In most disputes a respectable architect would probably be in the right; but a contractor who is losing money can scarcely be undeserving of sympathy, especially if it be the architect's duty at the outset to avoid a losing contract as an unsafe one. In connexion with this, the lecturer offered the suggestion whether an arbitration covenant between architect and client as to professional charges might not be of advantage. The last point of detail to be dealt with was the action of an architect in a formal reference taking the place of litigation; and he affirmed that there is no possible matter of dispute under a building contract in which an architect is not the best adjudicator. Litigation, in its relation to ordinary business, is acknowledged to be a failure, and the growing dissatisfaction of the whole commercial public with its inefficiency and outrageous cost is becoming one of the movements of the day. Hence the custom of taking building cases to expert arbitration. Surveyors had been the chief referees, for obvious reasons; but architects, even the more artistic of them, ought to possess all the qualifications, and the time was come for doing away in a great measure with the fallacy that the architect and the surveyor are two, not one. He had seen many legal authorities, and granted their value; he had also seen arbitrators and arbiters; but he never saw a qualified building-arbitrator whose decision, even when he split the difference and divided the costs, was not far and away more intelligent and acceptable than that of any Court of Law. In adding a few miscellaneous remarks regarding arbitration generally, the lecturer recommended the principle of the court of three surveyors appointed by the Building Act for party-wall cases, as being preferable to that of the one referee, and as affording greater scope and freedom to advocacy, besides opening a door for negotiation. He also would encourage the employment of architects instead of lawyers as advocates before a single referee. He pro-

\*No. 10 of the *Journal of Proceedings* of the Institute enumerates some of the work which Mr. Christian has carried out during the last forty years. The *Journal* says,—“From among a list of more than forty new churches, may be cited those of St. Mark at Leicester, of St. Matthew at Cheltenham, and of Allhallows at Bromley by Bow; from among some 150 restorations of churches,—from that of St. Mary at Scarborough to the little church at Skilton, near York, restored only last year, though the monograph of it was published by Mr. Christian as early as 1846,—may be cited those of Westwell (Kent), East Meon (Hants), Stabrope (Durham), Thorington (Essex), Bosham (Sussex), Alcombury (Hants), St. Dunstan (Canterbury), all interesting examples of Medieval architecture; Episcopal residences at Norwich, Gloucester, Manchester; Capitular residences at Exeter, Landaff, Bangor, St. Asaph, and in Amen-court for St. Paul's, London; rectories, vicarages, parsonages, and curates in every county in England (except Northumberland, Cheshire, and Cornwall), and in Wales,—not fewer than 20 in all; numerous schools; and a still larger number of country houses, among which are Lexington Manor (Wilt), Ashurst, and Broadwell (Glos.), Lillingston Dayrell (Bucks.), Ascot Wood, for the late Sir J. Shaw Lefevre, and Castle Malwood in the New Forest, for Sir W. Harcourt, M.P. As the architect and acting architect, since 1832, of the Ecclesiastical Commissioners for England, he has had to report on plans submitted for churches and other ecclesiastical works, amounting on an average of ten years to about 218 yearly, and also upon the Cathedral of Chester, Durham, Lichfield, Canterbury, St. David's, Worcester, Ripon, St. Paul's (London), Carlisle, the last named having been restored by him; and upon Southwell Minster, the continuous restoration of which, intrusted to him for the last thirty years, is still unfinished.” To this we may add that among Mr. Christian's buildings for commercial purposes is the Economic Life Assurance Office, New Bridge Street, Blackfriars.

tested against the specious allegations that expert arbitrators are costly; and was opposed to arbitrators being either arbitrators or assessors, having perfect faith in the architect. In conclusion, he had to submit that liberality, loyal justice to all concerned, impartiality that is warm and sympathetic with life as distinguished from that which is frigid and dead, is the best, strongest, and safest policy for the architect to pursue, leaving all harshness to lawyers, whose province it is. This spirit he was advocating as the law of architects; and he believed it to be recognised by all the best of them. But he had to go further, and to say that the principle would be supported by lawyers, as a principle of law, that the architect as a specialist shall not permit his judgment to be warped by legal formulas and dogmas, which it is the prerogative of lawyers to handle. In this doctrine there might appear to be material for differences of honest opinion; but he was sure, whatever controversy there might be, it could only be upon ambiguous words, not upon patent principles of uprightness.

#### LECTURES AT CARPENTERS' HALL.

##### GIRDERS AND BEAMS.

The second of the present series of free lectures on matters connected with building, was given on the 3rd inst., at Carpenters' Hall (as mentioned in our last issue). The lecturer was Prof. A. B. W. Kennedy, M.Inst.C.E., who chose as his subject, "Girders and Beams."

The lecturer commenced by telling his large audience that he intended to speak about very technical matters of considerable importance to all engaged in any work connected with construction, viz., about beams, which, although familiar to most of them in appearance, were of a somewhat complex character. Beams were used in every kind of structure, and it was therefore important that workmen should understand the way in which they acted. When a piece of material was strained in a structure, the force applied commonly fell under one of four classes:—(1) tension, as shown in a tie; (2) compression, as in a strut, column, or pillar; (3) torsion or twist, as in a shaft; and (4) bending or transverse loading, as in a beam or girder. In the first and second classes the load was supposed to be applied in the direction of length, while the position of loading was always supposed to be the same, viz., axial. It was really only with No. 4 that he had to deal that evening, but in order to better explain his subject he would point out its relation to the simpler cases of Nos. 1 and 2. If they took a tie-rod, they would find that length and shape were of little importance, its strength being dependent on its sectional area or size; while the more it was pulled the straighter it became. In the case of a strut, they were at once met with the difficulty that its strength did not depend only on its sectional area. In compression, length and shape were all-important, as was the method of fixing the ends, the tendency being to buckle. Torsion, again, was not of so much importance in a structure. If they wished to wrench a shaft in two, they would do so by putting a lever on the end, and the longer the lever, the less would be the force required; so that it was not a question simply of how much force was required to twist it, but also of where the force should be exerted. In the case of a shaft, the force acted with a certain leverage, and the effect of the force depended upon whether it acted with a large or a small leverage. Thus the effect would be the same if a pressure of one ton were applied at a leverage of one foot, or two tons at half a foot. This could be measured by multiplying the force by the leverage; and as it was convenient to have some name by which to indicate this combination, he would use the term given by all writers on mechanics, viz., that of "moment." The strength of a shaft, therefore, was dependent upon the force applied to twist it and the leverage multiplied together, i.e., upon the "moment" applied to the shaft, which might be in foot-tons or inch-pounds, or what not. With respect to a beam, the same principle applied. A beam was not broken by a force simply, but by a force in a particular position. The strength of a beam therefore depended, first, on the load put upon it, and next on the particular position of the

load, measured in feet from somewhere or other. So that the strength of the beam depended on what he had termed "moment," i.e., on a load having a certain definite position. The lecturer showed that in the case of a beam resting on two walls with a great deal of loading, the forces acting upon it were, first, all the loads distributed over it, and, secondly, the upward pressure of the two walls. It was necessary to remember that these upward pressures were as real as the downward pressures, and had to be considered in the same way. As it was not easy to measure the pressure upon the wall, he exhibited a model of a beam suspended from two small spring weighing clips, which registered 5 lb. each with a 10 lb. weight hung on the centre of the beam, and 1 lb. and 9 lb. when the weight was hung close to one end. The pressure on the wall would, therefore, be the same, though differently distributed, and unless in the case of every beam the upward forces were exactly equal to the downward forces, the whole thing would move bodily either up or down. One force could not bend a beam; it was the "moment" of the force about the centre that caused it to deflect in the middle. A beam could carry twice the load if distributed all over it that it could carry if the weight were in the centre. It was easy to find the strength required in a beam loaded in the centre if the bending action or bending moment of the forces on it could be ascertained, viz., by multiplying half the length by half the load, and expressing the result in foot-pounds. This, of course, applied to a beam loaded at one point, say in the centre, while in one equally loaded all over there would be only half the tendency to bend. He had thus endeavoured to give some idea of the forces that tended to bend a beam, but what was going on inside the beam whilst it was being strained? If a tie-rod were pulled with a force say of ten tons, it pulled back with exactly the same force. There would be a stress in the metal, which would stretch the tie-rod a little, after which the pull of the iron would be exactly equal to the outside pull. That was just what happened in the case of beams; the particles of wood resisted change of position, and there was stress in the beam balancing the outer forces. But it was not quite so easy to explain what happened in the case of the beam, for this reason, that in the tie-rod there was only the plain tension, while in the beam there was a bending moment. In order that the beam might not be broken, there must be something that could be measured in foot-tons or inch-tons to balance the moment which was trying to bend it. The Professor here exhibited a model of a cantilever, cut off from its supports, and showed how in order to hold it up it must not only have a corbel beneath it, but also a small tie at the top of a small strut at the bottom, connecting it to the wall. The cantilever showed tension along one part, and compression along another part; but it was not so easy to show this by a model of a beam supported at both ends. As long as the beam did not break the moment caused upon it by the load must be exactly equal, and neither more nor less than the moment inside the beam, just as the whole stress of the tie-bar must be equal to the pull exerted upon it. It was their business to keep this in view, as they must want the beams to be as strong and at the same time as light weight as possible. It was easy to see in what direction they had to work in order to do this. The strength of the beam depended on the moment between the internal tension and compression, and the further apart those two forces or "stresses" were kept the better. In a rectangular beam there was a great quantity of material in the middle which had very little stress, and this did little good. What was wanted was to get as little metal as possible into the middle, near what was called the neutral line of the beam. If an ordinary rectangular joist were used as a beam it would be weakened but little by cutting a piece off each side. Of course no one would think of doing this, but there were other materials than wood in which the same state of affairs would not apply. If he took the same weight of material and put the cut-out pieces on the top and bottom he would have done some good. There would be no more weight than there was at the beginning, but he had put the weight just at the place where it did most good; what he would have done would be really to increase the leverage,

and therefore the internal moment of the beam. This, he believed, was at the bottom of the whole modern practice of architects, engineers, and builders, viz., the trying wherever they could to put the material of the beam in two masses, as far apart as possible. They took one mass of metal, in which they intended to have tension, and another, in which they wished to have compression, and joined those together by a light web, so that they got the form of the rolled joist, the meaning of its section being that there was a considerable amount of metal at top and bottom, with a thin web joining the flanges together. To find the weight that any rolled joist of a certain section and span would carry what course should they pursue? If they took a 4-in. flange of the thickness of 1 in., and a total depth of 10 in.,—a 10 in. by 4 in. joist,—what area of metal had they got for tension to act in? Neglecting the middle part, they might say there were 4 square inches on which tension was acting at the bottom, and 4 square inches on which compression was acting at the top, the two areas being about 10 in. apart. The strength of a piece of iron in tension was about 20 tons per square inch, though they would not, of course, put anything like that weight on the beam. Supposing, therefore, as was reasonable, they put on 5 tons per square inch, they might allow 20 tons of total tension or compression in the 4 square inches, and the moment of the stress would be 20 by 10 in. = 200 inch-tons. That rolled joist then would be quite safe if the bending moment did not exceed 200 inch-tons. Now, as to the bending moment that was to go on the joist, if the span was 20 ft., what possible uniformly-distributed load would it bear? To find this they must reduce the 20 ft. to inches, and divide by 8, the result being 30. This divided into 200, the moment already found, would give 6 2/3 tons as the safe uniformly distributed load, or half this, viz., 3 1/3 tons, as the load which could be applied in the centre. The breaking load would be 27 tons. How now came to the question of what sections were available for use which fulfilled the necessary conditions of concentrating the metal at the top and bottom. The angle or T irons were unsuitable. The most useful things were what were called rolled joists, which had been imported for a good many years from Belgium. These were made of iron, which could not always be said to be of the best quality, but at the same time they had been useful for their purpose, and of late years it had even been possible to get them of steel. The C or channel iron was useful, and the I form was very suitable and could be had up to 16 in. or so deep. The two I forms were often placed vertically above each other, but the middle flanges were of no use, the whole being only about twice as strong as one joist of the same size. But if something stronger than the mere section were desired, the next thing was to use a couple of I joists side by side, putting plates top and bottom right across them to stiffen and hold them together. It would thus be seen that a much larger amount of metal was put outside than what existed before. At the same time it must be borne in mind that some metal must always be lost in this combination because of the rivet-holes, and they must therefore allow for this, by deducting the metal cut out. In the case of the dimensions being too great for single joists, it was usual to build girders up with plates and angle-irons at the top and bottom, their capacities for carrying weights being easy of calculation. He had been speaking of wrought iron, but it must be remembered that cast iron differed from wrought iron in that it possessed a greater resistance to compression than to tension, and that when they used a cast-iron beam they could put a smaller area of metal in compression than could be put in tension. That involved a different kind of design for cast iron as compared with wrought iron beams, the top flange being much smaller than the bottom one, because the top flange had only to resist compression for which the metal was comparatively strong, whereas the bottom flange had to resist tension for which the metal was comparatively weak.

The third of the present series of lectures was given on Wednesday evening last. The lecturer was Mr. Francis Chambers, F.R.I.B.A., who chose as his subject "Joinery." A report of the lecture will appear in our next.

## MR. R. S. POOLE ON MEDALS.

Mr. REGINALD STUART POOLE, Keeper of Coins and Medals in the British Museum, lectured on "Medals" on the 9th inst. at the Royal Academy. This was the last Academy lecture this season.

Mr. Poole, in the course of his introductory remarks, said he had been trying for more than thirty years to help forward the very interesting and, when properly understood, really great art of the medallist, and he was glad to feel that signs of progress were evident. Those who wished to form a right idea of what a medal was should think of it, not as a coin merely, but as something in the form of a coin which was intended to commemorate some person and some great event in his life, or some city and some important incident in its history. In the great period of art, that of the Greeks, there was no distinction between a coin and a medal in point of art; the coins which passed current among the people were equal in execution to the more special works of the medallist. Those who looked only at the present coinage of this realm might be pardoned if for a moment they seemed, after studying ancient Greek coins, to despair of progress. Let them look, for instance, at the ordinary penny of our current bronze coinage. On the obverse they would see the head of the Queen, — a very pleasing portrait of Her Majesty as she was fifty years ago; but why, he asked, should the same type of face be continually repeated, without the least regard to fitness and historical accuracy? On the reverse of the penny was scathed the figure of Britannia, whose head measured about one-eighth of the total length of the sitting figure, a proportion which would give far too great a height to the figure if standing up. Perhaps the best reverse to any of our coins was that of the dragon sovereign, and that was by an Italian artist. Even in this, however, in the grouping and relative proportions of horse and rider there was no approach to the perfection of Pheidias, for the artist had missed the most beautiful proportion between man and horse which Pheidias always observed. One cause of the comparative inferiority of modern coins consisted undoubtedly in the mechanical processes by which they were produced, for mechanical methods were contrary to the spirit of art, although, no doubt, the coins were very exact as to size and weight. Nevertheless, as he had said, he did not despair for the future of the medallist's art, especially seeing what had been done within the last thirty or forty years in two other arts, — viz., architecture and music. In these two branches of art he considered that we had recovered ourselves in a most remarkable degree. With regard to architecture, it was not too much to say that since the time of the initiation of the Gothic revival by Pugin and others there had been produced works of architecture worthy of any period of Gothic architecture. As a case in point he instanced the Church of St. John, Red Lion-square, Holborn, by Mr. J. L. Pearson, R.A. The lecturer next referred to the uniformity and continuity of excellence in Greek coins over a long period as contrasted with the varying excellence of Greek sculpture in different localities, even at its best period. He pointed out how different in character were the sculptures of the Phigaleian frieze, and those of the Temple of Zeus at Olympia, from the known works of Pheidias as seen in the Parthenon. Admirable as were these sculptures in design and in general motive, they were evidently from their execution only the work of local sculptors. The lecturer also pointed out the value of the study of Greek coins as throwing light on vexed questions of ancient history and archaeology. After a passing mention of the works of the Italian, German, and French medallists, he referred to the excellent work that is being done by Professor Legros, Mr. Poynter, R.A., and Mr. Fremantle (of the Royal Mint) in connexion with the Society of Medallists. This society offers prizes to students for the production of medals, and the most successful of these productions, a medal of Cardinal Newman, the work of Miss Eleanor Hall, was exhibited to the students, and highly praised by the lecturer, who, in conclusion, spoke to the students in much one of the qualifications needed by any one who aspired to be a successful medallist, and of the technical processes, conditions, and limitations of the art. From what he said we infer that

the art-students who have succeeded in becoming medallists are nearly all ladies, who seem to show peculiar aptitude for this work.

## ARCHITECTS' BENEVOLENT SOCIETY.

THE thirty-seventh annual meeting of this Society was held on the 9th inst., in the rooms of the Royal Institute of British Architects, Conduit-street.

Mr. William H. White, the Honorary Secretary, read the annual report of the Council, which was as follows:—

"Six meetings have been held by your Council during the past year, at which they have distributed in grants the sum of 509*l.* among 32 persons; while they are happy to state that they were enabled to pay three pensions of 20*l.* each, in place of the one pension of 20*l.* paid in 1885, making a total payment of 509*l.* The amount received by subscriptions has slightly increased, from 361*l.* 3*s.* in 1885 to 366*l.* 7*s.* in 1886. Fifteen new members were added to the list, but your Council regret having to state that the subscriptions in arrear at the end of 1885 amount to over 23*l.* In the present depressed state existing in every profession and business, this is scarcely to be wondered at; but it is hoped that these arrears may be shortly paid. 599*l.* 16*s.* was received by donations, including a legacy of 100*l.* left, free of duty, by the late Mr. Sancton Wood, one of the oldest contributors to the Society, and a member of the Council for several years, from 1853-61. The generous proposition of Mr. George Godwin, F.R.S., of contributing 100*l.* to the funds has been the means of adding 609*l.* New Three per Cent. Stock to the capital of the Society; the total amount of property invested, which in 1885 was 6,422*l.* 19*s.* 10*d.*, being at the present time 7,026*l.* 14*s.* 10*d.* The remainder of the donations was received from,— The President; the Hon. Treasurer; Mr. J. Macvicar Anderson; Mr. A. W. Blomfield, M.A., F.S.A.; Mr. Henry Cursey, Mr. Wm. Emerson, Mr. John Gibson, Mr. W. Grellet, Mr. J. Jennings, Mr. J. S. Phené, J.L.D., F.S.A.; Mr. F. W. Porter, Mr. R. P. Pullan, F.S.A.; and Mr. E. C. Robins, F.S.A. Your Council cannot refrain from expressing the hope that an example so advantageous to the Society may be even more generally followed in the present year. The contributions from corporations or societies have been very few; namely, ten guineas, a subscription from the Architectural Association of London, five guineas, a donation from the Nottingham Architectural Association; and, as in former years, the income of the small charitable fund of the Royal Institute of British Architects. The lamented death of Professor Donaldson caused a vacancy in the number of trustees, to fill which the Council have nominated Mr. Thomas Cundy, who, should the annual general meeting approve, has consented to hold the office. The trustees of the society will consequently be Mr. Charles Barry, Mr. George Godwin, and Mr. Thomas Cundy. Your Council have to announce with sincere regret that Mr. J. Goldcutt Turner has retired from the Council, owing to a deafness which prevents him from fulfilling his trust to his satisfaction. Mr. Turner has been a subscriber since 1869, more than twenty years, and besides being a member of Council for several years, was Honorary Secretary from 1876 to 1879. It having become necessary to obtain assistance in the business of the Society, your Council have appointed Mr. Heron B. Verity, Assistant Librarian, R.I.B.A., Assistant Secretary to the Society. The income account and balance sheet for the year ended December 31st, 1886, are herewith submitted. Your Council wish to call attention to the fact that nearly one-third of the fifteen new subscribers are Irish architects, recruited by Mr. Albert E. Murray, the Honorary Secretary of the Royal Institute of Architects of Ireland. If each member would emulate Mr. Murray, the Society's income would become doubled or trebled. Your Council have decided to hold a Dinner this year with the object of augmenting the funds of the Society. It is proposed, by the kind permission of the Worshipful Company of Carpenters, that it should be held in their Hall on the forty-second anniversary of the formation of the fund, namely, Monday, October 31st, 1887, and your Council look with confidence to each member of the Society doing his utmost to ensure the success due to so desirable an object."

The foregoing report having been read and approved, was adopted by the meeting. A vote of thanks was passed to the outgoing Members of Council, namely, Messrs. Cole A. Adams, William Emerson, Lewis Solomon, George J. J. Mair, F.S.A., and J. Macvicar Anderson. In order not to lose the benefit of Mr. G. J. J. Mair's advice on the Council, it was passed, by acclamation, that Mr. Mair should be requested to act as the Hon. Vice-Treasurer. A vote of thanks having been passed to the auditors, Mr. C. Forster Hayward, F.S.A., and Mr. W. Hilton Nash, the President, Hon. Treasurer, and Hon. Secretary were re-elected, and the Council were elected in the following order:—President, the President for the time being of the Royal Institute of British

Architects; Members of Council, John Hebb, B. St. A. Rommeu, Thomas Cundy, George Scamell, F.G.S., Thomas M. Rickman, F.S.A., Charles R. Pink, Banister Fletcher, William Grellet, W. M. Fawcett, M.A., F.S.A., Arthur Cotes, E. A. Grünig, H. D. Appleton, C. Forster Hayward, F.S.A., W. Hilton Nash, and G. P. Raggett. Hon. Treasurer, Prof. T. Hayter Lewis, F.S.A.; Hon. Vice-Treasurer, Mr. Geo. J. J. Mair, F.S.A.; Hon. Secretary, Mr. William H. White.

The auditors appointed by the annual meeting are Mr. Charles Fowler and Mr. George Inskip.

## "ALEXANDRA HOUSE," KENSINGTON GORE.

THE opening ceremony of "Alexandra House" took place on Monday last, and was performed by their Royal Highnesses the Prince and Princess of Wales. This institution specially owes its origin to the Princess of Wales, who, in 1839, charged Sir Philip Culliffe-Owen with a mission to organise a committee in order to consider the best means of providing a home in London for the rapidly-increasing class of young women who, desirous of earning their livelihood, were in attendance as students at the various Schools of Art, Science, and Music. The necessity for this committee was for a time obviated by an offer from Sir Francis Cook, hart, of Doughty House, Richmond, to defray the whole cost of the erection and furnishing of a suitable building for the purpose, and to place it, when complete and in full working order, at the disposal of H.R.H. the Princess of Wales. This munificent offer was at once accepted, and communications were opened with her Majesty's Commissioners for the Exhibition of 1851, who, recognising the project as coming within the scope and terms of their Charter, agreed to provide a site for the building. This site was one in immediate connexion with the Royal College of Music. Upon these arrangements becoming publicly known, many leading firms offered to assist; Messrs. Lucas Bros. undertaking the erection of the building at prime cost of material and labour. Sir Frederick Bramwell, with much time and labour, contributed a scheme of lighting and ventilation, carried out under his immediate superintendence by Messrs. Galloway, of Knott Mill Ironworks, Manchester, also at prime cost. The Porcelain Manufactory at Worcester, Messrs. Bradford (of Manchester), Messrs. Elkington (of Regent-street), Messrs. Webb (of Stourbridge), Messrs. Starkie Gardner, Vincent Robinson & Co., The American Elevator Company, Gilroy & Co., Doulton & Co., Willis & Co.,—all of these firms offered to furnish portions of the building at prime cost. Messrs. Doulton, in addition, presented a series of large pictures in tile work for the decoration of the dining-room, and fireplaces and mantelpieces in the principal rooms, and the figures at the entrance designed by Mr. Ledward. Messrs. Chubb & Sons presented all locksmith work for the building. The design for the building was prepared by Mr. C. Purdon Clarke, C.I.E., who, in 1833, went to America to study similar buildings. Upon his plans being approved, they were transferred to the late Mr. Robert Down for execution, Mr. Clarke, as an officer of the Science and Art Department, not having time to attend to the work.

The building, which occupies a site of irregular form, comprises fifty-six suites of rooms, in each of which two students are allotted two bedrooms and one sitting-room between them. A large concert hall, in which there is an organ presented by Mr. Frederick Cook, a gymnasium, a suite of practising-rooms for instrumental music, and art studios are also provided. An extensive range of kitchens is placed on the top floor of the building, whilst the dining-room, 90 ft. in length, is placed in the basement. The large drawing-room is made to serve a double purpose, being also the library, surrounded as it is with dwarf bookcases and cabinets containing a collection of books presented by Mr. Wyndham Cook. The building is solidly constructed in hard red brick, in accordance with the wish of Sir Francis Cook, who recommended the architect to study solidity in preference to showy decoration, the only portions of the building selected for special ornamental treatment being the entrance vestibule in glazed terra-cotta, the concert-hall, and drawing-room, all of which are in the Jacobean style. The fireplaces and railings were supplied by the Coalbrookdale Company (Limited).

CHURCH OF ST. MARY MAGDALENE,  
CHISWICK.

This church, which was built about thirty-eight years ago for the use of the Rev. Mr. Tooth, consists, at present, of a small building, 50 ft. by 20 ft., with shallow transepts all under one roof.

At the request of the present vicar, the Rev. Arthur Murray Dale, a scheme has been prepared by the architects, Messrs. Newman & Newman, of Tooley-street, London Bridge, by which the church will be enlarged sufficiently to accommodate 500 adults, exclusive of choir. This, as shown upon the plan, will be effected by pulling down the west wall and adding a nave, aisles, baptistery, narthex, and tower, and continuing the present transepts into the aisles, forming respectively a side chapel and sacristy. The Ecclesiastical Commissioners have practically approved the scheme, and also the Bishop of London, the former having promised an endowment. The view of the interior is taken looking eastwards, and it is hoped that the work will be commenced this Spring. It will cost about 6,000l.

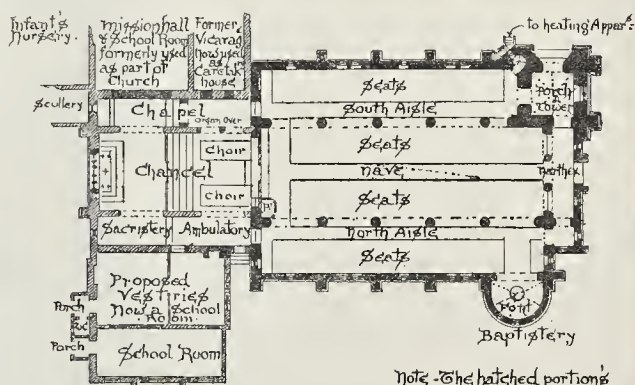
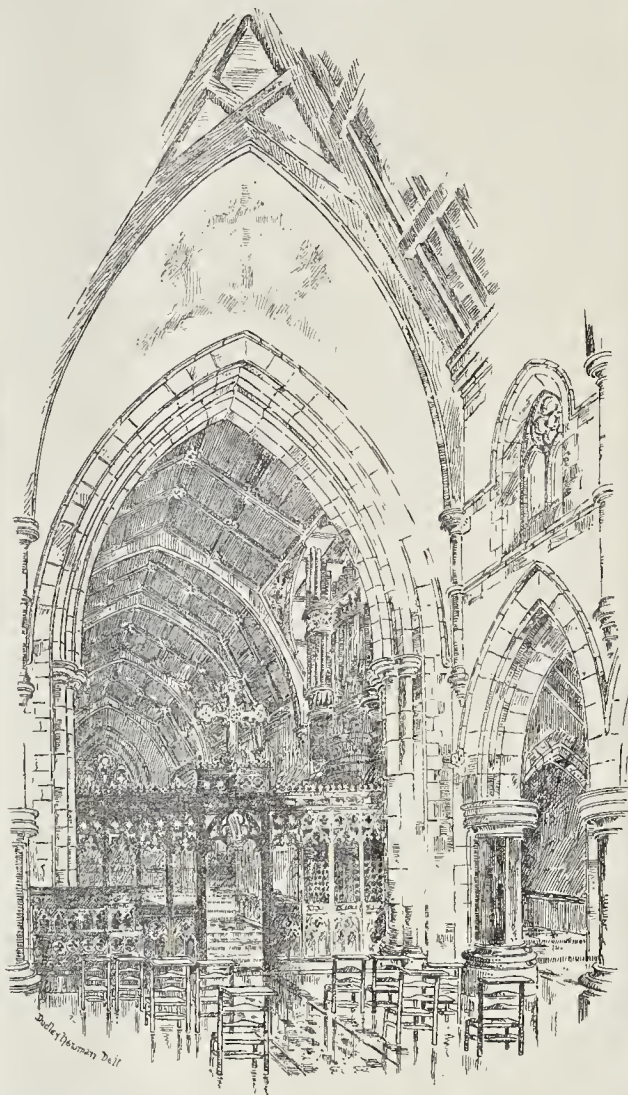
Illustrations.

THE CENTRAL PORTAL, ROUEN  
CATHEDRAL.

ONLY a small portion of the immense western façade of Rouen Cathedral is here shown, and this, perhaps, is not the most interesting, though it is, without doubt, the richest in sculpture and ornamentation. The rose-window and the upper stage of the central block belong to somewhere about the year 1515, whilst the porch below, with its beautiful pierced canopy, is considerably earlier, and of purer detail. Observe the great pinnacle on the left-hand side, and the manner in which it has been left in block for future carving. The minor entrances on either side of the principal portal form a curious contrast to it in workmanship and detail. They are of the end of the twelfth century, and though rude and coarse in execution, as is most of the carving of that early period, they do not suffer by comparison with the richer work of the fifteenth century adjoining,—indeed, some would go so far as to say that it is immeasurably superior. Whether this be the case or not, the subjects are most vigorously treated. The northern door illustrates the death of John the Baptist, and in it may be seen the daughter of Herodias dancing,—or rather tumbling, as Murray says,—before Herod. That in the south represents the Virgin with Salome, whilst the tympanum bas-relief in the centre is a tree of Jesse, a subject which the old builders seem to have been extremely fond of, if we may judge from the innumerable examples of its use which are to be met with in France, not alone in sculpture either, but in fresco, and perhaps to a still greater extent in the stained-glass windows. Who can forget after once seeing it the gorgeous twelfth-century example of coloured glass with this subject in the western lancet window of Chartres Cathedral? Rouen is rich in work of both early and late date, and will prove an inexhaustible field of work to the student.

EDINBURGH MUNICIPAL BUILDINGS.

We give this week further illustrations of the first and second premiated designs in this competition. Further consideration of the designs certainly does not lessen the surprise which we partially expressed before at the choice, for so picturesque and suggestive a site, of a design so entirely commonplace in its architectural treatment as that to which the first premium has been awarded. The plan is a very fine one, and we have always held and maintained that plan is the first thing to be considered in adjudicating on competition drawings; but surely something is to be considered besides plan. The curious thing is that architects who show so true a perception as to both the practical and effective arrangement of plan, should be apparently so entirely devoid of originality or the perception of picturesqueness and effect in architectural design. We cannot help feeling that, so far as the architectural effect is concerned, the erection of the building would be almost a misfortune for Edinburgh, though it would no doubt be a convenient and commodious building in a practical sense; not have we met with any difference of opinion on the subject so far.



Note.—The hatched portions on Plan signify Oldwork, and the tinted portions New work.

St. Mary Magdalene, Chiswick.—Plan and View of Proposed Additions.

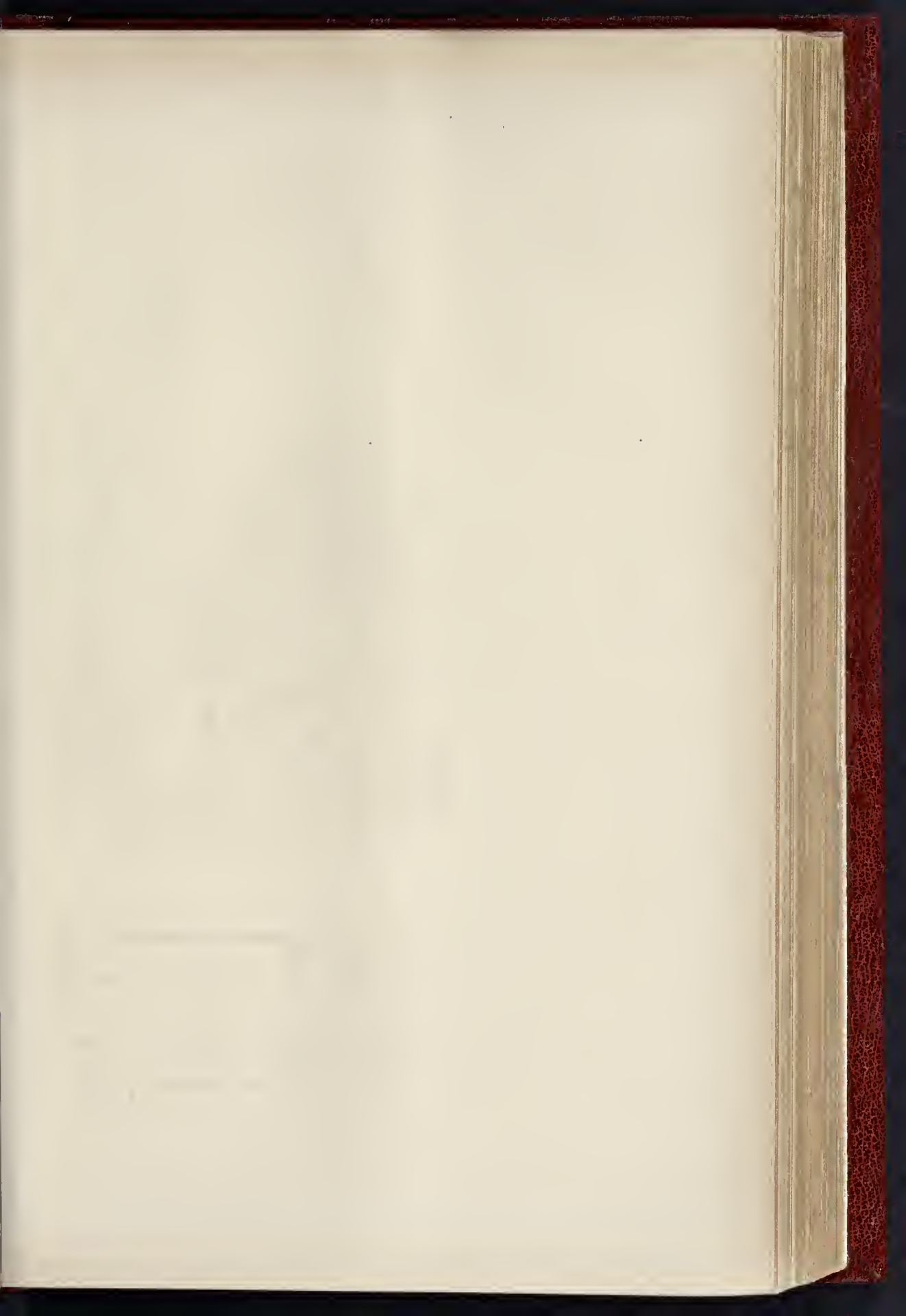
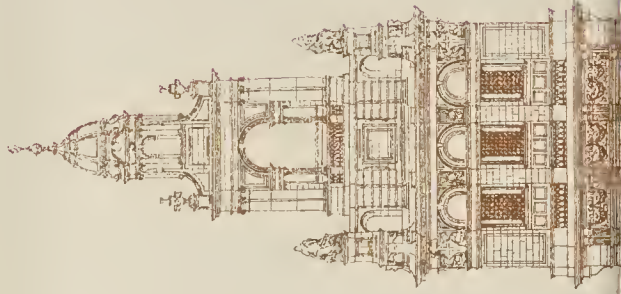


PLATE 1. THE BUILDER, MARCH 19, 1887

THE BUILDER, MARCH 19, 1887





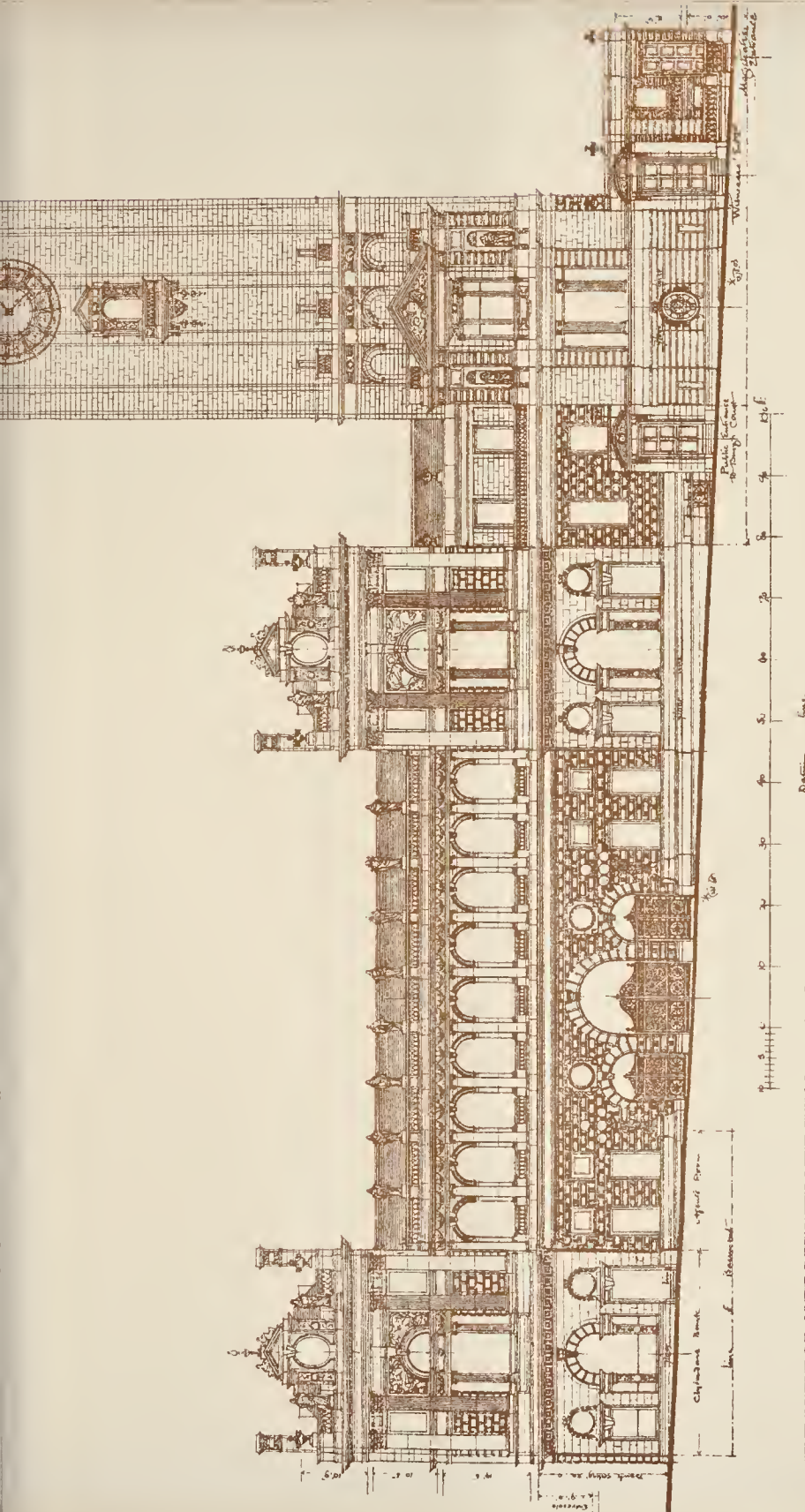
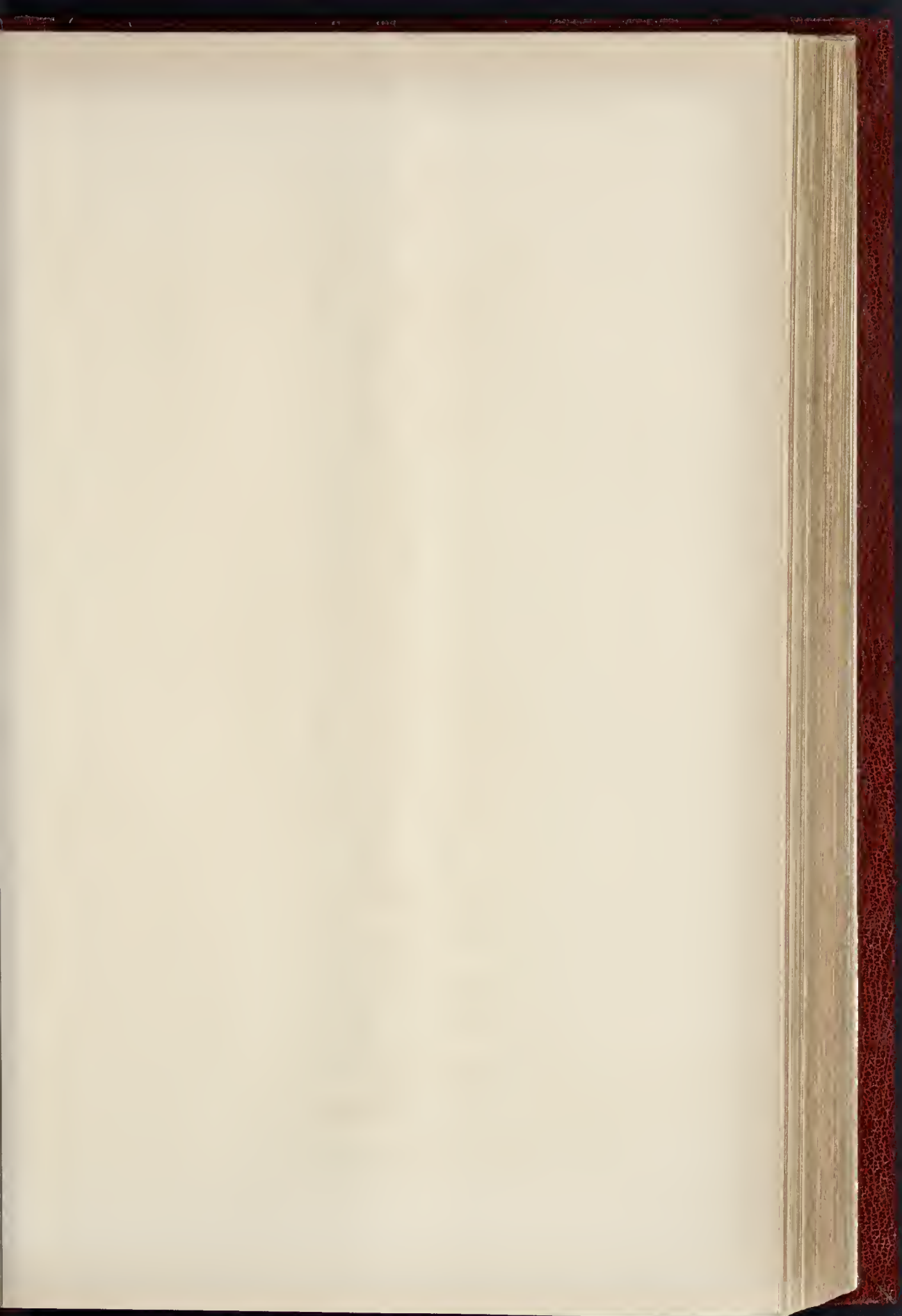


PLATE LXXXV. — 22 MARINE LANE, LONDON.

EDINBURGH MUNICIPAL BUILDINGS, SECOND PREPARED DESIGN. — MR. MALGOUM STARK, ARCHITECT  
ELEVATION TO THE HIGH STREET



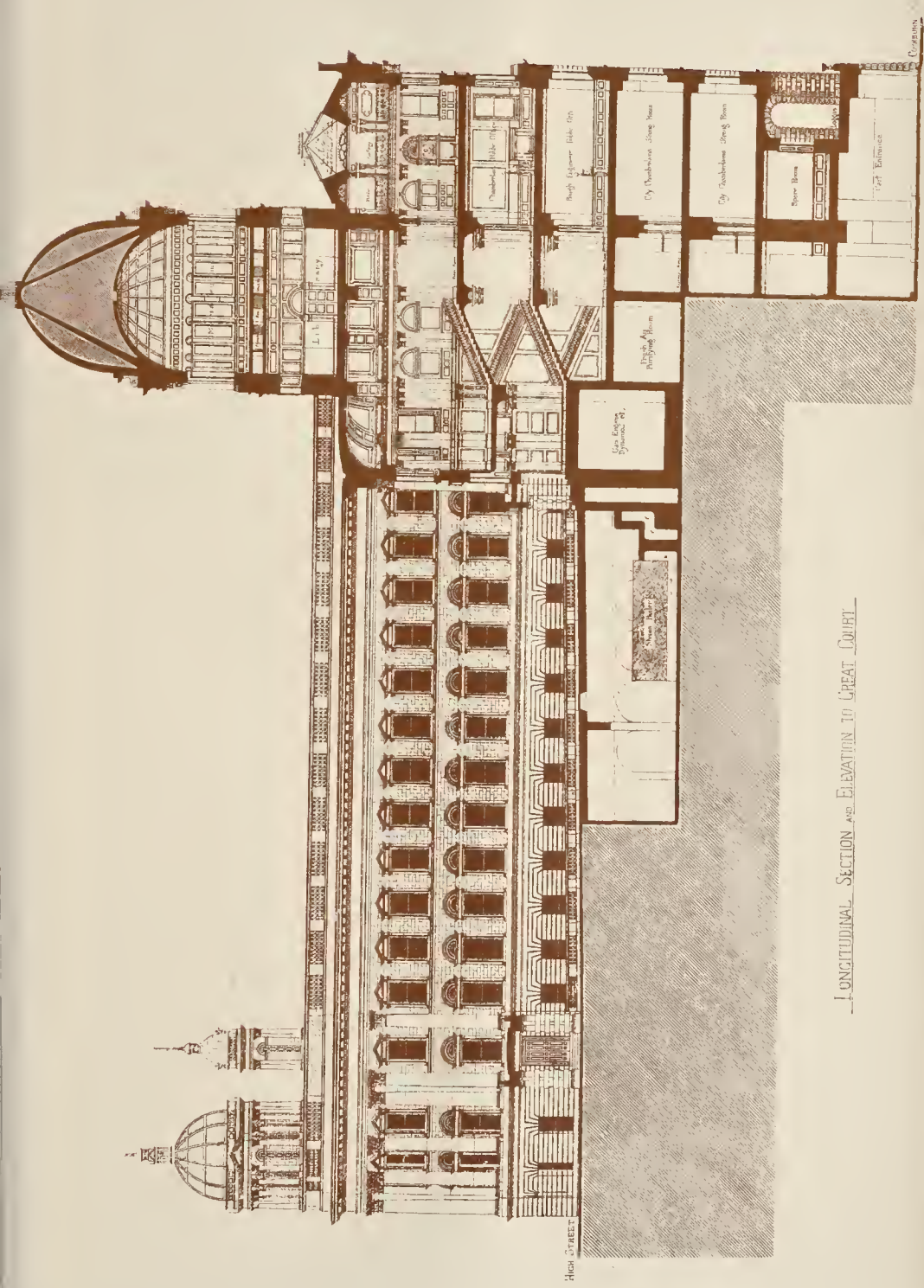


DESIGNED BY J. W. WOOD

THE BUILDER, MARCH 19, 1887.



ELEVATION TO CRAIGS CLOSE



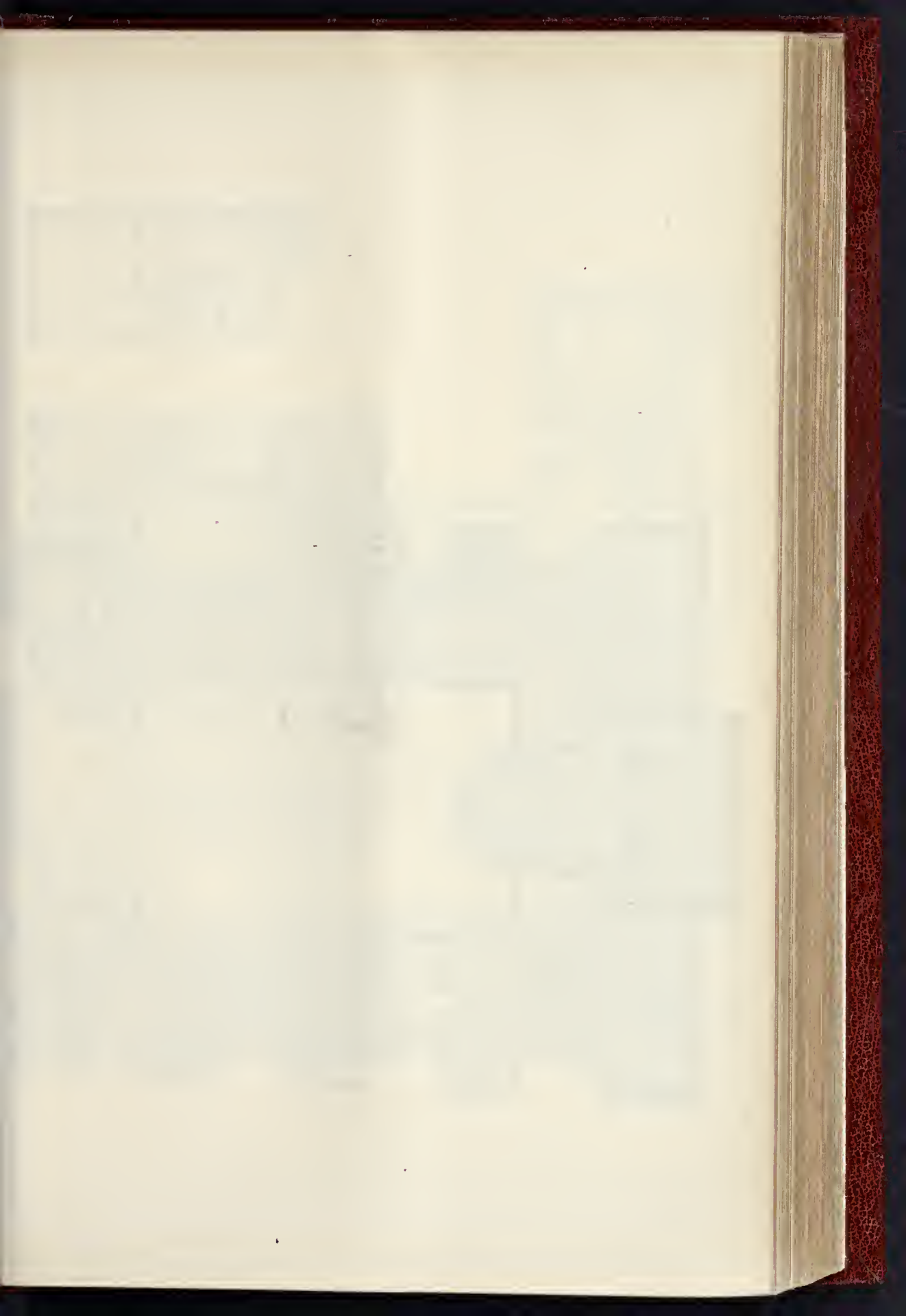
LONGITUDINAL SECTION AND ELEVATION TO GREAT COURT

EDINBURGH MUNICIPAL BUILDINGS, FIRST PREMATED DESIGN.—MESSRS. LEEMING AND LEEMING, ARCHITECTS.

HIGH STREET

EDINBURGH

THE UNIVERSITY OF CHICAGO



THE BUILDER, MARCH 19, 1887.



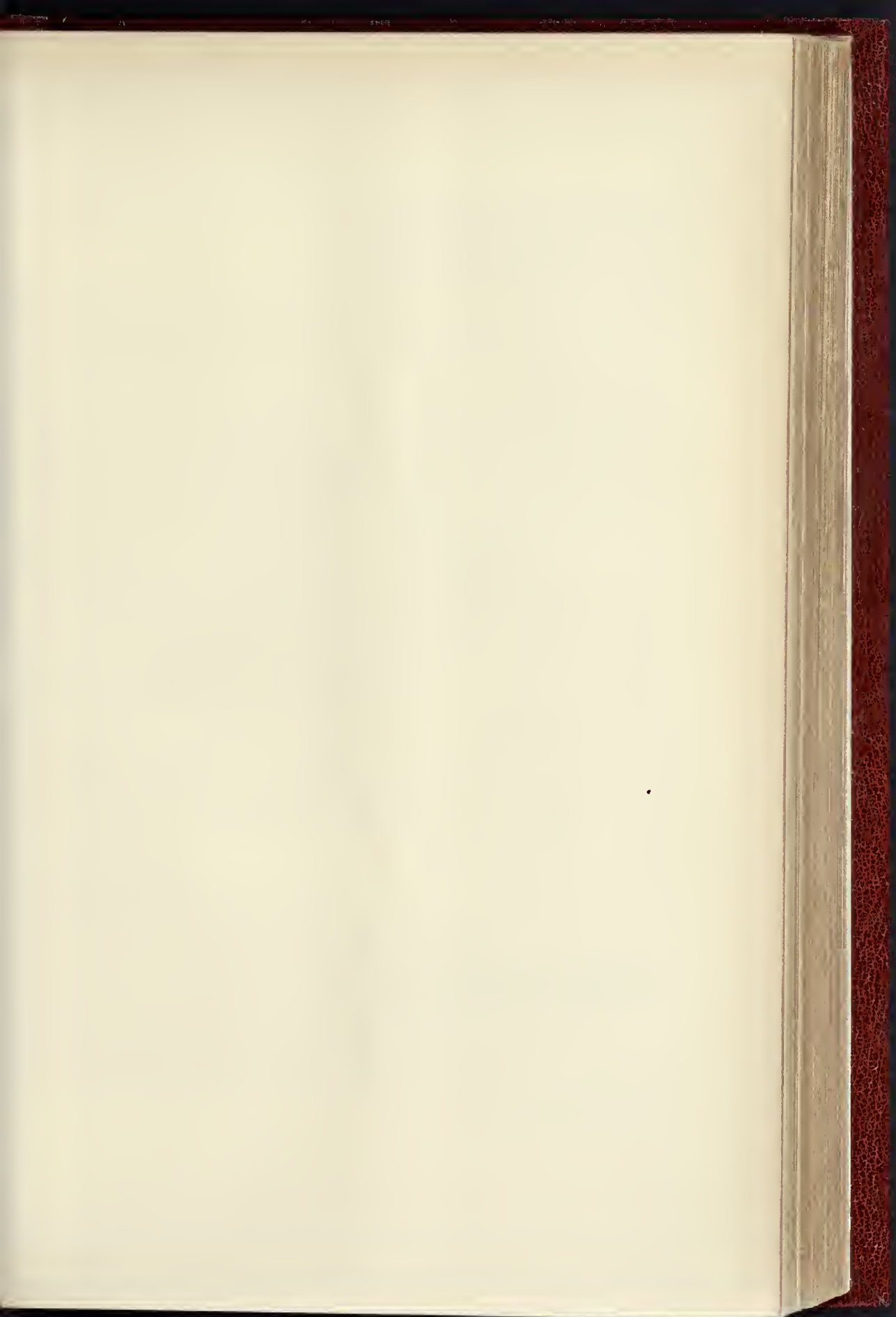




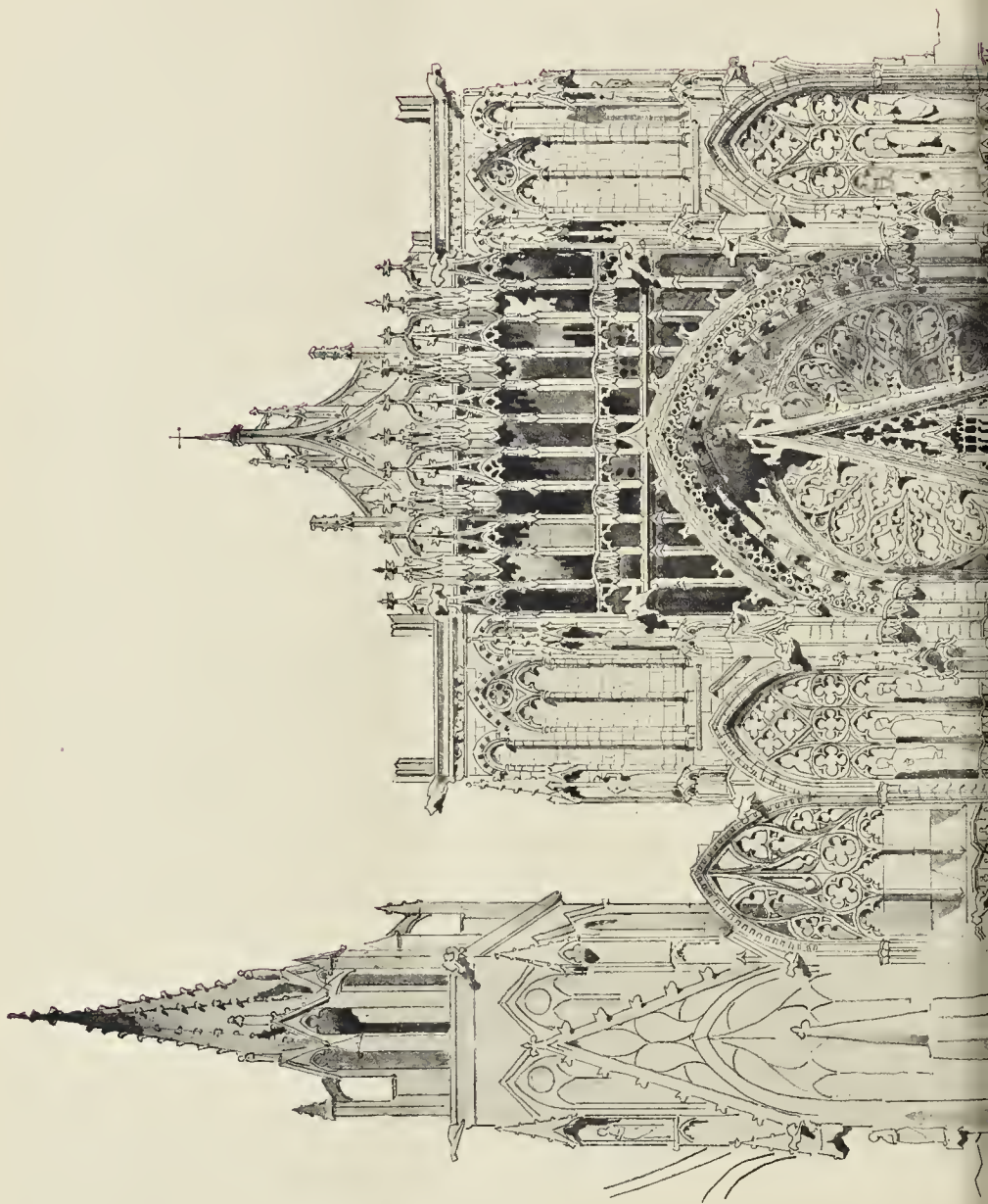
EDINBURGH MUNICIPAL BUILDINGS, SECOND PREMIAED DESIGN. — MR. MALCOLM STARK, ARCHITECT.

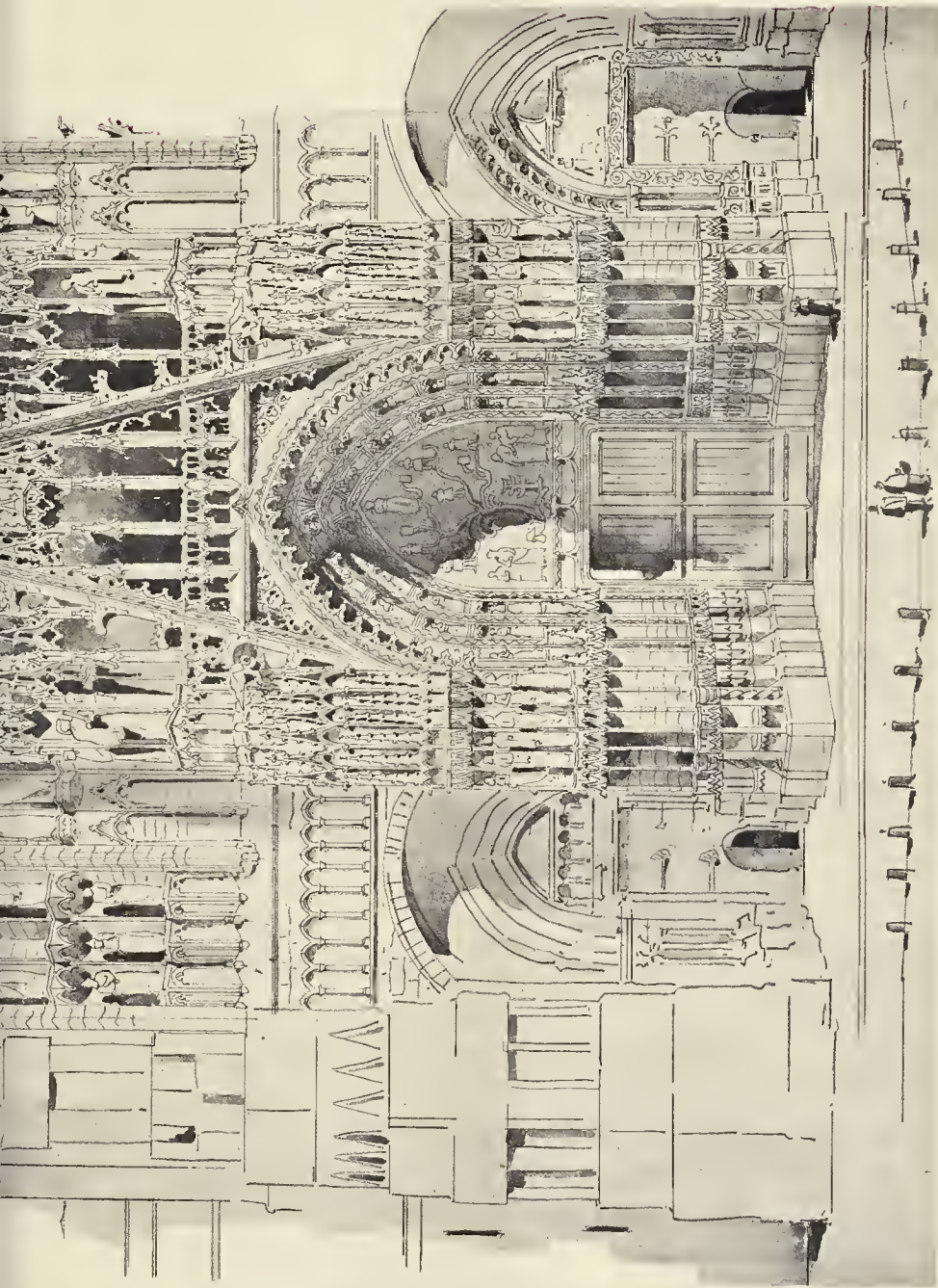
*THE PHOTO SPAGHETTI & CO. PRINTING WORKS, CAMDEN ST., LONDON, E.C.*





THE BUILDER, MARCH 19, 1887.



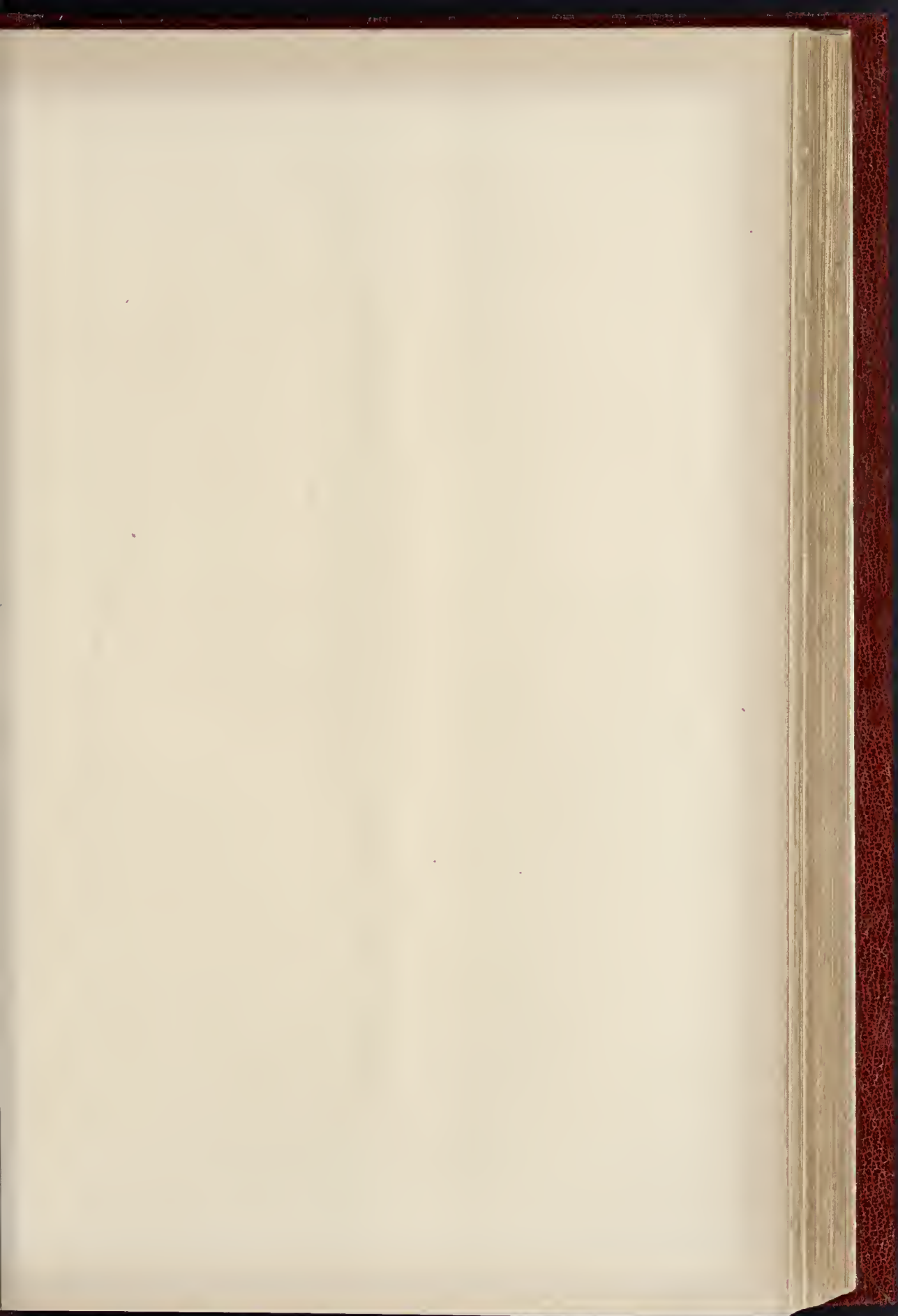


THE PHOTO-LITHO. CO., 25, ST. MARK'S, LONDON.

CENTRE PORTION OF THE WEST FRONT, ROUEN CATHEDRAL.—From a Sketch by Mr. ARNOLD B. MITCHELL, ARLEA.

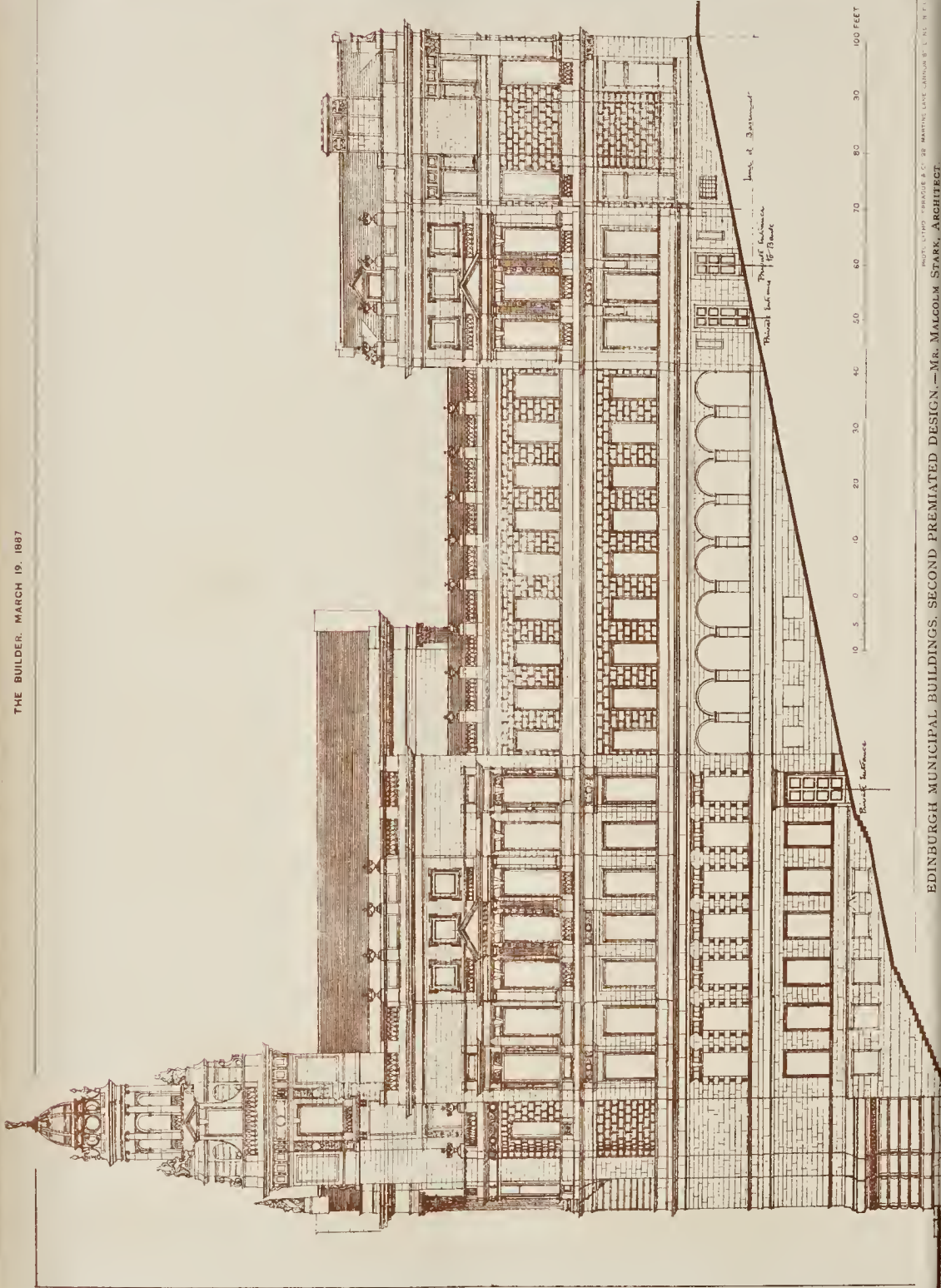
*Pugin Studentship Competition, 1887.*

1899 - REPORT OF THE BOARD OF TRUSTEES



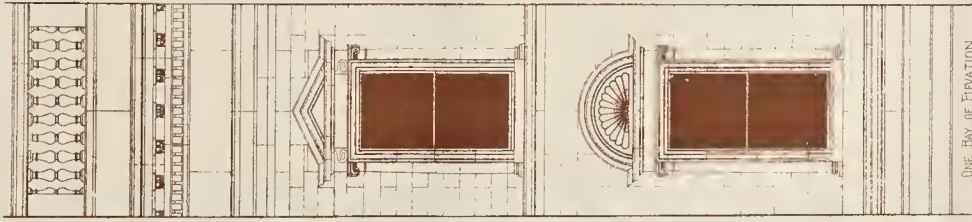
THE ARCHITECTURE OF THE BUILDING

THE BUILDER, MARCH 19, 1887



EDINBURGH MUNICIPAL BUILDINGS, SECOND PREMATED DESIGN.—MR. MALCOLM STARK, ARCHITECT.

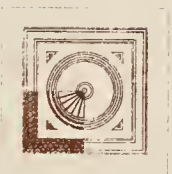




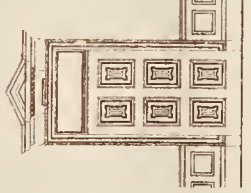
ONE END OF ELEVATION.



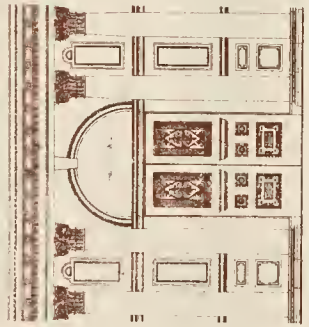
SECTION.



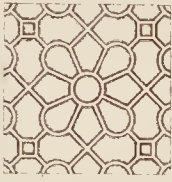
A PANEL IN COUNCIL CHAMBER.



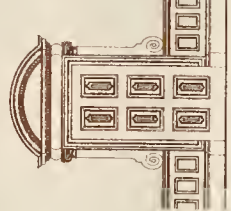
DOOR TO UPPER GALLERY, FINE ARTS.



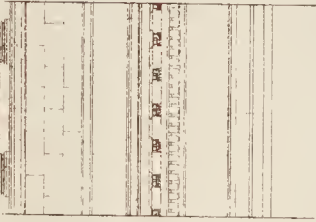
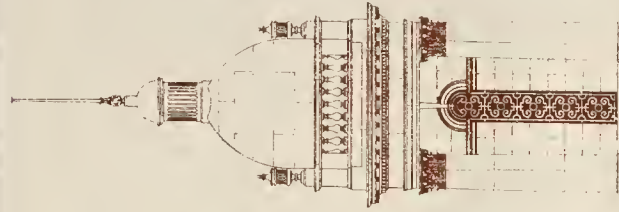
ENTRANCE TO COUNCIL CHAMBER.



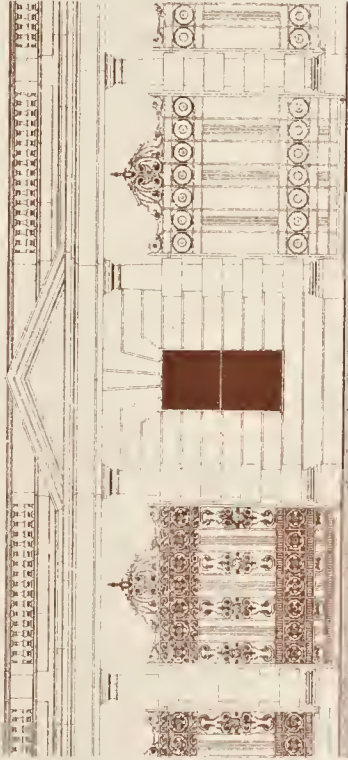
DETAIL OF BALCONY IN FINE ARTS GALLERY.



DOOR TO MUSICIANS' ROOM.



ENTRANCE TO GREAT COURT FROM HIGH STREET.



ENTRANCE TO GREAT COURT FROM HIGH STREET.

EDINBURGH MUNICIPAL BUILDINGS, FIRST PREMATED DESIGN.—MESSRS LEEMING AND LEEMING, ARCHITECTS.

PLATE LXXV. ARCHITECTS: MESSRS LEEMING AND LEEMING.

THE UNIVERSITY OF CHICAGO

## THE BUILDING TRADES' EXHIBITION.

The eighth annual Building Trades' Exhibition at the Agricultural Hall, Islington, was opened to the public on Monday, but was more than usually incomplete and unready. Even up to eight o'clock on Tuesday evening a great deal remained to be done, and considerable spaces remained vacant, although we noticed several stands which were devoted to "fancy goods" and other articles baring not the least connexion with building. No doubt the perennial unreadiness which characterises this exhibition is mainly due to the dilatoriness of exhibitors themselves, but whoever may be responsible for it, the middle was so great even on Tuesday evening that it was with exceeding difficulty that we were enabled to take note of many of the exhibits. The phenomenal weather of Tuesday last outside the Agricultural Hall, and the cold, forlorn, and dreary appearance of the interior (for there were few visitors) together constituted as gruesome a combination of circumstances as ever Mark Tapley could have desired as a concomitant of enjoyment. As year after year passes, we become more than ever confirmed in the justice of the opinion which we have often expressed, namely, that these trade exhibitions are held at too-frequently recurring intervals to render them of any interest and value. One sees the same things, year by year, which were shown in the earlier exhibitions,—or rather, some of the same things, for many of the best-known of the old exhibitors have ceased to exhibit during the last two or three years. The consequence is that there is little if anything that is specially noteworthy in the present exhibition, and very few novelties of any kind. Owing to the incomplete condition of the exhibition at the time of our visit, and to imperfections in the catalogue, we cannot pretend to notice the exhibits precisely in the order in which the stands are numbered, and we therefore omit the numbers of the stands.

Beginning under the Gallery at the Islington Green end of the Hall, we notice that Messrs. Shanks & Co., of Barhead, near Glasgow, had a fairly-good display of baths and sanitary fittings, including a pedestal closet named the "Citizen," which is an improved form of hopper closet; the manufacturers call it a "wash-down" closet. It has excellent flushing powers. A little further on, the Britannia Company, of Colchester, exhibit a very convenient portable saw-bench, to be worked by hand or treadle, and capable of performing the two operations of boring and sawing simultaneously. The Patent Victoria Stone Company exhibit their material, not only in the form of paving and steps, but in the shape of architectural features such as balusters, which are cleanly moulded, though their pale ashy grey colour is not pleasing. Mr. C. G. Tebbutt exhibits Tebbutt's patent safety bricks for stables, yards, &c., which provide a sure foothold and permit of drainage without the use of iron channels.

Among the few novelties in the Exhibition the first that we noticed was at the stand of Mr. Ernest Homan, who shows specimens of Homan's "Venetian Marble Mosaic Tiles," which are formed of variously-coloured marble tesserae embedded in cement and afterwards subjected by hydraulic power to a pressure of 4,500 lbs. per square inch. It is claimed that the density thus obtained for the tiles renders them impervious to moisture and as durable as the hardest stone. The designs are very good, and as this new flooring material is cheap we think it likely that it has a future. One of the specimens exhibited, however, is not very carefully laid. At the same stand are exhibited specimens of Homan's quartz, granite, and metallic stone paving, and sections of Homan & Rodgers' admirable flat-brick fireproof floors.

Messrs. W. R. Crow & Son exhibit some well-made but cheap joinery. Mr. J. Matthews, of Weston-super-Mare, exhibits Poole's patent bonding-roll square-cornered roofing tiles, whose merits have before now been recognised. Messrs. J. E. H. Andrew & Co. exhibit some very compact, simple, and smooth-working and quiet gas-engines. Messrs. C. Kite & Co. have a good display of ventilators, though nothing very new. The exhibitors who trade under the name of Stent's Patents, Limited, show Stanley's patent corrugated woven-wire fireproof "lathing," for plaster-work. The corrugations impart additional stiffness to the "lathing," which is very readily fixed, and

affords an admirable key for the plaster. Stent's patent flexible and spiral steel door and gate spring, which is mortised into the stile, and concealed from view, is an excellent contrivance; it is inobtrusive, and immediately detachable at will. Messrs. Henry & Morant exhibit Henry's patent sash-line fastener, which is easily fitted to any window-sash, and, once fixed, it enables a broken cord to be removed and a fresh one adjusted without taking out the sash. Messrs. Bradshaw & Co. exhibit samples of Seyssel, Trinidad, and Limmer asphalt.

Messrs. Stuart & Co. exhibit their patent Granolithic, which is an artificial stone of great strength and durability. It is specially adapted for use as paving, and for the floors of basements, sculleries, stables, &c. It has been very largely used in all parts of the world. Turpin's Parquet Floor Joinery and Wood-Carving Company, Limited, have a very excellent display of good parquetry and carved woodwork. Messrs. Brazier & Son exhibit a serviceable direct-action water-closet, of the "improved hopper" type, having a good depth of water at the bottom. Mr. Julius Sax includes in his show of electric bells and apparatus all the latest improvements and adaptations of those useful appliances. Messrs. Broad & Co. have a good representative show of sanitary stoneware, including a new grease-trap, called the "Excello."

Messrs. Hayward Bros. & Eckstein show their admirable stall-board lights and patent semi-prism reflecting pavement lights. Their patent self-locking coalplate, which we described some two or three years ago, supplies a long-felt want. Sheringham and other ventilators in variety, and circular staircases, are among the other exhibits of this firm. Mr. C. G. Roberts shows his ingenious rain-water separators, which have also been described in our columns. Messrs. Edward Smith & Co. make a very good display of red and buff terracotta and moulded bricks, together with a variety of floor and wall tiles (some of them hand-painted) embossed and incised tiles, mosaic work, &c. Messrs. Thomas Wontner Smith & Son exhibit what they claim to be non-poisonous sanitary paints, which are exhibited under a test which seems to show that (when first applied, at any rate) they are waterproof.

Radeke's Decorative Wood is a form of wall-decoration which has some claim to notice, inasmuch as, altogether apart from the samples exhibited, good effects may be got by its use at very much less cost than that of carved work. Although it somewhat resembles, and by the uninitiated and non-technical observer might be taken to be, carved work, it is not put forward as such. It is a German product, and consists of wood-pulp laid on a thin veneer and then stamped by hydraulic pressure to the required design, which is imparted by a steel or bronze mould. A great variety of work can be produced by this process, and with a surface of almost any wood. The work, which is fairly sharp and clean in execution, ranges from "sculpturesque" figure panels to mouldings and enrichments such as the familiar egg-and-tongue. Of course the effect of under-cutting is necessarily precluded by the conditions of the process, and as the new material shows on the face of it that it is not carved work, it will perhaps not be regarded as an irredeemable sham.

Mr. Henry Bassant makes a capital display of parquetry floors and borders in various woods and of different designs. The workmanship and materials are excellent. Wilkos's Metallic Flooring and Eureka Concrete Company occupy the centre of the hall with a variety of their specialities. This Company's well-tried materials are being largely used, but we prefer to see them used constructively. The Venus of Milo, statuette size, in the ashy grey material shown, does not attract us. We spoke, at the outset of this article, of the depressing condition of things which prevailed at the Exhibition on Tuesday, when this Company's exhibits were not all in place, and were not even all on the spot. But things might have been worse, for in the catalogue we found that among this Company's exhibits was to be "The 'Jubilee' Coffin, in Specular Granite, designed and registered by Mr. W. Miller" (!) Happily we were not privileged to see this fearfully-made and wonderfully-named "casket," as our American cousins would call it, but from inquiries we made we found that it had, probably (barring acci-

dente) be on view on Wednesday or Thursday. We further learnt that it was meant to take the place of lead as an air-tight and worm-proof receptacle for mortal remains, and that it would weigh about 5 cwt. We sincerely trust (as, no doubt, will the undertakers' men, when they hear of the new "invention") that this concrete coffin will not come into use, not merely because of its outrageous name, but on account of the retrograde step, from a sanitary point of view, which its use would involve. Advocates of "earth-to-earth" burial or of cremation are not likely to give the "Jubilee" coffin much quarter.

Messrs. William Wooliams & Co. have, as usual, some excellent wall-papers on view, designed by Mr. Owen W. Davis, Mr. J. West, Mr. G. C. Haité, Mr. A. F. Brophy, Mr. A. E. Sedding, Miss Louisa Ammonier, and others. These papers, which consist wholly of raised flocks upon mica grounds, are rich in effect and non-arsenical, but one drawback of wall-papers of this kind is the facility they afford for the lodgment of dust. Messrs. Musgrave & Co. exhibit their new patent "Ulster" slow-combustion ventilating stoves, and a model of their excellent stable stalls and fittings. Mr. Joseph F. Ebner shows his admirable hydrofuge system of laying parquet-work or wood blocks on concrete, stone, or ordinary fireproof constructions, also some excellent parquet work, wood mantels, and mosaic work. Messrs. J. H. Heathman & Co. have a good display of apparatus for the prevention and extinction of fires. Hitchens's Fireproof Plastering Company have again a good exhibit, a speciality being a model of a fireproof slung ceiling as fitted by them under the floor of the ball-room at the Eyre Arms Assembly Rooms, St. John's Wood.

The Bracknell Pottery and Tile Company exhibit some good red bricks and tiles, and the same may be said of Mr. Thomas Lawrence, of Bracknell. Messrs. Humpherson & Co. exhibit another *tour de force* in lead-working, some plumbers' brasswork of excellent quality and finish, and some good water-closets, including the "Beaufort," which combines in one fixture a w.c., urinal, and slopsink; this closet, like one or two others in the Exhibition, is of the pedestal type, and consists of an improved form of hopper, with a good flush. The Tees Scoria Brick Company exhibit their patent granitoid and scoroid paving sets, made from blast-furnace slag, and very durable under heavy traffic. Messrs. M. C. Duffy & Son show their "Acme" solid wood block flooring, of which we have spoken on former occasions. Mr. J. Stanna's exhibits one of his hydraulic dinner-lifts, with hollow run, to save weight, and capable of being worked by the low pressure of the ordinary water supply. A small hand-power lift and other specialities are also shown at this stand. Messrs. J. Wright & Co. exhibit their fireproof "fixing blocks" in various applications.

The St. Paneras Ironwork Company exhibit models of stable fittings, some iron staircases, and one or two delicately-executed wrought-iron grilles. Messrs. Steel & Garland exhibit the new patent "Marlborough" grate, which admirably embodies the main principles of construction and arrangement advocated by that indefatigable worker in the cause of fireplace reform, Mr. Pridgin Teale. Messrs. E. & J. M. Verity exhibit the "Rumford-Armstrong" and the "Rumford-Teale" grates,—not "Rumford," as erroneously printed on the catalogues and circulars. These grates have much to recommend them, and deserve the attention of visitors. Messrs. Ashton & Green (Limited) exhibit some very good and useful ranges and kitcheners, besides slow-combustion stoves, grates, and chimneypieces.

On the north side of the hall Messrs. Eddington & Stevenson exhibit various useful items of brickmakers' and contractors' plant. Perhaps the largest space occupied by any exhibitor is allotted to Messrs. A. Ransome & Co., who show in action a variety of wood-working machines, several of them being novelties. Among them we may name a new planing and moulding machine, which is very compactly arranged. It is capable, it is claimed, of doing a given quality of work at about twice the speed of ordinary machines for the same purpose. Another novelty is a large band-saw machine, readily adaptable for the sawing of deals, which it does much more quickly than

the frame-saw. One or two ingenious machines for sharpening saws should also be looked at by visitors to this Stand. Messrs. F. Rosher & Co. exhibit a good variety of bricks, tiles, copings, diapers, strings, &c., which deserve inspection. Among other exhibits of the kind in the hall is the safety casement sash exhibited by the Patent Sliding Casement Sash Company, and which was described and commended by us last year.

The principal exhibitors in the arcade entrance from Islington Green are Messrs. Chambers, Monnery, & Co., who show their well-known iron wall-ties, and a good assortment of builders' ironmongery. They also make a varied display of stoves, grates, and kitcheners. We may direct particular attention to the "As you Like it" register grate, which we have on a former occasion described, and the "moveable-canopy" grate.

#### ARCHITECTURAL SOCIETIES.

**Auckland Institute of Architects (New Zealand).**—We have received a report of the fifth annual meeting of the Auckland Institute of Architects, which was held on February 1st, Mr. W. F. Hammond, president, was in the chair, and delivered an address, in the course of which he said the membership of the Institute has been placed upon a broader basis, similar to the parent Institute in Great Britain, enabling persons interested in art to become honorary members and associates. The rules of the Institute have been revised. Connected with the Royal Institute of Architects in Great Britain, we enjoy a relationship which will doubtless tend to the mutual interests of both Institutes. We have added another secretary to our officers; Mr. Mahoney, jun., has become the first honorary secretary appointed under the rule adopted by our parent Society. The membership has increased by six full members, three associates, one honorary member, and nine honorary associates. During the session we have been the means of bringing under the notice of the public many products of the colony, such as limes and building stones. Many valuable papers have been read upon subjects connected with building—viz. timber; burnt clay for concrete works and roads as superior to scoria; the safety of people congregating in large buildings in cases of fire; permanent material, &c. The subject of the building regulations of the city is under the consideration of the Council, together with other subjects which are being prepared to lay before the members. A competition has been originated for the encouragement of planning and designing amongst our pupils. This is the first, which emanates from a gift of two members, Messrs. Grainger (of Melbourne) and Mr. Jackson, to be established as a prize fund, and capable of being increased, for the purpose of offering annual prizes, under the direction of the Institute. We have taken measures to obtain reform in competitions, similar to those adopted by the Royal Institute of British Architects. It was moved and seconded that the President's address be adopted and printed in pamphlet form. The Treasurer then produced the balance-sheet for the year, which showed a most favourable result, representing about £70 to the credit of the Institute, deposited in the Auckland Savings Bank. The following officers were then elected for the year:—Mr. H. G. Wade was unanimously elected president; Mr. E. Bell, vice-president; Mr. F. H. White, treasurer; Mr. T. Mahoney, hon. secretary; Mr. F. Hammond, secretary; and Messrs. Hammond, Baber, and Crey, members of Council; Dr. Murray Moore was nominated as an hon. associate; and Mr. J. Sanderson, architect (of New Plymouth), was unanimously elected a member.

**Birmingham Architectural Association.**—The ninth ordinary meeting of the current session of this Association was held at Queen's College, on Tuesday evening last, Mr. W. Doubleday in the chair. Mr. John Cotton (vice-president) gave his annual address, in which he dwelt upon the coming necessity for a more systematic training for architects than that at present in vogue under the pupillage system. A vote of thanks, proposed by Mr. Victor Scruton (hon. sec.), and supported by Messrs. W. H. Kenrick, H. H. McCounal, and W. Doubleday, was unanimously accorded to the author for his address.

**Edinburgh Architectural Association.**—On the

10th inst., this Association met at 20, George-street, Mr. Hippolyte J. Blanc, the president, in the chair. After the transaction of some formal business, Mr. David MacCibbon, architect, read a paper on "Architecture in the South of France," in which he drew attention to the ancient history of Southern Gaul, remarking that its first civilisation was entirely Creolian in character, the effect of which was apparent in its ancient monuments, although these belonged chiefly to the first three centuries of the Roman Empire. This part of France was particularly rich in Classic remains, most of which were illustrated, and described. The continuance in Christian buildings of the Roman style of architecture during the early centuries of the Christian era and throughout the Dark Ages was then dwelt upon and illustrated by buildings still existing in Southern France.—On Saturday last, the members visited Liberton House, Liberton Tower, and Inch House. The party, numbering about forty, were conveyed by rail to Newington, and from thence proceeded to Inch House. Mr. John McLachlan, the leader of the party, read a paper in which he stated that, architecturally, the house of Inch was very easily described. When stripped of its modern excrescences it was simply a Scotch L-shaped mansion of the beginning of the seventeenth century. The party afterwards visited Liberton House, and Mr. Cunningham, the tenant, gave a very lucid explanation of the architectural features of the building. He will probably read a special paper on the subject before the Association in about a month. Mr. H. J. Blanc, the President, before leaving, expressed the thanks of the company to Mr. Cunningham. Arriving at Liberton Tower, Mr. McLachlan gave an interesting account of its situation, its more prominent features, &c. The tower was without doubt one of the fifteenth century, similar in many respects to Elphinstone Castle, Rosyth Castle, and many others. Mr. McLachlan was cordially thanked, on the motion of the President, for his interesting explanations.

#### THE VICTOR EMANUEL ARCADE, MILAN.

THE Victor Emanuel Arcade (La Galleria Vittorio Emanuele) at Milan having fallen into a state of dilapidation, a commission (presided over by Sig. Carlo Maciachini) was appointed by the municipality for the purpose of considering the various proposals which have been made with a view to its restoration, and deciding what steps should be taken for that purpose. The Arcade was built in the years 1865-67 by a public company (the City of Milan Improvement Company) which was launched in England under the auspices of Baron Grant and the Crédit Foncier of England. It was erected from the designs of Signor Giuseppe Mengoni, who met with his death during the progress of the works by falling from a scaffold. The late Sir (then Mr.) Digby Wyatt was a director of the Company, and took an active part in the work of constructing the gallery, and in recognition of his services was decorated with the Cross of the Order of St. Maurizio and Lazzaro by the King of Italy, and was made an Honorary Member of the Royal Academy of Arts of Milan.

The first stone was laid by King Victor Emanuel on the 4th of March, 1865, and the Arcade was publicly opened by the king on the 15th of September, 1867, the time occupied in its construction having been thirty months, during which time about one thousand workmen were employed upon the building. There is a description and interior view of the Arcade in the *Builder* for 1868 (vol. xxvi., pp. 297-9), and a view of the entrance in the same volume (p. 491).

Cavaliere Broggi proposes to renew the decorative portion of the design with natural coloured terra-cotta, and to veneer the rest of the building with red Verona marble in slabs. The cost of the work, including the scaffolding, but not including the cost of superintendence, is estimated by the architect at 250,000 lire (10,000*l.*).

The Dell' Ara Company (Ditta dell' Ara) suggested the employment of majolica in lieu of terra-cotta for the ornamental parts, and marble for the plain surfaces. This would considerably increase the cost, which is estimated by the author at 350,000 lire, or 12,000*l.* As an alternative the Company proposed the substitution of kaolin or China clay

for majolica for the decorative features, which would reduce the total expense to 275,000 lire, or 11,000*l.*

Other designs were submitted by Signor Novi, of Genoa, and Signor Minnai, of Milan, but none of the designs met with the approbation of the Commission, who recommended the refacing of the whole of the building with marble, the replacing of the plaster statues by marble, the restoration of the frescoes, and the lighting of the arcade by electricity. The cost of this proposition is not stated, but it must necessarily exceed the cost of the designs by Sig. Broggi and the Dell' Ara Company.

#### QUARRY-WORKED STONE.

SIR,—Having had considerable experience in the conversion of stone by machinery, both in the quarry and on the contract, I can, speaking generally, corroborate Mr. Hugh Gough's view [p. 411, ante] that stone should be worked soon after it is quarried, and this is more particularly the case when it is moulded. There is, no doubt, a long-standing idea that stone should be well-seasoned before it is worked; but what do we find on the softer and more absorbent stones sold as seasoned? Simply a hard outside crust. If the stone was seasoned right through like a block of wood it could possibly be worked with advantage on the contract, but otherwise the outside is formed by the air is simply removed, and a much more perishable surface is exposed. I take it there are other reasons why stones perish in large towns besides their exposure to a deleterious atmosphere; for instance, stones used of an improper character for the work. I have seen stones short and crumbly or laminated in their nature used for moulded work simply because they can be worked easily and make a show, at any rate for a time. These can be bought cheaply; and as extreme, or what may be termed unfair, competition is at present the rule, very little of that work described by the Elizabethan Poet Churchyard as being,—

"So bravely wrought, so fair and finely framed,  
That to the world's end the beauty may endure,"

is to be seen: would that it were otherwise.

M. POWIS BAILE,

Author of "Stoneworking Machinery," &c.

\* \* This must close the correspondence. Our own comment on it will be found among "Notes" of this week.

#### THE BUILDING ACT (AMENDMENT) ACT.

##### TEMPORARY STRUCTURES.

SIR,—A matter of some importance to builders and shopkeepers rebuilding has lately been brought forcibly to my notice. It is as follows:—

I am carrying out the rebuilding of business premises, and as the owner desired to carry on his business during the rebuilding, part of the shop was temporarily enclosed. As the work proceeded it became necessary to erect a temporary shop on another portion of the site. The District Surveyor required that a special application should be made to the Board of Works under Section 13 (Amendment Act), and, needless to say, this entailed considerable delay.

Following the section referred to, there is an exemption for "any wooden structure of a temporary character erected by a builder for use during the construction, repair, or alteration of any building."

I contend that this exemption applies to all temporary structures, whether for the builder or occupier, during rebuilding. The District Surveyor is of opinion that the exemption applies to temporary structures for the builder's use only.

I should be glad if you, or any of your readers, could inform me if there has been any legal decision on the point.

I have made several inquiries, but have found great difference of opinion on the matter. II.

\* \* We are of the same opinion as the District Surveyor in the case, that the exemption refers only to structures for the contractor's use; but we have not seen any legal decision on the point.—Ed.

**Design for Art Museum, Geneva.**—In reference to this design, of which an illustration appeared in the *Builder* of February 12th, Herr Koch, the author of the design, writes to say that his design, though nominally a second premium one, received the highest premium awarded in the competition for which the drawings were made, the first premium not having been awarded. The competition was rather for an ideal building than for one to be carried out; two proposed sites being given for treatment by competitors, both of them presenting considerable difficulty owing to the variety of levels. We hope that Herr Koch may nevertheless have an opportunity of carrying out his fine and stately design.

OPEN SPACES IN THE REAR OF BUILDINGS.

BOVILL v. GIBBS AND INNER.

THE defendants, who are builders, were summoned to the Highgate Petty Sessions by Mr. Bovill, District Surveyor of St. Pancras under the Metropolitan Board of Works, for neglecting to provide 40 ft. of air space at the rear of a building,—a shop and residence,—in High-street, Highgate. In the first instance the summons was dismissed upon the defendants' contention that the case was not commenced within the time specified by the Act. A case was taken to the Queen's Bench on this point, and the Court (as stated in last week's *Builder*, p. 410, *ante*) overruled the decision of the magistrates. On Monday last the case again came before the Bench on the main issue.

Mr. Ward, barrister, appeared on behalf of the Metropolitan Board of Works, and Mr. Thomas Cleary represented the defendants.

It having been proved that there was less than 40 ft. air space at the rear of the building, which has been sold and is occupied, Mr. Ward asked the Bench to make an order upon the defendants to provide the requisite 40 ft. of air space.

Mr. Cleary claimed a right to have the summons dismissed on the ground that he had provided ample light and air space, not from the back, but from a side road. The place being well lighted and ventilated from the side, he contended that he was not bound to provide an inch of space at the back. He was aware of the Act setting forth that there must be 40 ft. of air space at the rear, but it must be read with the more recent Act, which sets forth that this must be done unless all the rooms are lighted and ventilated from a street or alley adjoining.

Mr. Bodkin said it was true that a building might be lighted and ventilated in that way, provided the builder got the permission of the Metropolitan Board of Works to so light and ventilate it; but in this case defendant had not obtained the consent of the Board of Works, and consequently they were bound to provide the 40 ft. of air-space in the rear.

Mr. Cleary said Mr. Bovill passed the original plans showing the lighting from the side, and that he submitted was equivalent to the consent of the Board of Works.

Mr. Bodkin held that the consent of the District Surveyor was not the same thing as the consent of the Board of Works.

Mr. Cleary said Mr. Bovill not only passed the plans but visited the building from week to week, and it was not until months after the building was completed that he complained of the want of sufficient air-space. Under these circumstances, how could the Bench order him to pull the premises down, which was what he would have to do if he had to provide 40 ft. of air-space at the back?

Mr. Bovill was examined, and denied that he passed the plans. They were certainly submitted to him, but he had no power to pass them. When he saw them, however, he pointed out that they were not in accordance with the Act.

Mr. Cleary said it would be extremely hard if the Bench made the order asked for, considering that the building was supplied with quite as much light and ventilation from the side, as 40 ft. of open space at the back would give.

Mr. Bodkin said, however hard it might be, the Act must be complied with. The Bench would make an order for the open space to be provided at the rear in accordance with the Act, and give defendants two months to carry out the order in. They would also have to pay the costs. The two months would give them time to try and get the consent of the Board of Works to the building being lighted and ventilated from the side.

and dated the 14th of January, 1885, as the plaintiff's invention did its work without the assistance of an air-valve, on the other hand, the evidence showed that the alleged anticipations consisted at the utmost of the exhibition of waste preventers acting by means of an air-valve, and consequently the defence failed. After remarking on the straightforward way in which the witnesses on both sides had given their evidence, and dealing with the other points in the case, his Lordship decided that the plaintiff was entitled to an injunction with an account of profits, and costs on the higher scale.

An application for a stay of execution pending appeal was refused.

The Student's Column.

FIELD WORK AND INSTRUMENTS.—XII. Surveying Instruments.

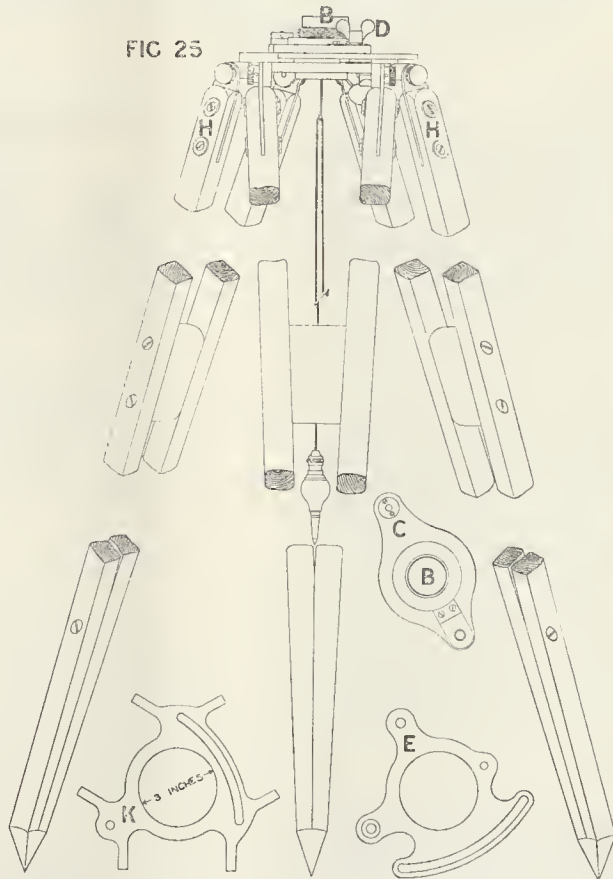
IX.—THE THEODOLITE (continued).

THE importance of paying careful attention to accuracy in setting up the theodolite is evident when it is remembered that an arc of a single minute subtends a distance of from 4½ in. to 4½ in. in a radius of 20 chains or one quarter of a mile. Figs. 23 and 24 show the usual form of wall-plate adopted for setting up the instrument over a permanent station, such as a brick or stone pier. When the coping stone is being fixed it

the tripod head to suspend the plumb-bob from, is preferable to a long-shanked hook rigidly fixed, as it adjusts itself better to a vertical line when the legs stand upon uneven ground.

With the view of facilitating the setting up of the theodolite over a given station point, and to maintain the line of the plumb-bob in the same line as the vertical axis of the instrument, various kinds of centering stands have been manufactured. Messrs. Troughton & Simms attach to all their three-screw combinations of parallel plates connected with theodolites a centering locking-plate, in which provision is made to allow of a motion of 1 in. in any direction for the adjustment of the plumb-bob over the station point, the centering-plate being tightened after setting over the station by a screwed washer-plate. This plate is somewhat similar in shape to the washer-plate shown in fig. 21, but has a raised thumb-piece at its outer edge, for screwing up or down the collar which holds the vertical axis of the instrument. By this means the locking-plate and the instrument are both clamped to the tripod-stand, or released without the addition of extra clampscrews. Messrs. Troughton & Simms also make a framed stand, shown in fig. 25, with an arrangement of plates shown in section in fig. 26, and in plan in fig. 27. With the usual form of tripod, the range over which

FIG 25



IMPROVEMENTS IN WATER-WASTE PREVENTING CISTERNS.

HUMPHRESON v. SYER.

THIS was an action tried in the High Court of Justice (Chancery Division), before Mr. Justice Kekewich, on the 7th inst. It was brought by Mr. Frederick Humpherson, trading as Humpherson & Co., of 297, Fulham-road, South Kensington, and formerly of 331, King's-road, Chelsea, against Mr. Milton Syer, of 35, Rye-lane, Peckham, for an injunction to restrain the defendant from infringing his Patent, No. 2,492, of the year 1885, for an improved waste-water preventer, chiefly used for flushing water-closets.

The defendant, by his pleadings, denied the infringement, and set up the plea of want of novelty, the impropriety of the alleged invention as subject matter for a patent, that the plaintiff was not the first and true inventor, and insufficiency of the specification.

Mr. Aston, Q.C., and Mr. B. P. Newman were for the plaintiff, and Mr. Moulton, Q.C., and Mr. W. R. Bonsfield for the defendant.

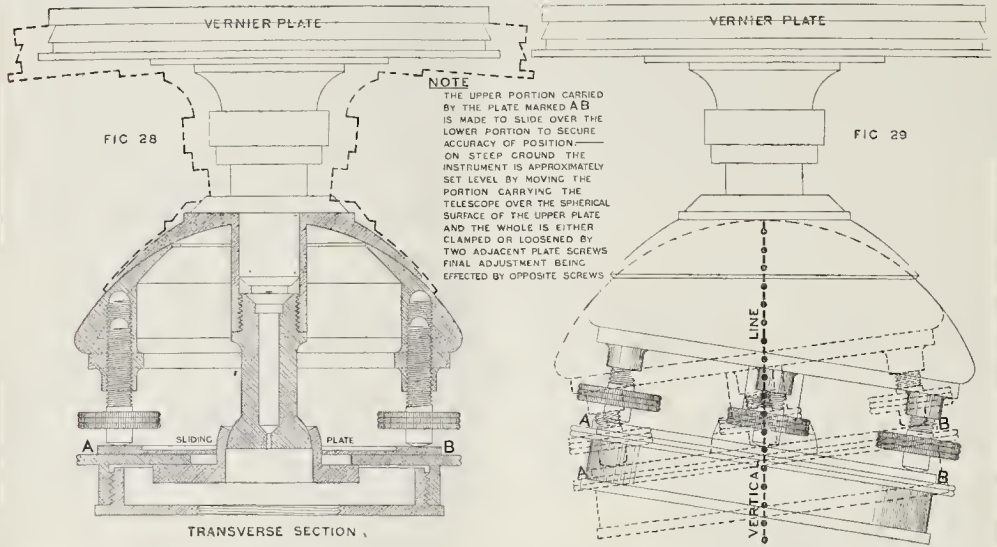
Mr. Justice Kekewich, in delivering judgment, said the principal defence was that the plaintiff was not the first and true inventor. In the first place, it was urged that the patent of the plaintiff was forfeited by Winn's patent, No. 3,582; but his Lordship was of opinion that this was not the case. He also declined to adopt the suggestion that there was an injunction by defendant's patent No. 505,

should be hedged true and the upper surface squared, so as to save trouble in subsequently working with the instrument when setting it up in this position.

With the use of an ordinary tripod head much time is employed in levelling the instrument over a fixed peg or station point, during which time the assistants are generally kept waiting. The plumb-bob is usually hung from the centre of the head of the tripod by means of a piece of stretched thin cord. A short piece of chain attached under the centre of

the head may be shifted in adjusting the plumb-bob is necessarily very limited, but with a framed stand a larger opening in the base of the system can be introduced for this purpose. The theodolite is fixed at B by the ordinary screw attachment to the hosed plate marked C. The middle plate marked E has two pivot connexions, the centre lines of which meet at right angles to one another at the centre of the plate. To one of these pivot connexions, the top plate is attached by a screw-bolt, which is secured by a

THE HOFFMAN TRIPOD HEAD

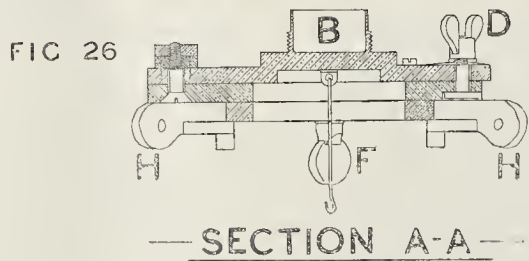


capstan-headed nut, shown at the left-hand side of the section. To the other pivot connexion the lower plate is attached in a similar way at a point near G in plan. The lower plate marked K is connected to the framed stand at the points marked H. The radial movement of the top plate over the middle plate and of the middle plate over the lower plate is regulated by a quadrant slot in the middle and lower plates, and the circular hole of 3 in. diameter in the lower plate allows ample play for the adjustment of the plumb-bob line to the vertical axis of the instrument. The top plate is clamped to the middle plate in any required position by the thumb-screw marked D, and the middle plate is clamped to the lower plate by the thumb-screw marked F. Thus the theodolite can be levelled first, when approximately set up over a station point, and finally moved accurately over this point by adjusting the centering plates.

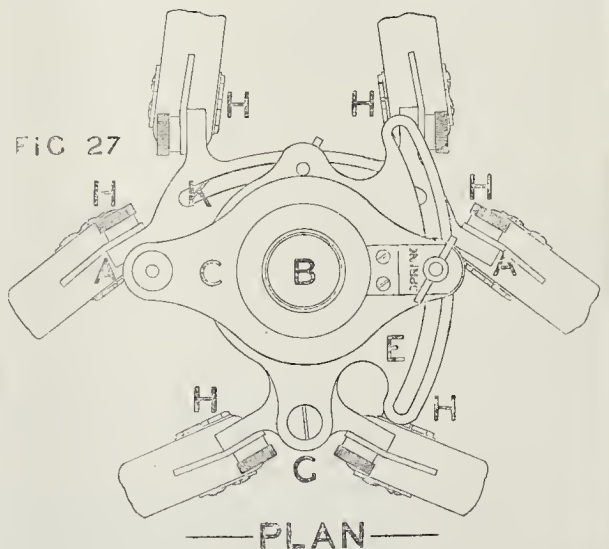
The Hoffmann tripod head, shown in figs. 28 and 29, is an American invention, combining the action of a ball-and-socket joint with the rigidity of the ordinary parallel plates. The upper plate is made in the shape of a circular curve, concentric with the half ball and socket-joint, and the hook or chain from which the plumb-bob is suspended, is fixed at the centre of these curves. The elevating screws to the upper plate rest upon a sliding-plate, and their centre lines will at all times be parallel to the vertical axis of the instrument in any position that the horizontal limb and stage over which the telescope is mounted may assume with regard to the tripod head. The amount of range available for thus setting the head of the stand level upon steep ground is indicated in fig. 29. The shifting head of the tripod and its sliding plate are clamped by tightening any two adjacent screws, final adjustment of the levels Q and T being effected by opposite screws in the usual manner.

**The Proposed New Municipal Buildings at Kingston.**—The carrying out of the proposed new buildings at Kingston by the Corporation, which was noticed in the *Builder* a short time since, is, it appears, to be deferred for the present. A meeting on the subject, convened by the local Ratepayers' Association, has just been held, at which a resolution was passed to the effect that, considering the heaviness of the rates and the large expenditure which the sewage scheme will entail, it is inexpedient at the present time to proceed with the scheme for the erection of municipal buildings. This resolution formed the subject of discussion at a subsequent meeting of the Corporation, when it was eventually decided to postpone the erection of the proposed buildings.

CENTERING STAND



— TROUGHTON & SIMMS' PATTERN —



## Books.

*The Naturalistic School of Painting.* By FRANCIS BATE. London: Published at the Offices of the Artist, 185, Fleet-street.

**T**HIS is a very interesting book on modern art, though it is rather difficult to epitomise within a reasonable space all the specific doctrines of the new school which are treated of in it.

Ignoring as false much of the treatment of light and shadow by artists of the present day, our author claims that, turning anew to nature, he and his followers have so far advanced in the knowledge of atmosphere, light, and colour as to have had disclosed to them "mysteries the full force of which had never been dreamed of."

Starting with the proposition that "the first impression of a good picture must be the first impression of nature, and all the qualities which reveal themselves upon examination of nature must be subordinate to the first impression of a picture and subsequent in their appeal to notice," he goes on to point out that this first impression consists of light and colour, and that our perceptions of form, &c., such as houses and trees, only follow on closer inspection.

As to shadow, Mr. Bate is, no doubt, philosophically correct in asserting that during sunshine objects in shadow, such as the side of a street, are, in fact, no darker than they were before the sun shone on them; in his own words, "Light has been added to one side, and not taken from the other."

On these premises, and fully admitting the immense difference between the light of the sun and the highest tints, even of the purest white, at the command of the artist, the shadows and half tones, he contends, should be painted true in tone, and the high lights as true and bright as they can be got; by this means it is claimed that "two-thirds of the painting can be quite correct, and it is not the artist's fault that the remaining third is not correct also."

Now, if the work of the artist is to be confined to what he sees as a first impression (though this proposition is qualified with respect to immediate foreground objects in a later part of the book), no doubt light and colour will predominate, and as certainly form will be absent or very vague, but we do not think that any man who has accustomed himself to the study of nature would be satisfied to be bound within any such limits. It is true that the educated eye may take in far more at a glance than could the casual observer; but what would the work of the architectural artist, for instance, be worth on such conditions as these?

It is quite certain that in all human art we must be content to use our brightest pigments to constitute our high lights, as against the transcendent illumination of sun-light; but, ingenious as the impressionist's theories may be, we submit that a far truer impression of the light, shadow, and tone of nature is conveyed by a picture possessing a due contrast between the lights and shadows, even though, to produce that contrast, it has to be painted in a lower key than that of nature, to compensate for the inevitable fact that the lights must be so far below those of the sun.

The impressionist theory, on the other hand, by keeping the shadows proportionately much too high to give value to the lights, must in practice destroy all balance, and turn out tame and feeble in effect, and the further of the two from the real impression of the original.

Whilst dissenting from some of the author's theories, we have read with great pleasure the chapters upon colour in shadow, reflections, broken surface in lights, &c., through which we have not room to follow him, but for which we must refer our readers to the book itself.

We perfectly concur in the opinions he expresses in condemnation of the objectionably heavy black or brown shadows we sometimes see even in otherwise good work; and in the importance of retaining a sense of local colour in them and keeping them cool, with warm lights, in outdoor work. The student will find much that is interesting and instructive on these subjects, as well as on those of atmospheric effects, transition of colour from light to shadow, and other kindred topics treated of in these pages.

The Naturalistic school lays great stress

upon observing the "centre of vision" in pictures, calling special attention to the fact "that the objects near and around it are most distinctly seen; further from the centre we see indistinctly; while outside the base of the cone of visual rays all is blurred."

This natural law, which it no doubt is, applies to objects near the eye in a far greater degree than to those at a moderate distance, for then the lateral range of vision rapidly increases.

In landscape, therefore, where even the foreground is generally supposed to be at some distance from the spectator, the observance of this rule is less imperative than in some figure-pieces, and more especially in portraiture. The "vignette" seems to suggest that this law has been long recognised in art; but may it not be observed with something like exaggeration when a picture is gradually shaded off on each side to such a "blur" as to disfigure the whole work, unless the nose of the spectator be kept close to the canvas?

At the head of Chapter viii. Mr. Bate quotes the reply of Constable to the question of Sir George Beaumont as to the style in which he intended to paint: "In God Almighty's style, Sir George." And well we know the result of his labours as a worshipper at Nature's shrine. Like Turner, he painted light, from the bright sunshine of midsummer to the fitful gleams in light and shadow of a showery or stormy day; nor can the work of either of these great men be accused of being deficient in tone, yet they depended for their impressions of nature upon contrasting their high lights not only with deep shadows, but also with the delicate gradation of half tints, on the importance of which in the production of tone the writer of this book very justly lays great stress, but which, with deference to him, is no new thing among artists of reputation.

Many of us who can look back a few years must call to mind many supposed fresh departures in art, often based on far-differing theories. Some thirty and more years ago there arose a school, commenced almost in a vein of caricature, while possessing abundant detail and elaborate and often grotesque form, it had at first little comeliness, but it seems now to be absorbed into the art of the day (a more vigorous and careful one, probably, than that which preceded it), till almost every vestige of its original features are lost. In like manner let us hope that whatever is true and good in the present movement, almost the reverse in theory of the one referred to, may survive, and tend to the progress of English art, not splitting its practice into sects and schisms, but strengthening its growth as a united national school.

Mr. Bate's book is well, and in parts eloquently, written, and the sincere love of nature which is evident throughout it claims the sympathy of every true admirer of nature or of the painter's art.

*Iron Bridges of Moderate Span: their Construction and Erection.* By HAMILTON WELDON PAXDEN, late Inspector of Ironwork to the Salford Corporation. London: Crosby Lockwood & Co. 1887.

This little book by a practical engineer is the latest addition to Vesley's Rudimentary Series, and is typical of the works by which the perennial youth of that noted series is maintained. The author describes in very close detail the manufacture and erection of iron bridges of from 100 ft. to 150 ft. span, and shows throughout an intimate knowledge of the actual requirements for carrying out such work satisfactorily, but we are not quite sure that we grasp his meaning when he tells us "the working conditions of the bridge are in no sense fixed data, and even as the nigger could not count one pig of a drove, because he ran about so, so in like manner with a bridge." The fact is, engineering writers too frequently get into pitfalls when they attempt to be "humorous."

Commencing with the selection of the site, and the mode in which the foundation is determined from borings, considerable emphasis is laid upon the necessity for a thoughtful appreciation of the manner in which the parts have to be prepared and fixed together, particularly as regards the preparation of the drawings and specification; and we are then introduced to the first operation upon the wrought-iron plates selected for the bridge, viz., the testing. The ordinary tests are de-

scribed, together with the appearance of the samples, and what is to be learned from them. The general design of the main girders is illustrated, and various modes are shown of connecting the main to the cross girders. The drilling-out of the work in the shop, and the drilling of the plates, receive ample attention, but the author reverses the current opinion when he says that a ring of iron round the punched hole is injurious, while this is not the case with steel. He has evidently had "large" experience, for he mentions girders whose flanges consist of "twelve, fourteen, or even many more plates piled one upon another," and rivets with a length of "18 in. or more," but he was probably not thinking of these when he described the rivets as being "1½ diameters longer than the hole," without any mention of the number of plates they pass through.

We are next taken to the site, and can mentally see the erection being accomplished, so minute and careful is the statement of the various details. The remarks are not confined to the particular example selected; every opportunity is taken to interpolate "wrinkles" and hints likely to be of service to any one about to engage in the duty of inspecting ironwork. The description is, however, marred by sundry blemishes of diction, as, "replacal," "judgmentally," "Tweddle" (for R. H. Tweddell), &c.; but these may be forgiven for the sake of the valuable technical information disclosed, with which none but practical men are personally acquainted. The author tells us that he "has had a good deal to do with contractors for ironwork, and though he has met some 'sharp' hands, the far greater number have been till their death, or those living, are as upright, honourable men as could be met with." We are pleased to hear this, but should prefer to see it stated in Queen's English, especially in Jubilee Year. The remainder of the book consists chiefly of extracts from the writings of Clark and Fairbairn; papers read by Graham Smith; an American specification conched in general terms, the contractor being left to make the design; and an English specification for a lattice-girder bridge of 140 ft. span.

To the "iron man" in a drawing-office the book will be very acceptable; the literature on the subject is so extremely sparse that the smallest contribution is welcome, and this work contains just the kind of information that is most difficult to obtain.

*Expansion of Structures by Heat.* By JOHN KELLY, C.E. London: Crosby Lockwood & Co. 1887.

THE object the author has set before him is to show the effects of heat upon metallic and other structures. The aim is a laudable one, for this is a branch of physics upon which the engineer or architect can find but little reliable and comprehensive data in books. It is true that a certain amount has been written in various works, more especially those relating to iron bridges, but the subject has always, so far as we are aware, been treated as subsidiary to other and wider considerations. After a short preliminary chapter, in which coefficients of expansion and contraction for various substances are given, the author proceeds to lay down general rules, and from them to formulate the data, so that calculation can be made as to the effect of expansion and contraction on inclined straight bars, bent or curved bars, rings, &c. Amongst other substances dealt with is india-rubber, which, unlike most other substances, contracts when heated. Examples of the effect of these rules are given as to girders, chains, pipes, &c. For investigating the laws which govern the expansion and contraction of simple frames, exposed to atmospheric influence only, the author assumes (1) that all bars of any frame are formed of materials having the same expanding and contracting coefficients; (2) that all bars of any frame are subjected to the same variations of temperature at the same time; and (3) that all bars of any frame are at liberty to expand and contract freely. Working with these assumptions, the author goes on to explain that an equal rise in temperature will produce a relatively equal expansion of parts, and is at considerable pains to show that such expansion will not change the figure, although it will increase the size of a structure.

The next section of the work treats of complex frames and plates, in connexion with which subject many useful instances are given, and although perhaps the explanations may appear

to those versed in the subject somewhat diffuse, it is well sometimes to remind students of facts not altogether unknown to them. We next pass to another part of the work, which the author considers under two heads, viz.:—1st, the power of bodies to absorb and conduct heat; and 2nd, the force developed in bodies during expansion and contraction caused by variations of temperature. Under the first head the action of heat on metal frames when exposed only to the action of the atmosphere, or to the direct action of the sun's rays, is discussed, and structures surrounded by earth or water are afterwards treated of from the same point of view. Under the heading of the "Mechanical Force of Heat" the strengths of various materials are given, and the changes of temperature caused by sudden application of force are considered. As a rule the author expresses his meaning in plain and sufficient language, but in the section of the work we have now arrived at,—that relating to the work of expansion and contraction,—we find more difficulty in following him. He says "the elementary principle that action and reaction are equal holds good in the case of expansion and contraction, as well as of all other applications of mechanical force." A horizontal bar is supposed to be at liberty to expand by heat in both directions, in which case the centre will be a fixed point. This may be accepted, but when an obstacle is placed at one end of the bar we fail to see how the rules given for finding the neutral section apply. The obstacle is supposed to offer a definite resistance, P; but no count is taken of the resistance the bar itself offers to expansion by reason of its friction against the substance it rests upon. To find the neutral section, or section of no motion, this latter element is necessary. In one instance, however, P is supposed to be infinitely great, and then the neutral section is at the extreme end of the bar which is contiguous to the obstacle. Leaving out the friction of the expanding bar, as the author does, the neutral section would always be in that position, but this does not accord with the results attained by the author's mode of working. It would seem, then, that the principles the author lays down are just, but that they are not duly considered in the formulæ. The movement of inclined bars downwards, when resting on a plane, in which case P is the gravity of the mass, is treated in the same manner, and a practical illustration is given in the movement of the lead on the roof of Bristol Cathedral, and another in the creeping of rails, an effect so noticeable in the case of the St. Louis Bridge,—which is more generally ascribed to the working of the traffic, as the author points out. In discussing the practical bearing of expansion by heat, the author points out that it has been calculated that in the Britannia Bridge the unequal expansion, caused by one part being in sunshine and the other in shade, will develop more strains in an hour than would be caused by the heaviest rolling loads or the most violent storms. It is comforting, therefore, to learn that the error allowed by practice in the length of bars between pinholes is  $\frac{1}{4}$  in.; and further, that under the most extreme conditions of distribution of sunshine and shade, the expansion and contraction of any parts of a structure will not cause a greater variation than this, supposing the bars of which it is composed are not more than 5 ft. in length. The Crystal Palace is also instanced as an iron and glass structure of great length, and which has not been appreciably injured by variations of expansion and contraction, although the conditions are more than ordinarily unfavourable. "In short," the author says, "it has been shown that it is only in exceptional cases that special calculations need be made with reference to strains caused by an unequal distribution of temperature." Then follow some remarks on deflection, the effects of friction, and the book concludes with a short chapter on masonry structures.

*Elements of Geodesy.* By J. HOWARD GORE, B.S. New York: John Wiley & Sons, 15, Astor place, 1886.

ANY one interested in the historical literature of this subject will accept Mr. Gore's book on the "Elements of Geodesy" as a valuable addition to his library. The object of the work is clearly stated in the preface, and so far the author has kept to his text, but the book is scarcely likely to be of service in this country, as it deals with surveying upon a large scale

only, and supplies numerous mathematical formulæ and calculations which apply more to trigonometrical work in new countries, than to the comparative limited areas that have to be specially surveyed at home in connexion with new works. Pages 28 to 35 contain some practical advice connected with the adjustment and method of observation in telescopic instruments. The pages which follow are, however, of far too mathematical a character to be studied by the ordinary surveyor. We find a useful index at the end of the work, and we praise the author for enumerating his authorities at the end of each chapter. These authorities are among the best known, but it is not every author who has the privilege of a lady's help in such an abstruse treatise. We notice in the preface that the author expresses his indebtedness to his friend, Miss Lizzie P. Brown, for her suggestions, and for the elimination of errors that otherwise would have seriously blemished the work. Under these circumstances, Miss Brown is certainly entitled to share with the author our praise of his book.

*Graphic and Analytic Statics in their practical Application to the Treatment of Stresses in Roofs, Solid Girders, Lattice, Bracing and Suspension Bridges, Braced Iron Arches and Piers, and other Frameworks.* By ROBERT HUDSON GRAHAM. Containing diagrams and plates to scale, with numerous examples, many taken from existing structures. Specially arranged for class-work in colleges and universities. Second edition, revised and enlarged. London: Crosby Lockwood & Co. 1887.

WHEN a work of this character reaches a second edition in a short time, it is sufficient proof that the subject at least is one that commands attention, but it does not always follow that the method of dealing with it is the best possible. For instance, in constructing the reciprocal diagrams of framed structures, Bow's practice of lettering the spaces, for which figures can equally well be used, so very much facilitates the construction of the diagram that it might well have been adopted here; even after the student has attained a fairly ripened experience he finds this an advantageous method, particularly where any of the force-lines in the diagram overlap each other, and it may also be applied to polar diagrams where these relate to forces upon structures. And again, in any book "specially arranged for class-work in colleges and universities" we expect to find a systematic arrangement of the whole, with a gradual building-up of the subject from elementary principles, yet it is not until we reach p. 33 that we are reminded of the necessary and sufficient conditions for equilibrium in a system of forces, viz., that the force polygon and the polar polygon will simultaneously close; although the preceding pages are occupied with the discussion of forces under various conditions. We seem throughout the book to be repeatedly starting in new directions, and should imagine that with more experience in teaching, the author would desire to re-arrange much of the matter therein contained; in other respects the work is fairly creditable. There are many good points in the author's handling of specific subjects, and a considerable amount of valuable analysis is presented in combination with the corresponding graphic treatment of various cases. A useful feature is the addition of practical examples at the end of each chapter in the form of question and answer, mostly relating to existing structures, of which some carefully-drawn diagrams are given. Chapters I. to VII. of Part III. show the most connected order, and towards the end give evidence of originality. They comprise the general theory of direct stress, extension under stress, couples of forces, resultants and centres of force, centres of gravity, bending and other moments, moments of inertia, and, lastly, an investigation of straight beams and girders under various loads, and in equilibrium. The book closes with a new and interesting chapter on the Culmann Arch method, the principal facts of which have been previously made public by the author in the pages of one of our contemporaries. The science of graphic statics, although of modern growth, is progressing with strides proportionate to its facility of application and the consequent interest it evokes. Its practical adoption, however, depends so largely upon the manner in which it is put before the rising generation that it behoves every author to take the utmost pains to so weave his facts together

that their necessary sequence shall be patent to all, and thus encourage the student to follow the argument until he sees and appreciates the advantages of mathematical analysis. There seems to be a growing tendency among writers on statics to assume that because the application of mathematics secures greater accuracy, no results worth mentioning can be obtained otherwise, whereas we all know how little real use is made of precise methods in our everyday work, and it should be the aim of professedly educational works to demonstrate rather than to assume the utility of precision.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

3,044, Ventilators. G. Nic.

The object of this invention is to render smoke and other ventilators more effective by preventing all leakage or draught, and keeping them at the same time noiseless. This is effected by fitting the ventilator with a highly sensitive valve mounted on an oscillating frame eccentrically hung, so that the ventilator is open or closed by the slightest up or flat against the face plate of the ventilator as to render it absolutely smoke and draught tight.

3,419, Roofing Tiles. C. E. Davis.

The object of the improvements which are the subject of this invention is to allow rain-water to pass off a roof covered with tiles without percolation, even when the roof is constructed at a very slight angle from the horizontal. Recesses and projections are so arranged that the tiles fit very compactly, and the tiles when fixed allow no rain-water to drip through the joints.

3,597, Self-acting Water-closets. J. Lawson.

By this invention no valve is required in the action of the closet. A small cistern carries the flushing water to a height so as to give force when flushing. A small vertical pipe rises in this cistern, and an air-tight vessel or float is suspended by levers. When the closet is in action, the levers lift the float out of the cistern, the ball-cock falls, and the water in the small cistern is emptied down the flushing-pipe.

4,245, Floors. J. Brierley.

According to this invention, the floors are made of wood and earthenware combined. Along the back of each tile, a dovetail or recess is made. The boards or timber on which the floor is laid has also recesses, which are filled with cement, and these hold the tiles in position flush with the surface portion of the floor.

4,332, Ridge and Hip Tiles. G. H. Conch.

According to this invention, the tiles are made in three parts,—two wings, and a centre or connecting part. The wing portions have the edges curved, and provided with engaging teeth and grooves. They thus lay together the tiles at any angle, and may be doweled when in position for further security.

115, Portable Houses. W. M. Duckes.

This invention consists of a frame house wherein the pieces are specially numbered and arranged for fixing. It is so designed that it may be taken down or set up by the ordinary skill of workmen, so light that it may be easily transported in a convenient vehicle, readily adjusted to inequalities of the ground protected against fire, may be heated and ventilated, and constructed cheaply. The way in which all this is effected is by an ingenious complication of numbered parts or pieces, which when fitted to each other form the house.

##### NEW APPLICATIONS FOR PATENTS.

March 4.—3,296, J. Taylor, Chimney Pots.—3,299, G. Moss, Ventilating Apparatus.—3,329, T. Arrol, Trough Decking or Flooring for Bridges and Structures.—3,330, A. Quinlin, Ratchet and Swing Braces.—3,331, T. Rymer-Jones, Refractory and Non-conducting Bricks, Tiles, &c.—3,349, J. Elmer, Parquet Flooring, &c.—3,351, R. Spence, Fireproof Floors.

March 5.—3,353, R. Fickwell, Water Waste Preventer.—3,390, J. McKee, Register Grates or Stoves.—3,404, S. Coombs, Rotary Door Check.—3,415, J. Wilson, Roofing Tiles.

March 7.—3,431, J. Duckett, Water-closets.—3,432, T. Gill, Water-closets.—3,445, G. Goodhue, Timber Structures for Mines.—3,459, F. Sage, Door Stops, &c.—3,470, W. Moore, Preventing Water-pipes from Bursting.

March 8.—3,486, G. Newman, Door Checks and Springs.—3,488, S. Hill, Door Spring.—3,495, W. Danelly, Separating, Holding, and Laying Newly-formed Bricks for Drying Purposes.—3,507, J. Pope, Construction of Walls of Houses, &c.—3,538, E. Dummer, Window Fasteners.

March 9.—3,565, G. Girding, Artificial Stone.—3,574, Cassidy and Woodfield, Fastenings for Doors, Windows, &c.—3,595, R. Ash, Ventilating Apparatus.

March 10, 3,624, J. Summerscales, Hinge for Step-ladders and Trestles.—3,640, T. Jones Ladder.



PROVISIONAL SPECIFICATIONS ACCEPTED.

16,683, W. Grayston, Safety Hinge for Painters, Plasterers, or Joiners' Trestles, &c.—533, J. Mitchell, Joiners' Bench, Stop, and Cramp...

COMPLETE SPECIFICATIONS ACCEPTED.

4,496, T. & J. Holt, Flushing Cisterns for Water-closets.—5,638, J. Russell, Cooking Ranges.—5,843, C. Howe, Cement or Plaster.—6,100, W. Macfarlane, Water-closets.—6,155, J. Siddler, Lavatories...

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

Table listing estate exchange reports with columns for property description, agent, and price. Includes entries like 'Chelsea—1 to 5, Foundry-place, freehold' and 'Regent's Park—11, Mornington-place, freehold'.

Table listing estate exchange reports for March 10, with columns for property description, agent, and price. Includes entries like 'Waltham-green—5 to 10, Euter-piece, a cottage' and 'Barnsbury—6, Barnsbury-road, 7 years ground-rent'.

Table listing property sales for Canonbury-road-23, Canonbury Park North, 49 years, ground-rent 4/10s, and other properties with their respective agents and prices.

MARCH 11.

Table listing property sales for Peckham—Ground-rent of 18/18s, reversion in 63 years, and other properties with their respective agents and prices.

MEETINGS.

SATURDAY, MARCH 19. Architectural Association.—Visit to the National Gallery and the Houses of Parliament. 2.30 p.m. South Kensington Museum.—Mr. Whitworth Wallis on "Pompeian Architecture and Art." II. 5.15 p.m.

MONDAY, MARCH 21. Surveyors' Institution.—Mr. P. E. Pilditch on "Disinfection Practice," followed by a discussion upon this and Mr. Wheeler's paper, read at the previous meeting. 8 p.m.

TUESDAY, MARCH 22. Institution of Civil Engineers.—Discussion upon Col. E. Matfield's paper on "Gun Steel." 8 p.m. Manchester Architectural Society.—(1) Paper on "Sanitary Science," (2) Election of Officers. 7.31 p.m.

THURSDAY, MARCH 24. Society of Telegraph-Engineers and Electricians.—Mr. A. E. Kennelly on "The Resistance of Faults in Submarine Cables." 8 p.m.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Visit to New Municipal Buildings Glasgow.

Miscellaneous.

The District Surveyorship of West Hampstead.—At the meeting of the Metropolitan Board of Works on the 11th inst., the Building Act Committee recommended that Mr. R. Plumble, District Surveyor for South Islington, be transferred to the district of West Hampstead, vacant by the resignation of Mr. T. Blashill, now the Superintending Architect of the Board.

Tunnel under the Straits of Messina.—An Italian engineer, Signor Gabelli, has framed a plan for a tunnel under the Straits of Messina from Italy to Sicily, a proposal which, by-the-by, is not a new one. He estimates the length of the tunnel at eight miles and a half, and proposes that its depth below the surface of the sea be about 500 ft.

A Jubilee Project for North-West London.

Mr. John Leighton, F.S.A., has made a proposal for making a new avenue through Regent's Park to Primrose Hill Park and Eaton Fields. He points out that within the precincts of the parishes of St. Pancras, St. Marylebone, and St. John, Hampstead, about forty years since, Parliament purchased a plot of ground, which it dedicated in perpetuity as a place of recreation for the people.

The Sanitary Registration of Buildings Bill.—At the meeting of the Council of the Sanitary Assurance Association on Monday last, a communication was read from the Association of Municipal and Sanitary Engineers and Surveyors requesting the Council to convene a conference on the subject of the Sanitary Registration of Buildings Bill, and, in the event of the request being acceded to, offering to co-operate in the matter.

That in compliance with the request of the Association of Municipal and Sanitary Engineers and Surveyors, a Conference be convened to consider and report upon the principle and details of the Sanitary Registration of Buildings Bill, which is now before the House of Commons: that at the first meeting of the Conference be held on Monday, April 4th, at three o'clock p.m., at Sir Joseph Fryer, K.C.S.L., M.D., F.R.S., Sir Vincent H. Kennet Barrington, Mr. Mark H. Judge, A.R.I.B.A., and Mr. H. Bultford, Barrister-at-Law, be appointed to represent the Sanitary Assurance Association at the Conference; that Mr. C. C. Leitch, M.P., Dr. R. Farquharson, M.P., Sir W. Guyer Hunter, M.P., M.D., Dr. Charles Cameron, M.P., and Sir Henry E. Roscoe, M.P., F.R.S., be invited to attend the Conference; and that the governors of bodies of the following institutions be requested to appoint four gentlemen to represent them at the Conference.—The Royal Institute of British Architects, the Institution of Civil Engineers, the Royal Institute of Architects of Ireland, the London Sanitary Protection Association, the Society of Medical Practitioners registered as qualified in Sanitary Science, the Institution of Surveyors, the Association of Municipal and Sanitary Engineers and Surveyors, the Society of Medical Officers of Health, the Sanitary Institute of Great Britain. Further, that the question of inviting other bodies to join in the Conference be left in the hands of the Conference.

Tunnel under the Straits of Messina.—An Italian engineer, Signor Gabelli, has framed a plan for a tunnel under the Straits of Messina from Italy to Sicily, a proposal which, by-the-by, is not a new one. He estimates the length of the tunnel at eight miles and a half, and proposes that its depth below the surface of the sea be about 500 ft. The cost of the tunnel is calculated at about 3,000,000*l.*, and the time of construction at five years. From preliminary soundings it has been found that the character of the sea bottom is favourable to the construction of such a tunnel. Another proposal which has been made to the Italian Government is for a bridge across the Straits, the length of which is estimated at about nine miles, but in all probability the former proposal will be the one adopted. The inhabitants of Sicily are strongly in favour of such a tunnel, which they believe would be a financial success.

Edinburgh Free Library Buildings.—At a meeting of the Free Library Committee, held in the Council Chambers, Edinburgh, on Monday afternoon, it was agreed to limit the competition for plans to Edinburgh architects.

**The Water Supply of Paris.**—The destructive influence of the changes of temperature upon aqueducts of masonry has shown itself in the structure which carries the water of the Vanne to Paris, in consequence of which some districts of the city had recently to be furnished temporarily with Seine water. The aqueduct, which crosses the valley of the Bièvre near Arcueil by seventy-seven walled arches, is supported in some portions by the Maria de Medicis Aqueduct, dating from the seventeenth century, the fine piers of which form one of the architectural attractions of Arcueil. The modern aqueduct, a lofty and hold structure of limestone, carries the waters of the Vanne to Paris. Owing to the recent frost, a crack was found in one of the arches, causing the water to percolate, and threatening the destruction of the masonry. The crack, which involves not only the modern, but also the older structure, is a very narrow one, and was plugged with lead, the water being drained off during the repairs. In order to ensure an uninterrupted supply of pure and fresh water to Paris, and to serve the water at all elevations, it is intended to bring the waters of the Vigne springs (department of the Eure) to the city. It is hoped by this new source to prevent the interruption of the supply during repairs of the old aqueducts that may become necessary, as well as in times of drought.

**Wellingborough.**—The new steam flour-mill at Wellingborough, for Mr. J. B. Whitworth, have just been completed. The new mill, which is situated close to the London and North-Western Railway station, with siding, is built of Wellingborough bricks on concrete foundations, and is divided into three distinct fireproof compartments,—the warehouse, engine-room, and the mill proper. These all have exterior iron doors opening on to landings, and no internal communication, this reducing risk in case of fire. Over the engine-room a tower has been carried up to carry a large cast-iron cistern to hold 7,000 gallons. The boiler-house and chimney-shaft (100 ft. high) are on the south side of the building. The stables are fitted with Tebbutt's patent stable-floors and Messrs. Green's stable fittings. The contract was taken by Mr. Geo. Henson, of Wellingborough. The milling machinery has been erected by Messrs. Robinson & Sons, of Rochdale. The engine, which is condensing 150-horse-power, together with boiler and economiser, is by Messrs. Timothy Bates & Co., of Sowerby Bridge. The electric light has been fixed throughout the buildings by Messrs. Christy & Son, of Chelmsford. Pipes are laid from the tank to every portion of the building with hydrants and hose on each floor, and also automatic sprinklers. The whole of works have been carried out from the plans and under the personal superintendence of Messrs. Usher & Anthony, architects, of Bedford.

**The Polytechnic Science and Art Classes.**—On Wednesday evening Lord Hartington presided at the fourth annual distribution of prizes, certificates, and medals to the successful students of the science, art, technical, and general classes, in connection with the Polytechnic Young Men's Christian Institute, Regent-street. Mr. W. T. Paton, hon. sec., opened the proceedings by making a statement as to the position and work of the Institute. He said that the total number of students during the session ending June 30, 1886, was 6,875. In 1883, the year of inauguration, the number of students had been 3,200, and since that date a steady increase had taken place. In the last four years the students had gained sixty of the medals offered by the City and Guilds of London Institute for open competition throughout the United Kingdom, and nineteen of these medals had been won by the students of last year. The ceremony of distributing the prizes having been completed, Lord Hartington followed with an interesting address.

**The Examination Hall of the College of Surgeons.**—This building,—the foundation-stone of which was laid by the Queen,—was opened on Monday last. We gave a view and plans of the building a year ago, viz., on March 20th, 1886. Mr. Stephen Salter is the architect. The locks and door furniture throughout were supplied by Mr. James Hill.

**Lifts.**—Mr. J. Stannah is now making for Messrs. Glyn, Mills, & Currie's bank a hydraulic lift which will be one of the largest and most powerful bank lifts in existence. It will be worked by water from the Hydraulic Power Company's mains.

**Appointment of City Engineer for Dublin.**—At a meeting of the Corporation of Dublin on Tuesday last, Mr. Spencer Harry was elected City Engineer of Dublin, in succession to the late Mr. Park Neville, at a salary of 750*l.* per annum. There were eighteen candidates.

**Edmonton Cemetery Chapels.**—The entrance-gates and railing in connexion with this work (mentioned in our last) were executed entirely in hammered iron by Mr. George Rowe, from the designs of Mr. Ricketts, Surveyor to the Edmonton Local Board. The work is artistic in character, and shows some originality of design and treatment.

**Nottingham School of Art.**—On the 14th inst. the medals, the Queen's and other prizes, gained by the students of the Nottingham School of Art in the National Art Competition and Government examinations of 1886, were distributed in the large hall of the Mechanics' Institution by the Bishop of Ripon. The chair was occupied by Mr. T. I. Birkin, J.P., in the absence of the Mayor of Nottingham (Ald. Turney, J.P.).

**Baths at Buxton.**—Considerable additions have just been made to the baths at Buxton by the Duke of Devonshire. Spacious new bathing establishments connected with the old baths in the Hot Bath Colonnade have been completed, or nearly so, and it is here that the latest and most improved form of massage treatment can be obtained. For some months past the new buildings have been in course of erection under the direction of Mr. Curry, the Duke's architect, and the personal supervision of Mr. J. D. Simpson, clerk of works. The work of fixing the baths has been entrusted to Mr. John Smeaton, sanitary engineer, of London, whose foreman was Mr. Alexander McKay.

**The Estate Exchange.**—At the annual general meeting, held on the 7th inst., Mr. B. J. Bridgewater in the chair, it was moved, seconded, and carried, "That the report and statements of account be entered upon the minutes." The following resolutions were also carried:—"That the retiring members of the committee, viz., Messrs. C. Oakley, R. Reid, E. W. Rushworth, P. St. Quintin, and A. Savill, be re-elected." "That the auditors, Messrs. Samuel Green and P. St. Quintin, be re-elected." "That Mr. G. B. Smallpeice and Mr. Samuel Walker be elected to serve upon the committee." A vote of thanks was unanimously passed to the Chairman for presiding.

**Burial Reform.**—The reply given by Mr. Plunket in the House of Commons to the question recently put to him by Mr. Baggallay respecting Brompton Cemetery suggests very serious reflections as to our present mode of burial. From that reply it appears that the cemetery contains in all 38 acres and 20 perches, and that there now remain 4 acres and 34 perches available for burial purposes. The space already used is therefore less than 34 acres, and in this there have been buried the enormous number of 135,617 bodies, an average of 3,988 per acre. It has been calculated that 1,000 graves can be made in every acre of land set apart for burial purposes, leaving a reasonable margin for spaces between graves, walks, &c. Hence, as the depth of graves is often 11 ft. or 12 ft., and sometimes even deeper, the figures, large though they at first appear, are not excessive. Nor would there be anything to fear if it were the truth that all these bodies are really buried. But, as Mr. Seymour Haden has said, speaking of modern burial, a large proportion cannot be considered as buried at all. The first burial in Brompton Cemetery took place in 1840, and, as it has always been what may be termed a fashionable place of interment, the probabilities are that a large proportion of the burials have been in lead coffins and in vaults or bricked graves. The result is, as it always must be when the dead are disposed in this manner, that the cemetery becomes filled with what Mr. Haden severely, but truly, describes as a mass of boxed-up putridity. It appears, moreover, that the burials therein still average in round numbers 5,000 yearly, and that the Government derived last year a profit of 7,070*l.* from the cemetery. Considering all these circumstances, and also how completely the cemetery has become surrounded by dwellings, it appears only reasonable that, if burials are to continue there, every inducement should be made by reduced tariffs, &c., to bury in perishable coffins and in graves.

**Housing the Working Classes.**—The twentieth annual general meeting of the Artizans, Labourers', and General Dwellings Company, Limited, was held on Thursday, the 10th inst., Mr. Ernest Noel presiding. The report showed that the rental for the year 1886 amounted to nearly 96,000*l.*, the net revenue being 66,047*l.*, out of which interim dividends upon the preference and ordinary capitals amounting to 38,628*l.*, had been paid. It was now proposed to pay a dividend of 5 per cent on the ordinary share capital for the second six months of the year, carrying over 1,000*l.* to revenue reserve, 3,000*l.* to capital reserve, and 1,602*l.* to next year's accounts. The increase of capital during the year had been 83,650*l.*, the total amount paid up to Dec. 31 was 1,317,930*l.*, the authorised capital being 1,000,000*l.* in ordinary shares, and 750,000*l.* in preference shares 4½ per cent. The completed estates of the company in London are Shaftesbury-park, S.W., and Queen's-park, W., comprising nearly 3,400 separate houses. At Noel-park, N., at the close of the year, 1,041 houses were completed, 870 being let and occupied. This estate, when completed, will comprise 2,600 houses. The new block-buildings in Lisson-grove were progressing rapidly.

PRICES CURRENT OF MATERIALS.

|                                                     | £ s. d.  | £ s. d. |
|-----------------------------------------------------|----------|---------|
| <b>TIMBER.</b>                                      |          |         |
| Greenheart, B.G. ....                               | 6 10 0   | 7 10 0  |
| Teak, E.I. ....                                     | 9 0 0    | 14 0 0  |
| Sequoia, U.S. ....                                  | 0 2 3    | 0 0 0   |
| Ash, Canada ....                                    | 3 0 0    | 4 10 0  |
| " "                                                 | 2 5 0    | 3 10 0  |
| Elm ....                                            | 3 10 0   | 4 10 0  |
| Fir, Dantsic, &c. ....                              | 1 10 0   | 4 0 0   |
| Oak ....                                            | 2 10 0   | 4 10 0  |
| Canada ....                                         | 3 0 0    | 6 0 0   |
| Pine, Canada red ....                               | 2 0 0    | 3 10 0  |
| " yellow ....                                       | 2 5 0    | 4 0 0   |
| Lath, Dantsic ....                                  | 2 0 0    | 5 0 0   |
| St. Petersburg ....                                 | 4 0 0    | 5 10 0  |
| Wainscot, Riga ....                                 | 2 15 0   | 4 0 0   |
| " Odessa, crown ....                                | 2 15 0   | 3 0 0   |
| Deal, Finland, and 1st. std. ....                   | 7 0 0    | 8 0 0   |
| " 4th and 3rd. ....                                 | 5 10 0   | 6 10 0  |
| Riga ....                                           | 6 10 0   | 7 0 0   |
| St. Petersburg, 1st yellow ....                     | 8 10 0   | 14 0 0  |
| " 2nd yellow ....                                   | 7 0 0    | 8 0 0   |
| " white ....                                        | 6 0 0    | 9 0 0   |
| Swedish ....                                        | 6 0 0    | 15 0 0  |
| White Sea ....                                      | 7 0 0    | 25 0 0  |
| Canada, Pine, 1st ....                              | 11 0 0   | 16 0 0  |
| " 2nd ....                                          | 6 0 0    | 9 0 0   |
| " 3rd, &c. ....                                     | 8 0 0    | 10 0 0  |
| " Spruce, 1st ....                                  | 5 0 0    | 7 0 0   |
| New Brunswick, &c. ....                             | 5 0 0    | 7 0 0   |
| Battens, all kinds ....                             | 4 0 0    | 11 0 0  |
| <b>Flooring Boards, sq. 1 in., prepared, first.</b> |          |         |
| Second ....                                         | 0 8 0    | 0 11 6  |
| Other qualities ....                                | 0 6 0    | 0 7 6   |
| Other qualities ....                                | 0 5 0    | 0 6 0   |
| Cedar, Cuba ....                                    | 0 0 0    | 0 0 0   |
| Honduras, &c. ....                                  | 0 0 0    | 0 0 0   |
| Australian ....                                     | 0 0 0    | 0 0 0   |
| Mahogany, Cuba ....                                 | 0 0 4    | 0 0 7   |
| St. Domingo, cargo average ....                     | 0 0 4    | 0 0 6   |
| Mahogany, Mexican, cargo av. ....                   | 0 0 3    | 0 0 4   |
| Tobacco ....                                        | 0 0 4    | 0 0 6   |
| Honduras ....                                       | 0 0 4    | 0 0 8   |
| Maple, Bird's-eye ....                              | 0 0 6    | 0 0 8   |
| Rose, Rio ....                                      | 7 0 0    | 10 0 0  |
| Babia ....                                          | 6 0 0    | 10 0 0  |
| Box, Turkey ....                                    | 5 0 0    | 15 0 0  |
| Satin, St. Domingo ....                             | 0 0 5    | 0 10 0  |
| Porto Rico ....                                     | 0 0 6    | 0 10 0  |
| Walnut, Italian ....                                | 0 0 4    | 0 0 5   |
| <b>METALS.</b>                                      |          |         |
| Iron—Bar, Welsh, in London ....                     | 4 2 6    | 4 15 0  |
| " " in Wales ....                                   | 4 2 6    | 4 7 6   |
| Staffordshire, London ....                          | 5 10 0   | 6 0 0   |
| Sheets, single, in London ....                      | 6 0 0    | 7 0 0   |
| Nail-roads ....                                     | 5 15 0   | 6 10 0  |
| <b>COPPER.</b>                                      |          |         |
| British, cake and ingot ....                        | 42 15 0  | 43 5 0  |
| Best selected ....                                  | 43 10 0  | 44 10 0 |
| Sheets, strong ....                                 | 50 0 0   | 51 0 0  |
| Chili, bars ....                                    | 39 2 6   | 39 15 0 |
| <b>LEAD.</b>                                        |          |         |
| Yellow Metal ....                                   | 0 0 4½   | 0 0 4½  |
| Pig, Spanish ....                                   | 12 11 3  | 0 0 0   |
| English, common brands ....                         | 12 15 9  | 12 17 6 |
| Sheet, English ....                                 | 13 33 9  | 14 0 0  |
| <b>SPRUE.</b>                                       |          |         |
| Silesian, special ....                              | 14 5 0   | 14 7 6  |
| Ordinary brands ....                                | 14 2 6   | 14 5 0  |
| <b>TIN.</b>                                         |          |         |
| Strait's ....                                       | 101 12 6 | 0 0 0   |
| Australian ....                                     | 101 10 0 | 0 0 0   |
| English ingots ....                                 | 105 0 0  | 0 0 0   |
| <b>OILS.</b>                                        |          |         |
| Linseed ....                                        | 20 2 6   | 20 5 0  |
| Cocoanut, Cochon ....                               | 35 0 0   | 36 0 0  |
| Ceylon ....                                         | 20 6 0   | 20 6 0  |
| Palm, Lagos ....                                    | 22 10 0  | 0 0 0   |
| Rapeseed, English pale ....                         | 22 10 0  | 0 0 0   |
| " brown ....                                        | 21 0 0   | 0 0 0   |
| Cottonseed, refined ....                            | 18 0 0   | 19 5 0  |
| Wallow and Oleya ....                               | 25 0 0   | 45 0 0  |
| Lubricating, U.S. ....                              | 5 0 0    | 6 10 0  |
| " refined ....                                      | 5 0 0    | 12 0 0  |
| <b>TURPENTINE.</b>                                  |          |         |
| American, in casks ....                             | 1 8 0    | 0 0 0   |
| <b>TAR.</b>                                         |          |         |
| Stockholm ....                                      | 0 15 0   | 0 15 6  |
| Archangel ....                                      | 9 12 6   | 0 0 0   |

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Table with 5 columns: Nature of Work, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page.

PUBLIC APPOINTMENTS.

Table with 5 columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page.

TENDERS.

Table listing tenders for BAGSHOT (Surrey) and other projects, including names like Langham, Barks & Son, Spooner, Kemp, Norris, Leslie & Knight.

BRAMLEY (near Guildford).—For house at Woodrough, for the Hon. E. Thesiger, C.B. Messrs. Peak, Lunn, & Peak, architects, Guildford.

Table listing tenders for BRAMLEY (near Guildford) and other projects, including names like Kinglerie, Martin, Wells & Co., R. Pink, Milford, J. Harris & Son, Woking, Mitchell Bros., Shalford, H. Brown, Bramley, P. Peters, Horsham, J. Bottrill, Reading.

BROMLEY (Kent).—For widening a portion of Watmore-road, for the Bromley Local Board, Mr. Hugh S. Cregeen, surveyor.

Table listing tenders for BROMLEY (Kent) and other projects, including names like E. Peill & Sons, T. Lansbury, CARDIFF, Mr. R. A. Lansdowne, architect, Newport, Mon.

CHARLTON (Kent).—For the erection of a billiard-room to the Antiquarian public-house, Lower Woodchurch, Charlton, Kent, for Mr. John Boyd.

Table listing tenders for CHARLTON (Kent) and other projects, including names like William & Sons, Holloway Bros., Hay & Whitaker, J. Reece & Co., Architects' estimate, 412l. 4s.

CHELSEA.—For the erection of a block of shops in Cheyne-walk and Cremorne-road, Chelsea, for Mr. J. Knights, Mr. Henry W. Dobb, architect, London-wall.

Table listing tenders for CHELSEA and other projects, including names like A. Brickell, Contractors' estimate, 4,500 0 0, Lindsay & Co., Paddington, 142 0 0.

CLERKENWELL.—For erecting two warehouses, and three dwelling-houses, at Clerkenwell, Mr. Robert W. Hobden, architect, Devonshire-street. Quantities supplied:—

Table with 3 columns: Ware-houses, Dwelling-houses, Total, listing costs in £, s., d.

EASTBOURNE.—For alterations and additions to the Grand Hotel, Eastbourne, comprising a new facade towards Compton-street, with shops under, Mr. Morton M. Glover, architect. Quantities by Mr. H. Lovegrove:—

Table listing tenders for EASTBOURNE, including names like T. Hider & Son, Higgs & Hill, J. Peckless, Eastbourne, Grover & Son, Perry & Co., Patman & Fotheringham, Collis & Sons, J. Barnes, Brighton, J. H. Chappell.

EDMONTON.—For the erection of twenty-four houses, on the Angel Park Estate, Edmonton, for Messrs. Jas. & H. B. Craig, Mr. Henry W. Dobb, architect, London-wall.

EDMONTON.—For the erection of nineteen houses on the Angel Park Estate, Edmonton, Mr. Henry W. Dobb, architect, London-wall.

GUILDFOURD.—For alterations and additions to the White Hall, Guildford, for Mr. C. J. Sells, Messrs. Peak, Lunn, & Peak, architects:—

Table listing tenders for GUILDFOURD, including names like Martin, Wells & Co., Aldershot, R. Pink, Milford, W. W. Burdett, Guildford, J. Bottrill, Reading, G. Strudwick, Guildford, G. Garnett, Guildford, J. H. Kinglerie, Oxford.

ISLINGTON.—For the erection of a block of artisans' dwellings, Waterloo-terrace, Upper-street, Islington, Mr. Henry W. Dobb, architect, London-wall.

LEEDS.—For the erection of the Leeds Municipal Fine Art Gallery and Museum, Mr. W. H. Thorp, A.R.C.E.A., architect, St. Andrew's-chambers, Park-road, Leeds. Quantities supplied:—

Table listing tenders for LEEDS, including names like Brown & Backhouse, Liverpool, Wm. Nicholson & Sons, Leeds, Wm. Houldsworth, Bradford, W. A. Peters & Sons, Rochdale, Moulson & Son, Bradford, Wm. Thompson & Son, Leeds, Longley Bros., Leeds, James Wilson & Son, Bradford, Walker Binks, Bradford, Hannam & Barber, Leeds, Wm. Ives & Co., Shipley, J. Tomlinson & Son, Leeds, J. Hill Thors & Son, Leeds, Armitage & Hedges, Leeds, Wm. Gilson, Leeds, Charles Myers, Leeds, Cross & Umpieley, Leeds.

\* On basis of competition scheme. † Including additions and cellaring to the whole of the basement. ‡ Tender of 7,978l. on basis of Contract A accepted, with modifications and additions included in Contract B, amounting to 945l., making a total of 8,923l.

LEEK.—For concrete works at Hope Mills Extensions, Leek, Messrs. W. Sugden & Son, architects:—

Table listing tenders for LEEK, including names like Roger Lowe (accepted), 2346 19 9.

For Labour only—Excavator, Bricklayer, and Plasterer's Work.

E. S. Bromage (accepted) 377 4 2

LEEK.—For boundary walling and gate pillars, for Mr. H. Davenport, Messrs. W. Sugden & Son, architects:—

Table listing tenders for LEEK, including names like James Heath (accepted), 2345 0 0.

Wrought-iron Gates. Elgton Bros. (accepted) 50 0 0

LONDON.—For the erection of new printing warehouse and offices, Long-acre, for Messrs. Woodfall & Knicker. Mr. W. Seckham Withington, architect, Mark-lane:—

Table listing tenders for LONDON (printing warehouse), including names like J. K. Coleman, Kirk & Randall, W. Shepherd, T. Knight, J. Woodward, C. F. Kearley, Allard, Stephenson, Collis & Son, Elkington, Patman & Fotheringham.

LONDON.—For general repairs and new iron eave-gutters, &c., at the Licensed Victuallers' Asylum, Asylum-road, Old Kent-road, Mr. W. F. Potter, architect. Quantities by Mr. C. R. Griffiths, Bank-chambers, Tooley-street:—

Table listing tenders for LONDON (repairs), including names like R. J. Amos, Deptford, H. L. Holloway, Hatcham, W. Wells, Paddington, J. Walker, Poplar, W. Watson, Ilford, Essex, W. Wythe, Dalston (accepted).

LONDON.—For rebuilding house, near Tulse-hill, for Mr. T. Alderton, Mr. W. T. Hollands, architect, Chancery-lane. Quantities not supplied:—

Table listing tenders for LONDON (rebuilding house), including names like Smith & Sons, South Norwood, A. M. Deacon & Co., Lower Norwood, Henley & Co., Anerley.

LONDON.—For painting, cleaning, &c., St. Matthew's Church, New Kent-road, for the Rev. J. M. Cadman:—

Table listing tenders for LONDON (church), including names like Edgley, Marebant, Watts, Dove, Sayer, Tarrant (accepted).

LONDON.—For alterations to the premises known as the Sussex Club, Whitechapel-road, for Mr. Young:—

Table listing tenders for LONDON (Sussex Club), including name like Lusk (accepted), 2325 0 0.

LONDON.—For alterations and decorations to the premises known as the Bedford Club, Westminster Bridge-road, for Mr. Rose:—

Table listing tenders for LONDON (Bedford Club), including name like Lusk (accepted), 2363 0 0.

MAIDENHEAD (Berks).—For residence and stables (in Forest of Dean stone), Maidenhead Court, Maidenhead, Berks, for Mr. C. Gerouse Boxall, Mr. F. Wheeler, architect, Chancery-lane. Quantities by Messrs. Evans & Deacon:—

Table listing tenders for MAIDENHEAD, including names like Little & Senecal, Turtle & Appleton, Foster & Dicksee, St-phenson, Hill Bros.

NEWPORT (Mon).—For erecting three houses, Victoria-avenue, Maidee, Newport, Mon., for Mr. H. E. Prosser:—

Table listing tenders for NEWPORT, including name like James Williams (accepted), 2000 0 0.

NORTHAM.—For building cemetery chapels, Northam, for the Rye Union Rural Sanitary Authority, and iron fencing, Mr. Charles Smith, architect, Rye. Quantities not supplied:—

Table listing tenders for NORTHAM, including names like Davis & Leaney, Goudhurst, W. Comford, Northiam, Edward Perigo, Northiam (accepted).

IRON FENCING. G. Coleman, Northiam, 138 14 0. Morion & Co., Liverpool, 129 0 0. Geo. Howe, Lower Edmonton, 129 0 0. C. Milsted & Sons, Tenterden, 118 0 0. S. Winton & Son, Rye, 117 0 0. Davis & Leaney, Goudhurst, 113 0 0. Grove Iron Works Co., Southwark, 112 0 0. W. Comford, Northiam, 107 4 6. E. Perigo, Northiam, 106 0 0. Hill & Smith, Brierley Hill Iron Works (accepted), 83 15 8. Houssart & Co., King William-street, City, 83 0 0.

PAIGINTON.—For erecting general grocery stores, for Mr. W. Lambhead (Dollé & Co.), on the Palace Avenue Estate, Paiginton, Mr. Geo. Soudou Bridgeman, architect, Torquay and Paiginton:—

Table listing tenders for PAIGINTON, including names like W. A. Goss, Torquay, E. P. Bovey, Torquay, Drew Bros., Paiginton, F. W. Vanstone, Paiginton, H. Rowe, Plymouth, F. Matthews, Babcock, R. Yeo, Torquay, H. Webber, Paiginton, W. Rabbin, Paiginton, M. Bridgman, Paiginton.

PAIGINTON.—For building the carriages of two-houses, and other work, 1 and 2, Palace Avenue Estate, Paiginton, Mr. G. S. Bridgeman, architect:—

Table listing tenders for PAIGINTON (carriages), including name like Henry Rabbin (accepted), 4950 0 0.

PORTSEA.—For St. Mary's Church, Portsea:—

Table listing tenders for PORTSEA, including names like Armitage & Hodgson, Paramor, Thompson, Parmuter, Woodward, Dove, Evans, W. R. & C. Light, Burridge, Ward & Co., Goddard, Stephens, Bastow, & Co. (accepted).

**READING.**—For a coachman's lodge, Lower Redlands, Reading, for Mr. Herbert Sutton. Mr. Geo. W. Webb, architect.—  
 Higgs & Son, Reading ..... £475 0 0  
 J. H. Margatta, Reading ..... 447 0 0  
 Geo. Scarle, Reading ..... 429 0 0  
 J. Bottrill, Reading ..... 395 0 0

**READING.**—For a public memorial fountain, St. Mary's Butts. Mr. Geo. W. Webb, architect, Reading.—  
 Wheeler Bros., Reading (accepted) ... £400 0 0

**SANDWICH.**—For the restoration of St. Bartholomew's Church, Sandwich, Kent. Mr. J. Oldrid Scott, architect.—  

|                       |      |      |      |        |
|-----------------------|------|------|------|--------|
| A.                    | B.   | C.   |      |        |
| Wilson, Canterbury    | £697 | £231 | £147 | £1,076 |
| Denne, Walmer         | 482  | 306  | 207  | 995    |
| Denne & Son, Deal     | 500  | 330  | 120  | 950    |
| Arcock, Dover         | 499  | 369  | 157  | 947    |
| Wise, Deal (accepted) | 420  | 318  | 141  | 879    |

 A. Restoration, North Chapel.  
 B. Chancel fittings.  
 C. Oak pews, South Nave.

**SPITALFIELDS.**—For alterations at the Red Lion public-house, Commercial-street, for Mr. F. Ormer. Mr. Edward Brown, surveyor, Liverpool-street.—  
 Belcher & Ulmer ..... £375 0 0  
 Fuller & Coulthart ..... 315 0 0  
 O. Mower ..... 313 0 0  
 J. Walker ..... 298 0 0  
 R. Marr ..... 288 0 0  
 S. W. Hawkins (accepted) ..... 277 0 0  
 W. Jackson ..... 218 0 0

**STREATHAM.**—For residence and studio, Coventry Park, Streatham. Mr. F. Wheeler, architect, Chancery-lane. Quantities by Messrs. Evans & Deacon.—  
 Maxwell ..... £2,331 0 0  
 Mason ..... 2,237 0 0  
 Barnes ..... 2,270 0 0  
 Deacon ..... 2,195 0 0  
 Hill Brown ..... 2,098 0 0  
 Turtle & Appleton ..... 2,095 0 0  
 Jervis Smith (accepted) ..... 2,633 0 0

**TAUNTON.**—For alterations to the White Hart Inn, East Reach, Taunton, Somerset, for Messrs. S. & W. T. Toms. Mr. W. H. Cressa, architect, Taunton.—  
 J. Morse ..... £278 10 0  
 A. J. Spiller ..... 375 0 0  
 Wm. Creed ..... 274 0 0  
 Chas. Fox ..... 253 0 0  
 Geo. Handford ..... 245 0 0  
 J. Monntstephens (accepted) ..... 210 0 0

**WHITECHAPEL.**—For alterations and additions to 239 and 243, Whitechapel-road, for Messrs. Napper & Sons. Messrs. Wigg, Oliver, & Son, architects. Quantities by Mr. Herbert Paine:—  
 Eaton ..... £1,595 0 0  
 Sargent ..... 1,458 0 0  
 Little ..... 1,456 0 0  
 Cranston ..... 1,334 0 0  
 Fyton & Burton ..... 1,207 0 0  
 Lask ..... 1,233 0 0

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**TO CORRESPONDENTS.**

Registered Telegraphic Address, "THE BUILDER, LONDON."

J. M.—B. F. (no address given).—"One interest" (your letter is not suited to our column)—H. H.—M. F. F. P.—R. A. J.—W. H. C.—E. B. V.—A. C.—S.—J. W. C.—G. R.—E. F. H.—J. H. (small appeal)—T. M. D. S.—G. H. W.—H. D. S.—T. R. K. (subject shall have attention next week)—D. & S. (below our mark)—L. & A. (appeared a fortnight ago).—Several lists of tenders received too late.

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

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors. We cannot undertake to return rejected communications.

Letters or communications (beyond news-items) which have been duplicated for other journals, are NOT DESIRED. All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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**Map of London,**

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# The Builder.

VOL. LIII. No. 2593.

SATURDAY, MARCH 26, 1887.

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### Professional Wire-Pulling.



WE have briefly noticed in our last, the Supplemental Charter asked for by the Institute of Architects has been conceded, as every one expected it would be, and the clique of persons who got up a factious opposition to it to serve some purpose best known to themselves, and under the guise of an assumed concern for the welfare of the profession, may have the satisfaction of knowing that they have gained nothing by their disingenuous attack upon the leading representative body of the profession except to raise a general feeling against themselves,—which has already found expression at public meetings,—and the tortuous tactics they have employed, and to evoke the formal and official support to the Institute of the leading provincial architectural societies, as well as that of the only London architectural society besides the Institute which has any important or recognised position. The last number of the *Journal of Proceedings* of the Institute contains, printed in full, the two petitions which were got up with such a flourish of trumpets against the Institute, and the categorical reply of the latter body; and it is as well that those of our readers who are not members of the Institute, who may not, therefore, see the *Journal*, and who may have been appealed to by the specious representations of the clique in question, should know a little about the facts, which one or two quotations will show them quite sufficiently.

We have referred to the two petitions in opposition; but even this pretended dual form is a piece of hogsw. One petition professes to issue from a certain "Society of Architects," the other from an "Architectural Federation Committee." The two, as is pointed out in the answer of the Institute, "to all intents and purposes emanate from the same source, the directing spirits being in both the same individuals, namely, the officers of the 'Society of Architects.'" Concerning the said Society, the protest of which comes second on the list, the Institute rejoinder says:—

"The Royal Institute, although it is in intimate communication, and in regular correspondence, with every, or almost every, architectural Institute, Society, or Association in the empire, as well as with the principal architectural bodies in Europe and America, and although it periodically presents to, or exchanges with, them its *Kalendar*, its *Journal of Proceedings*, and its annual volume of *Transactions*, has never received from the 'Society

of Architects' any official notice of the constitution, the rules, or even a list of members, of that body; and the Royal Institute has, officially, no knowledge of the Society. Furthermore, the statement made in this clause (7) of the Society's petition, that the Architectural Association (of London) is merely a students' society, is incorrect. The Architectural Association of London, which has been established for more than forty years, is composed of architects, architects' assistants, and architectural students, to the number of one thousand, located in London and various parts of the country."

The Architectural Association, the importance and activity of which are well known in the profession, was one of the six bodies which sent in counter petitions in support of the Institute, and therefore it was the policy of the opposers to endeavour to represent it to the official authorities as a juvenile body of students. But, turning to the opposing petition of the "Architectural Federation Society," which comes first on the list, and to which the answer of the Institute is mainly directed (since the second opposing petition was very little more, essentially, than a duplicate of the first), it will probably enlighten some of those who have been urged to sign petitions and circulars in opposition to the Institute, to see side by side the statement of the opposition as to their status and position, and the counter statement in the reply of the Institute. The third and fourth clauses of the opposition document run as follows:—

"3. That your Memorialists were appointed at a Conference which was publicly advertised and convened by notice addressed to all existing Societies and members of the Architectural profession in the United Kingdom, held at the Freemasons' Tavern, Great Queen-street, on the 6th day of April, 1886, whereat architects from all parts of the United Kingdom, and members of nearly all the existing Architectural Societies, including the said Royal Institute of British Architects, were present, and at such meeting the following resolutions were passed:—

"That in the interests of the Architectural Profession and of the Public alike, it is desirable that all architects in the Kingdom should be united in one body, having branches in the Provincial Cities and Towns, and a Central Council in London, including amongst its members representatives from the Provinces.

That a Committee be formed without delay to give effect to the foregoing Resolution, and to facilitate the formation of Committees in the Provinces.

That it is the opinion of this Meeting that instructions should be given to the Committee to consider the means necessary in order to obtain an Act of Parliament making it compulsory for all architects to hold a Government diploma.

"4. That your memorialists were appointed as the Committee to carry out the objects of the said Conference of Architects, and they have issued the following form to about 2,500 out of about 8,063 members of the Architectural professions in order to obtain the respective opinions of such members, namely:—

"Whereas we, the undersigned, are of opinion that it is for the benefit of the Public and the Architectural Professions alike that legislative powers should be obtained, so that all persons hereafter entering the Professions shall be duly qualified by examination; We are desirous that

Committees should be formed to promote the object in view, and to obtain the necessary Act of Parliament."

"That this form of Declaration has already been signed by 1,257 members of the Architectural professions in all parts of the United Kingdom during the short period of two months, and signatures are daily being added, whereby the said number of signatures of members of the professions will be largely increased; indeed, it may fairly be assumed from the foregoing figures that when forms of declaration have been sent to the whole of the members of the professions, the total number of signatures will be at least 4,000."

Now, let the candid reader compare with this a portion only (for we have not space for the whole) of the replies under the same headings on the part of the Institute:—

"3. The Royal Institute did not receive any official notice of the Conference referred to. It was convened to be held in connexion with a Building-Trades Exhibition by a self-constituted body called 'Society of Architects,' of which Society the Royal Institute has no official knowledge, and the meetings in question were held on the 6th of April last, the Royal Institute not being officially represented at them; nor did any provincial society (according to the published reports) send to them any duly-authorized representative. The two meetings of the Conference to which the memorial refers were attended for the most part by juniors; not a single architect of age, leading, or reputation supported any of the resolutions, nor did any gentleman announce himself, nor was he announced from the chair, as a representative of any provincial society. . . .

"4. Mr. H. R. Gough and Mr. E. Farman, on behalf of the memorialists, state that they were appointed as 'the Committee' to carry out the objects of the Conference of April last, but they do not describe the manner of their appointment, nor do they furnish a copy of the resolution appointing them, which was as follows:—

"That the Committee do consist of the following gentlemen, with power to add to their number (at least twelve members of the architectural profession not belonging to any Society being included), viz.:—The President and Vice-Presidents of the Royal Institute of British Architects (four); the President and Vice-Presidents of the Society of Architects (three); the President of the Architectural Association (of London); the Presidents of existing provincial Societies (about sixteen); the Royal Institute of British Architects' Federation Committee (about seventeen, minus the Presidents of provincial Societies); Mr. R. Norman Shaw, R.A., Mr. Robert Walker (of Cork), Mr. G. A. Audley, F.R.I.B.A., Mr. Henry Hall, F.R.I.B.A., Mr. C. H. Robertson, and Mr. Walter Emson."

"The Conference of April last thus decided that the question should be dealt with by about forty-seven persons, some forty of whom were to be members or representatives of the Royal Institute and of Provincial Societies, and at least twelve members of the architectural profession not belonging to any society. But the greater number of those who were then designated by the Conference, as the 'Architectural Federation Committee,' declined to accept the nomination, and wrote stating that they so declined. The Committee were consequently reduced to the following:—

- The President and Vice-Presidents of the 'Society of Architects' (London).
- Birmingham Architectural Association.
- Presidents of Edinburgh Architectural Association, Northern Architectural Association, of the New York Architectural Association, and of the Royal Institute of the Architects of Ireland.
- Mr. Basil Champneys (London).

could not help remarking the many people on Saturday afternoon and Sunday morning last, in particular about Primrose Hill and Hampstead Heath with newspapers in their hands; he was led by curiosity to inquire the cause, and found they were perusing the plan, and taking a survey of the new (Queen's) road that was proposed in our last Saturday's paper, from the bottom of Portman-square by Hampstead to Finchley Common. It was pronounced by all parties to be the greatest and most practicable improvement in the roadway that ever was made about the metropolis, the new Islington and City-road not excepted." This is now Baker-street and Finchley-road. Professor Cockerell, R.A., again, in the *Builder* of July, 1853, published a map of Primrose Hill and Hampstead Heath. He started a road from the middle of the Albert-road, behind the Zoological Gardens, but without any connexion from the Crown land southward,—a great defect; from the Albert-road he went with a magnificent sweep over the hill to Belsize, utilising the avenue of ancient elms, to where the Vestry-hall now stands, and so on by Pond-street, where there was a break, to Traitors' Hill, and round to the "Spaniards." At this time the country was open, and Fitzjohn's-avenue had not been thought of; this latter, with the improvements in High-street, Hampstead, in course of completion, now giving a better route. In 1863, on the occasion of the tercentenary of Shakespeare's birth, Mr. Leighton proposed a route from Portland-place to the Hill, where he proposed to place a monumental tower of many stories, to contain a statue of the poet, with museums of the stage, relics, costume, &c., the whole being surmounted by an observatory and a time-hall. Regarding the Hill Park, it may be remarked that George IV. once thought of building a palace there, and that it was measured for the first International Exhibition, 1851. A few years since the Hill was proposed as a site for the Wellington statue, now at Aldershot,—an infelicity it was happily spared. The most remarkable fact connected with the formation of so important a feature as the road proposed by Mr. Leighton through the Regent's Park to Hampstead is the few obstacles that would have to be overcome, there practically being none, save the acquisition of the Eaton Fields, which would give unity to the whole. This ground might possibly be acquired in exchange for land at Windsor, as was done when the Hill park was first acquired. Two of the principal pleasure resorts, the Zoological and Botanical Gardens, would flank "The Victoria Avenue" on either side, and be brought into direct communication with town. The Hill enclosure might be named "The Jubilee Park."

CONSIDERABLE feeling has been aroused in Chelsea by a departmental project to exclude the public in future from the open space before Chelsea Hospital. This valuable area, of about twelve acres, known as "Burton's Court," and containing a fine avenue of trees which gives a name to the houses beyond, was bought with public money in 1662, and for generations past has formed a favourite playground and resort with the inhabitants around. An arrangement has just been made with the War Office and the Commissioners of Chelsea Hospital for leasing the land as a cricket and football ground for the soldiers quartered in London; and a grant of 800*l.* will be asked for in Parliament towards that purpose. That our soldiers should have a Campus Martius for their games is, in itself, a very good thing; but the local grievance is aggravated by the following circumstance. About twenty years ago the public, and the military pensioners as well, were thenceforth denied admittance into the Hospital grounds that lie between Wren's central quadrangle and the river. Those terraced gardens, carefully tended and beautifully situated, would seem to be appropriated to lawn-tennis courts and the like thereto, for the sole enjoyment of the Hospital officials and their friends. These proceedings certainly seem to be in violation of a stipulation which, as we are informed, was made in 1850, to the effect that the Governor and his staff should

have no privileges as against the public in respect of these grounds, which are held in trust by the Commissioners.

THE announcement of the death of Captain Eads, the American engineer, at a by no means advanced age, is of quite sufficient interest for a notice in an English technical journal, if only for the great originality with which his undertakings were stamped. The fact of his being of very humble origin is nothing, for American industrial life teems with such cases; but it is certainly seldom that we find in an uneducated person such a rare talent, not only for seeing what might be done, but also how it was to be done. It will be enough to mention three of the undertakings which were directly of his conception and carrying out (although he has not lived to carry out the last). The first was the magnificent steel bridge which crosses the Mississippi at St. Louis, bearing upon it the converging rails of some eight or ten great systems, to be united on the other side with those of the far West. Captain Eads's attempts to deepen the mouth of the Mississippi at New Orleans were crowned with success, and by means of his original and gigantic works seaward, that city has become a more important port than it ever had been. His last and biggest scheme was in rivalry with M. de Lesseps and the Panama Canal, and was to consist in carrying out a broad ship canal, which was to unite the Gulf of Mexico and the Pacific Ocean, starting from the Bay of Tehuantepec. How this great scheme will be affected by the engineer's death it is impossible to say, but it must evidently receive a considerable shock.

WHAT is called the "D. C. Green ventilating system," of which demonstrations have been given this week at the offices of the agents for the system, in Queen Victoria-street, presents some points which promise well for its usefulness. The principle is to send a current of air from a compressor, at a pressure of 3 to 5 lbs. per square inch, through a specially designed nozzle at the end of a pipe of the necessary diameter, the nozzle being placed in the axis of a tube or conduit of much larger diameter, discharging parallel with the sides of the conduit, and setting up an induced current in the conduit, which is supplied with air from sources independent of the mechanical agency. The action in the model we saw in operation appears to be powerful and certain; the quantity of air requiring to be mechanically driven is a very small proportion of the whole, the bulk of air supplying the induced current being simply drawn from natural sources through any conveniently placed opening communicating with the conduit. By a very ingenious arrangement of a double brass cone controlled by a spring, the nozzle is made to accommodate itself to varying pressures of air so as to preserve always the same velocity at the point of discharge; or nearly the same, let us say, for there is a perceptible difference in the discharge at the end of the conduit when the pressure is altered, but nothing at all proportional to the change of pressure. The nozzles can be placed so as to act either as inductraughts or extractors. A great advantage is the small space occupied; a nozzle, about 3-in. diameter and 9-in. long, doing the work of a pretty large fan. The rush of the air produces an unpleasant noise; but (except in small houses, for which mechanical ventilation would hardly be employed) it could be got in a sufficiently remote position in a basement or elsewhere to be out of hearing. The pipes serving the nozzles are only small pipes of 1 in. or 1½ in. diameter, so that they can be easily led about a building; and the conduits take somewhat the place of "Tobin" tubes. The system is certainly worth the attention of architects.

THE photographs of works of English architects which are to be sent out to the Adelaide Exhibition will be on view to the public at the rooms of the Institute of Architects next week. The show will not be a very large one; it includes about a hundred photo-

graphs; but varieties of recent English work are fairly represented. The photographs of Holloway College make a good show, and will probably be admired. Mr. Jackson's Divinity Schools, one of the best and most original buildings of the recent English school for which it is so difficult to find a distinctive title (perhaps one of the best things that could be said for it), are among the selection; Mr. Waterhouse has contributed photographs of his Manchester Town-hall, perhaps his most typical work, and of the Natural History Museum; an Audley-street house by Mr. Aitchison, and interiors by Mr. Edis and Messrs. George & Peto (the latter duo of architects being well represented) are among the set. Works by London architects, as might be expected, predominate; the few examples of provincial architectural ability are not among the best that might be produced.

THE studies by Mr. Bridgman, the able French-American painter, and pupil of Gérôme (American by birth, French by training), which are on view at the Fine Art Society's Gallery, fully sustain the reputation of the painter. They include a great many architectural sketches in oils, exteriors and interiors, brilliant in effect, and full of light and colour, though slightly painted. Some excellent studies of animals should also be noticed.

THE exhibition at Mr. Wallis's gallery, open this week, contains two noteworthy works by Firlé, a North-German artist, whose work would at first sight suggest that it is by one of the French-American painters who have come to the front lately; it is far more delicate and transparent in colour than most German work. The two paintings by which this artist is illustrated are "Ein feste Burg" (34), a group of girls singing to the accompaniment of a piano, and "The Sower soweth the Word" (73), a school interior. This is a picture full of careful study of individual character in the various heads and figures; and it has the great merit of having something of moral beauty as well as of mere technique. Both paintings are in low and delicate tones, and form a great contrast in style to the majority of the contents of the gallery. Professor Müller is as powerful and as prosaic as ever in the "Camel Market, Cairo" (15), the crude force and heat of which are intensified by the juxtaposition of two silver-grey Corot's, one of them, "Le Lac de Garde" (18), an exquisite specimen of this painter's genius. "A Summer Idyll" (44), by Carl Marr, is a painting of cattle and figures remarkable for its truth of evening effect and for its harmonious composition in regard to line and grouping,—a source of expression in painting which is much neglected now, and the recognition of which is even thought pedantic by many, but which is a real means of expression in this case, at all events. The exhibition includes Meissonier's remarkable study called "The Smoker" (116); a good specimen of Heffner's effective but stagy landscape (103); two or three capital little works by Seiler; a curious study of a draped Egyptian head, by Professor Müller, entitled "A Living Sphinx" (109); and works of more or less interest by Rougier, Joanowits, Munthe, de Blaas, and others.

WE are informed that the exhibition of the "New English Art Club" will be open in April and May, at the Dudley Gallery, and that the "Jury of Selection" have already been elected from, and by the votes of, members; this being the first instance in this country in which this system of electing a "Hanging Committee" has been adopted. The list of jurors includes the names of Messrs. Aumonier, Fred. Brown, G. Clausen, A. Parsons, Jacob Hood, J. M. Whistler, and T. Stirling Lee. Mr. T. B. Kennington is the honorary secretary.

WE fear that Mr. Hodges will gain little by his appeal to the Institute\* with regard

\*On Architectural Competitions in general, with some references to one in particular." By E. F. Hodges, A.R.I.B.A.

to the Fulham Town-hall competition. Mr. Hodges is not happy in the statement of his case, which he contrives to make appear as if it were a wrangle as to the superficial area of a part of the building, instead of one involving an important question of principle, and his remarks with regard to the conduct of the competitors are too vague and general to excite the attention of the Institute or the public. The allusion to "the professional gentleman who permits his friends to see his drawings during their preparation, who is at pains to point out their merits, who is careful to let them know his motto, and does all he can to render impartial judgment difficult or impracticable," will, we much fear, be lost upon the generality of the public, who will see nothing to condemn in such practices, and perhaps a good deal to admire. It is an old proverb that a man who supps with the devil must have a long spoon; and an architect who enters into a Vestry competition cannot afford to be thin-skinned if he wishes to succeed.

IT has been announced in the daily papers that a circular was to be issued this week "to all interested in Manchester and the neighbouring districts" calling upon them to invest money in the Manchester Ship Canal scheme, as unless five millions of share capital are issued and accepted by the 6th of August next, the powers to construct the canal will lapse. The directors, it is stated in the circular, "confidently recommend the canal as an investment"; but directors have that way with them. We should be very glad to see the canal made, but we cannot think that the financial prospects of a scheme that requires to be nursed in this way are very brilliant. Capital has a way of finding its way into things that tend to remuneration, and of eschewing those things that are contrary to the same, and will not hearken to the voice of directors, direct they never so wisely.

ARCHITECT AND CONTRACTOR.

MR. HENRY LOVEGROVE, A.R.I.B.A., read a paper on this subject at the meeting of the Architectural Association on the 18th inst. In the course of his introductory remarks the lecturer said that when he selected the subject of his paper he had hoped not only to say something of architects and something of contractors, but more about the document which forms the connecting link between them,—the contract; but on the latter head he had been to a great extent forestalled by a very able friend of the Association [Professor Kerr], who had read a paper on the subject at the last meeting of the Royal Institute of British Architects.\* After some observations on the way in which the architect is regarded by other professional and business men, Mr. Lovegrove said,—

Much has been done by the Royal Institute of British Architects to define the status of the architect, and there is no doubt in my mind about the effect of the regulation as to admission to the Institute by examination only. If the Institute has been lethargic in the past, it is so no longer. Its many departmental and other committees are steadily working away to reduce the accumulated matter into proper order, and to so prune the branches that the stately and respected tree may bring forth truly excellent fruit. I grant that examinations will not make able architects, still less architects of high artistic powers; but none can deny that those aspiring to be architects should be able to answer the very fair and reasonable requirements of the Architectural Examination, which may be regarded as a definite minimum of the knowledge and skill to be possessed by one who seeks to belong to the ranks of the practitioners of a profession. The mere preparation for the Examination is of immense benefit; the systematic study and wide range of reading enlarge the mind of the student and extend his technical knowledge. In the furtherance of architectural education, theoretical and practical, this Association has led the van.

The new Charter of the Royal Institute of British Architects appears to meet the wants of the hour, and I for one cannot understand that the necessity existed for the

formation of another architectural society. Such a movement must tend to weaken the influence of the old and well-known society, and retard the progress of architectural knowledge, against which the activity of members, and awards at building exhibitions, can be no adequate compensation.

After some remarks on pupillage and the commencement of practice, Mr. Lovegrove continued—

I should like, while addressing a body of fellow-members of the Association, to be able to speak in glowing colours of the future of the architectural profession. On that point I am a pessimist, and as I cannot help my convictions,—the result of a considerable acquaintance with the building world,—I will briefly give my grounds for such belief. It is hardly necessary for me to refer to the good old times, gone for ever, when there was plenty of work to do, and very few architects to do it; but I will take things as they are in this present year of grace, the Jubilee year of one of the best sovereigns that England has had. Agriculture is in a deplorable condition; the country gentleman's income has been so considerably reduced, that neither he nor the other country residents can contribute to new buildings, the rates he pay for the sorely-needed cemetery or Board school being quite a sufficient tax on their impoverished resources. Under these circumstances, improvements to farm buildings, or extensive alterations to the mansion of the squire, are quite out of the question. In cities and large towns trade has been depressed for so long that nothing beyond really necessary work can be indulged in, and the comfortable suburban "villa" which was at one time built by the thriving shopkeeper is a thing of the past, as the formation of "stores" has nearly destroyed the retail trader. All these causes have reduced the work of the architect. The spread of education, and especially the almost universal instruction in drawing, will in time take much work out of the hands of the profession, and especially from the younger men, by depriving them of employment to prepare drawings for builders, and by their services being dispensed with altogether, the builder undertaking to provide drawings for nothing. Many large contractors can well afford to, and do, keep an architect; but in the future many builders will have sons who have not only learned to draw, but who have acquired considerable skill and proficiency. Meaning for builders has often been the means of gaining a few pounds by the struggling practitioner, but in the future many in the employ of the contractor will be able to perform such duties. I shall be told that the spread of education and culture will induce people to insist on the employment of able architects for public buildings, and I admit the truth of the assertion; but public buildings and decorative designs requiring the highest skill will not give employment to one-tenth of the practising architects. At present it appears to me that there are from three to six architects after each job, and so eager are they for work, that advertisements for designs, offering the most unfair terms, are answered by a large number of competitors.

The subject of competitions has received so much attention here that I can do no more than briefly refer to it. I have heard some strange stories of public and advertised competitions, of small premiums paid and the work carried out by a local builder and architect. One limited competition particularly struck me; the School Board of a rural district met to settle who should submit plans, and after the selection of two or three members of the Royal Institute of British Architects, the Chairman, a clergyman,—a man of education and, presumably, of culture and intelligence,—proposed a carpenter in an adjoining village as one of the competitors! There can be no doubt about the fairness of a professional arbitrator provided that the one selected be one of the highest position, but I can call to mind two instances in which the arbitrator, after the premiums were paid, submitted a plan of his own and eventually carried out the work! I noticed in a church newspaper last week an advertisement addressed to the clergy by an architect who "offered his services on moderate terms,"—a clear indication that many must be finding the struggle severe, and, if they have not a good connexion, almost hopeless.

I have shown that the outlook is not bright; but still, I must urge you to work hard and

make a good fight; you have put your hand to the plough, and there must be no looking back.

The future of that branch of the profession to which I have more particularly given my attention has an outlook even more gloomy than that of the architect proper. The fierce competition of these days necessitates the acquirement of every pound, and the commission on the quantities is a temptation, so that dahlhing in quantities seems to be getting every day more common. I think that a knowledge of quantity-taking is most useful to every member of the profession, but that it is better for an independent surveyor to prepare the quantities, and not the architect of the building. Some bills of quantities, and especially provincial ones, can hardly be said to be worthy of the name, although the commission charged is the maximum. It is only reasonable to infer that the man who now and then takes off quantities cannot possess the same skill as one who is constantly engaged on the work. I notice that in the heads of a paper which will shortly be read before the Institute reference is made to the system of taking out the quantities as "made intelligible to the architect." It is impossible to anticipate what the lecturer may say upon this point, but it appears probable that he will advocate the provincial method of writing descriptions of the items and partly disposing with abstracts. This method may render it easy for the architect to find the items, but I maintain that the end and aim of a bill of quantities is that the work may be fairly and accurately priced without reference to the architect's after-convenience; and after all, if his specification is sufficiently detailed and his drawings clearly made and well figured, very little reference need be made to the quantities.

The word contractor is somewhat comprehensive, so I will explain that I refer only to the building-contractor. At the present day in London the entire work in erecting and completing a building is undertaken by one individual or firm,—a very nice, comfortable arrangement for the architect. In many parts of the country some five or six separate contractors are engaged, and seem to manage very well; but the work of the architect is greatly increased by this plan. My experience proves that two or three individuals privately arrange to submit a lump-sum tender for a country job; thus the bricklayer, carpenter, and plumber join,—in some cases the name of one appearing, in others those of two. In other cases I have frequently known the contract taken in one name, but of course the work in its various branches is undertaken by other local tradesmen; and although the architect can only officially recognise one contractor, he is often in communication with others, and if not careful may be mixed up with subsequent disputes.

Many of our building firms carry out excellent work as regards the actual erection of the building, but finishings are often very improperly done for want of a responsible and competent head of the subordinate branches. The general foreman thoroughly understands his own branch of building, but in such an important trade as that of the plumber, the work is not so skillfully devised or so thoroughly overlooked as where an experienced master plumber is responsible for it.

We in London are often inclined to think that country work is inferior to that done in London, and we are wrong. I have seen first-class work turned out by country artificers. Only last week I looked over some joinery prepared in a distant provincial town which could probably be equalled by one of the best London firms, but would not be excelled. The country contractor is nearly always a practical man, who has been brought up to the business, and he gives continuous personal supervision. Our larger London contractors could not personally supervise all their work, so that an efficient staff becomes necessary, and I can testify to the great skill and ability of some of these gentlemen.

A contract has been defined to be an agreement between two or more persons to do some definite thing or things. A contract may be express or implied, and, if express, the terms are usually defined. For example,—A is about to build a house, and agrees with an architect that the total amount of remuneration for services shall be 50l., with a definition that two sets of tracings and two copies of specification, shall be supplied, and all superintendence. This would be an express contract; but if A simply

\* For summary of this paper see last week's Builder, p. 453.

structed the architect to prepare drawings, &c., then there is a contract implied on the part of A to pay the reasonable charges of the architect. An architect is not a party to a building contract; he is the arbitrator under it, as for many years the conjunction of architect and builder has been abolished, and no architects of any position are connected with the execution of building contracts or the supply of materials. I think that civil engineers are not so particular in this respect, as I have known of eminent firms in some cases acting as engineers to plan and superintend works, and in others to take a contract and execute the same. If I am in error or have been misinformed I regret it, as I much respect the profession of the civil engineer.

The first step in a building contract is the engagement of the architect, and this is binding if not in writing; thus, a client may call and request you to prepare sketch-plans, and afterwards return and ask you to prepare the working drawings, which in due course you do. You are retained and engaged to perform a particular service, the retainer being a request in terms to the architect to hold himself engaged. If an architect is engaged to perform certain duties for a particular term over a year, then such retainer should be in writing. As a matter of business it is well to get a letter actually ordering the work to be done, and to word your own letters to the client so as to imply the fact of your being retained or instructed to do the work. With some persons it is absolutely necessary to get a formal written order, to prevent the necessity for going to law; and having advised you to get the written order, I add the precaution,—get it stamped. If engaged as architect to a public body or corporation, it is essential to get a written appointment under seal. Although one would suppose that the minutes of the corporate body, if correctly entered, would contain quite sufficient evidence of the decision to engage a particular architect without requiring the production of a formal deed, yet in law such appointments are required to be made under seal.

An architect is supposed to exercise care and skill in the practice of his profession, and by holding himself out as a member of the profession undertakes to use a fair, reasonable, and competent degree of skill.

Actions against architects for want of skill are fortunately very rare; failures in construction may and often do arise from some neglect on the part of the builder, and in cases where an incompetent man gets into a muddle the matter is, if possible, concealed from the world. But actions by architects to recover their charges are more frequent, and usually arise where contemplated works have not been carried out. The client having no building for his money thinks that a very small sum will compensate the architect for his plans and specification. Still less does the ordinary mind grasp the idea of paying for quantities for abandoned work; yet, after due explanation, I have generally obtained my fees,—not always, I admit, for the whole sum.

We shall get in time a set of conditions of contract more clear in some respects than the "Heads of Conditions of Contracts" settled by the Special Committee of the Royal Institute of British Architects and the London Builders' Society, and until we do it will be well to use those. Many architects settle for themselves, with or without the advice of a solicitor, what shall be the form of contract in use in their offices, and some such forms are far better than the very wordy documents drawn up by solicitors if left to their own devices. If any of us wonder at times at the builders objecting to certain clauses in the contract and desiring their modification, we should remember that the arbitrator under that contract is paid by the opposing party, the employer. The contractor is, therefore, justified in seeing that the terms are equitable, as, although he may have a confidence based upon tradition and increased by acquaintance with the architect and a knowledge of his fair dealing, the architect may disagree with the client, and another, with very different views of fair dealing, may by his arbitrary conduct subject the contractor to heavy loss. "Extras" will arise, and they are often of the employer's own making. It is well to provide a provisional sum for contingencies, or, at least, a few rods of brickwork or something similar, to prevent unpleasantness at the completion of the work, as you have not only to get over the

fact that the client objects strongly to the payment of any sum beyond the contract, but he feels that he is a much injured man in not being relieved of all risks. Young architects especially are afraid to tell the client of the extras as they arise; hence unpleasantness at the end.

I am not an advocate for the quantities being made part of the contract in law, although they are generally so in fact. The great use of quantities in settling up is that there is a definite basis for the settlement of variations. Quantities are often very badly priced. I have been astonished when measuring up at the completion of the work to observe the want of system and the inequality of the pricing, while the moneying-out is often very carelessly performed. I have known many instances of this, such as a large quantity of an article at 1s. per foot being carried out at 1d.; a large provisional sum carried into the rate column instead of the pounds; with errors in casts innumerable, both in the body of the bill and in the summary. Your duty, gentlemen, will be to see that your clients get all that they contract for, but you must never forget that you are to act fairly and honourably to the builders. Sharp practice never has succeeded in the long run, and it never will.

[For a report of the discussion which followed, see p. 165].

#### LECTURES AT CARPENTERS' HALL: JOINERY.

As briefly mentioned in our last, Mr. Francis Chambers, F.R.I.B.A., lectured on this subject at Carpenters' Hall on the 16th inst.\* After an interesting historical sketch of the trade and of the position and functions of the joiner, the lecturer dealt with the adaptability of different woods to the requirements of the joiner, and went on to say,—

The boundary between the provinces of the carpenter and joiner is vague and ill-defined. Very often the one or other invades the domain of his fellow-craftsman; thus in rustic buildings the carpenter nails down the rough oak or elm boards upon the joists, &c., and practically completes the floor; but in business of a higher class the floor proper is now always the joiner's work. Good flooring is a test of a builder's work. The neasey floor, with creaking boards and splintering edges, gaping joints and curling section, compared with the close platform, flat as a table-top, rigid and smooth, with joints almost imperceptible, marks the difference between the cheap house, built to sell, and the house built for the man who means to dwell in it and enjoy it. Old surveyors, when I was young, used to carry an old worn gd. to test the joints, and no floor would pass muster when the gd. would penetrate. Few of the modern floors can stand that test. One hundred or fifty years ago there were comparatively few builders in London who did not store their floor-boards for years before they used them. Now, the builder gives his order to the saw-miller, and in twenty-four hours he gets an acre of floor-boards, and they are laid complete within a week. It is not surprising that the result is unsatisfactory, even if the deals have been long stacked. The sawing of them into boards exposes fresh surfaces of fibre to atmospheric influence, and the wood begins to shrink and warp and crack. The boards should be stacked under cover for at least a year before they are laid. Our old master builders kept them stacked for five or six years; but I fear only the pianoforte makers keep that good custom now.†

There is no royal road to the efficient seasoning of timber. The desiccating processes seem to have only partial success. They have in some cases a tendency to make the wood over-sensitive, or absorbent of damp, and I have seen floors of desiccated wood well laid, by change of weather swell and curl and crack, and even start the nails. Either for good old port or old deals, time seems to be still of the essence of the contract.

The hand-to-mouth practice of our time has led to a reduction of the width of floor-boards. It is evident that a plank 5 in. or 6 in. wide will not shrink so many parts of an inch as one 9 in. or 10 in. wide, the aggregate shrinkage being spread over double the number of joints;

but the effect of dock-planking, with joints some 3 in. apart, is not so pleasing as in a really good floor of wider planks, and the labour is of course greater. The tendency of some boards to curl and take a concave outline is corrected in good floors by ploughing and tonguing the joints, and in later times the tongue is frequently of hoop iron, inserted into a saw-cut on each edge. This plan, when the board is thick enough to be nailed through the edge, forms a very close floor, almost water-tight and dust-proof,—a great advantage where there is no ceiling beneath it. It has a disadvantage in the difficulty of access to the cellular space between floor and ceiling. The iron tongue stops the saw or chisel, and the floor is destroyed in taking it up.

In the old times, a floor once laid was rarely disturbed, but now, when the gasfitter, the plumber, the hot-water engineer, and the electrician hide all their abominations beneath the joists, a floor is rarely at rest.

The joiner should lay a straight-edge over the joists on which he is about to lay a floor, and if any of them do not come even with it they should be furred up or adzed down; inequality in the joists is a frequent cause of a bad floor. If the floor-board does not take a firm bearing flat on every joist there will result a floor uneven, or creaking at every step. Whenever practicable heading joints should be avoided. There are few rooms exceeding 24 ft. in length, and floor-boards can be had in greater lengths. The nail-heads should not be seen in a good floor. If they are punched in they lacerate the wood, and it splinters. If countersunk and plugged, as was sometimes done, a row of ugly spots was left; the boards should be edge-molded,—it entails more labour if done carefully, but is well repaid by increased wear of carpet and improved appearance of the finished floor. It is still more desirable now the good custom obtains of showing a wide margin of the stained and wax-polished floor.

In laying oak flooring it is safer to lay a rough 1 in. or 1½ in. deal floor first as a bed. Oak is more rigid than deal, and will not adapt itself so well to irregularities in its bed. It, moreover, gives opportunity to arrange the floor in diagonal or lozenge pattern parallel to the lines of joists, and the oak can be reduced to ½ in. or even ¼ in. in thickness.

Parquetry, from the French *parquet*, which simply means the floor, makes tentative efforts to obtain a hold with us, but without much success. It depends much on glue or cement, which is much affected by the dampness of our climate; but for shops, show-rooms, and picture galleries it is admirably adapted. It is easily swept and kept clean, and saves the cost of linoleum or carpet.

The door was probably the earliest work on which the joiner tried his prentice hand. It was, at first, a very simple structure; vertical planks joined together formed a flat sheet or table top of wood, which was then cut or sawn to the size of the opening it was intended to fit. All ancient doors were of this type. They were sometimes, as in the case of Solomon's Temple, carved on the face in low relief. They were studded with bronze or iron nail-heads, shaped, and arranged in patterns, at d (but not till many centuries had passed) they were decorated by the curled and twisted filaments of the wrought-iron hinge, which, like a growing plant, spread its foliage in fanciful and beautiful curves over the rough surface. The vertical planks were at first set side by side with square edges, secured together by nails or wooden pins to cross-bars at the back, or a sinking was formed in the connected planks and the cross bar let into the substance of the planks for half its depth; or, to get a tighter hold, and to depend less on nail or pin, the edges of the groove were splayed and the cross-bar dovetailed. The cross-bars were braced with diagonal struts to throw the weight of the heavy door upon the pivot. The edges of the vertical planks were related or grooved and tongued, so that when the wood shrank it should not leave an open seam, stitched, as it were, together with dovetails or pins to reduce the weight of the door by spacing the vertical planks fitting in the interval with a thin board. Halving the cross-bars on the two extreme styles and tenoning the intermediate styles into the cross-bars or rails was the happy thought of some Medieval joiner, whose stock of wood, perhaps, had run low, or whose heavy doors had displaced the pivot and struck fast against the stone reveal; however it chanced, he became the unconscious inventor of the panelled door

\* For reports of the previous lectures, see *Builder*, pp. 383, 424, ante.  
† Not all of them, for there are "jerry" pianofortes as well as "jerry" buildings.—Ed.



in all its infinite variety. And it was a great advance. The door became lighter and stronger, and adapted to the simplest decoration as well as the most elaborate.

It is a mistake to mould the bottom edge of a panel. It becomes dust-trap, and, in external doors, frequently a water-trough for thirsty sparrows.

In early joinery the moulding of the panel was always cut on the edge of the stile or rail. In modern joinery the moulding is generally applied on the face of the panel, butting on the square edges of styles and rails. In good work it is rebated to fit into a groove.

The labour entailed in stopping or mitreing the moulded edge is considerable, and where machinery was introduced it was found impracticable to use it for this purpose; but the applied mouldings are produced at a cost so slightly exceeding the prime cost of the slip of wood that it is not surprising they have become almost universal, except in high-class work. I note that in the Palace of Justice in London there is not a single case of applied moulding,—all decorations in the beautiful joinery of the palace springs from the design of its framework, and is a lesson to the joiner in honesty and fitness. Formerly, the panel was narrow,—did not exceed the width of 9 in. or 10 in.,—but about the end of the sixteenth century they were much wider. A door, instead of two styles intervening, making it three panels in width, had one, or sometimes was framed as a two-panel door, with panels 2 ft. 6 in. wide, but their wood was dry and well-seasoned. They could do with impunity what would not result in total failure; panels of such a width would now soon be lattice work; but a panel may be any width, if the joints of the boards of which it is built are shown with the junction either rounded or V-jointed, and they can be treated with slight labour, so as to be highly decorative.

There is a French proverb, "A door must be shut or open." Some modern doors hardly conform to it, as when shut they are still open to draughts, to smells, even to vision; but it is clearly the function of a door to swing upon its pivot or hinge, and close at will the opening to which it is attached. It should be hung firmly, open freely, and close exactly upon the rebate of its frame. Its edge must not touch the jamb, but so nearly touch it that a worn sixpence should be the measure of its windage. The pivot was the earlier hinge, and when the door was on the face of the wall,—covering the opening,—not set in a rebate of the masonry it was the best form of hinge. It enabled the door to turn through the half circle and fall back flat upon the wall. The pivot hinge is still used. There are some conditions in which nothing else is practicable, as in swing doors, and the outer doors of lobbies, where the external door is required when open to form the panelled side of the lobby and to be flush with the frame. A very good example is the entrance doorway of the Carlton Club. But the difficulty of hanging or unhanging a pivot door was great. The joiner had not yet invented the contrivance now so familiar, by which the pivot becomes a short rod concealed in the hanging stile and is raised or lowered by a screw thread.

The pivot fell into disuse, and the clasp hinge,—embracing the hanging stile, and throwing out long arms and branches along the rails,—became the hinge which, while it greatly strengthened and adorned the door, was easily fixed and as easily removed.

At the end of the seventeenth century some barbarian invented the lutt hinge. It was weak and ugly,—it held by screws only to the edge of the door and to the surface of the jamb, but it was cheap,—the labour to fix it was reckoned by minutes, and it could be cast in iron or brass and multiplied in thousands from a single pattern. In the struggle for existence the hinge of beauty and of strength faded too quickly into nothingness. It has, within the experience of most of us, revived to a small extent. I am glad to hear that the cheap cast shams, entirely disconnected with the hinge, and which once threatened to be the fashion, now cover the shelves of the ironmongers as unsaleable articles.

In the practice of the architects who flourished from the close of the eighteenth century to the reign of William IV., curved surfaces of walls and partitions were more frequent than they have since been. The ends of rooms, the halls, vestibules, and staircases were planned circular or elliptical, and the doors of them were made

of necessity circular on plan; and as there was also a fashion of circular-headed or elliptical arched opening, it was a palmy day for the joiner. He had reached "circular-circular," as the measuring surveyor calls it,—"double double toil and double,"—but the square of double when the bill came in. The tortured wood was strained and twisted, glued and blocked, built up on moulds with infinite wasted labour, ingenuity, and skill.

I remember once planning a quadrant Spanish mahogany partition, about 12 ft. radius, which had two doors in it. They were to fit semicircular arched openings. I received tenders for the house; they were far above my estimate, and my client hesitated to accept it. The first glance at the priced quantities disclosed my mistake. This unlucky quadrant with its doors had been priced at a fabulous price, bearing a large proportion to the whole cost of the house. I have steadily avoided "circular-circular" ever since.

These circular framings were very frequent in those days, and you will find in the "Joiners' Assistants" and "*Vade Mecum's*" of the period elaborate instructions for the construction of columns and diminished columns, of niches and sunk hemispheres, and many other curious contrivances, of one and all of which I say, "Avoid them, for they are shams, shallow conceits to distort and caricature in one unsuitable material forms which are natural and fitting in another." On the screen are two examples of the kind, diminished columns in King's College, London, where the wood casing is, as usual, the mask of the iron columns or stanchion which is doing the work.

The lecturer, in conclusion, proceeded to treat of windows, shutters, and staircases.

#### TIMBER HOUSE FRONTS.

This was the subject of the fourth lecture of the series, which was delivered on Wednesday evening last by Mr. Lacy W. Ridge, F.R.I.B.A.

Mr. Lacy Ridge said it was within the comparatively narrow limits suggested by this title that he wished to speak, partly because the subject of "Half-Timber Houses," or, as they might more properly be called, "timber-houses," was so extensive and complicated for anything like adequate treatment in a single lecture, and partly because, by confining himself to one portion of the subject only, he hoped to be able to consider the treatment which it had received at some four different and distinct periods of architectural history, which would enable them to see how men working with varying materials, and under differing surrounding circumstances, had solved a problem in all its essential points alike, and had produced results distinguished from one another by marked characteristics, each style being in its way admirable and true to the causes which gave it birth. He proposed to start the consideration of the subject at a period when architectural art was far advanced, and to call attention to a class of building specimens of which might be easily reached by any who had retained a healthy love of fresh air and exercise, at the cost of a few pence expended on a railway fare just to put them beyond the suburban region which had been handed over to, and, alas! as a rule, rendered hideous by, the speculative builder. At the beginning of the fourteenth century, beyond which few, if any, existing timber houses of this country dated back, Gothic architecture had been flourishing in this country for more than a century in its purest forms. Its most important works, and the noblest of the remains which had come down to us, were of stone; but whatever building or manufacturing work was undertaken at that period always showed in its design a sense of fitness, a following out of the nature of the material employed to its legitimate conclusion in design that argued a high sense of constructive art in the workman,—the result of traditional training in his trade guild. Another peculiarity of this epoch in England, which continued for some time afterwards, and in a slight degree reached even our own day, was the clearing, as society quieted down and population increased, of the great woods by which large portions of the surface of the country had been covered. Where the woods were thickest and the largest clearings were made, there oak, the characteristic timber of England, was most plentiful, and there naturally timber houses most abounded. No counties exceeded in fitness for the study of the subject the Home counties by which London was

surrounded: Essex, Hertfordshire, Surrey, and particularly the weald of Kent and Sussex. The great forest of Anderida, extending over the Weald,—it was said to be some 100 miles in length and thirty in breadth,—shut off the little kingdom of Sussex, the smallest of the Heptarchy,—that is the South Downs and the little strip of land between them and the sea, whose watering places are now so familiar to the Londoner,—from the outer world. In later times that forest furnished boundless stock of material for houses, and afterwards for our ships of war in the days of our "hearts of oak." Therefore timber houses abounded in that part of the country. The lecturer then called attention to an illustration of an old house, formerly the vicarage of Alfriston, in Sussex, of which he said that whatever of art there was in its front, whatever there was in it capable of giving us pleasure, was done without decoration of any sort; a more genuine piece of carpentry it was impossible to imagine. The charm of such buildings consisted largely in the naturally-twisted outlines and roughness of the oak, and in the lavish profusion with which it was used. One might study such buildings as this for picturesque quality of outline, for variety of light and shade; but one could not imitate them in Baltic timber "sawn like square," and valued at per foot cube. In some instances the floor was made to project to the sides as well as to the front, in fact, that was very common in corner houses in our villages. In such cases a principal joist or hinder was set diagonally across the corner, and was carried on a corner post with brackets set diagonally both outside and in. A house at Charing, in Kent, illustrated this point. By selecting pieces of the tree where branches jutted out from the main trunk, the post and brackets were got from one piece of timber, and we could not doubt that the material that happened to be available largely influenced the design. The house at Charing had unfortunately been rather badly treated, and, for some reason or other, an important part of the upper bay had been plastered up and its gable weather-boarded over. Nevertheless, it was a good study, in which the bay-windows were made to give variety to the projecting upper stories, modifying and breaking up the very heavy shadows and greatly increasing the play of light and shade and the interest of the building. The windows themselves, with their solid moulded mullions and transoms, were fairly complete. The windows had been subjected to such continuous alterations that it was difficult to find an ordinary window in a straight wall in its original condition. Where they were not content to mould and rebate the main timbers and glaze into them, a process like that shown on a door-head at Shoreham, in Kent, might have been used. The lintels and posts were moulded; the head was a shaped timber placed in a rebate, and the jumbs are moulded and had a splayed joint next the main timbers. The brackets at Charing were of a somewhat late and conventional type, probably seventeenth century. A simpler and earlier form was shown in the corner of a house at Eynsford, Kent. In that case the bracket was a piece by itself, tenoned into beam and upright. This house was very picturesquely situated near the bridge in the village, and was a striking object. It had a good barge-board, apparently of the fourteenth or early fifteenth century. Barge-boards gave an excellent finish to the gables, and were frequently, or, in fact, almost always, richly carved. As they did not require any great thickness of material, and could easily be carved in deal, they had at times been much used in modern work; but not, the lecturer regretted to say, with such taste or such success he confessed to some feeling of prejudice against that partial detail. The old ones were always excellent, and were merely boards carried on the projecting ends of plates, purlins, and ridges to cover their ends and protect the gable wall. Occasionally the two boards were framed into a central flutal or drop at the ridge. The way in which plates were cut to take them was noteworthy. They did not cover the projecting eaves. When that was tried the effect was bad. Alluding to a small drawing of some houses from Chester, showing enriched semicircular arches, panels and strings, grotesque pilasters, and bold consoles or brackets, the lecturer said that there were not wanting those who wished that the use of these

Classic forms had stopped here, and that our native arts had been allowed to continue their course and to expand unaffected by the desire to make things look like something else, and to reproduce in a shop-front the columns of a temple of Jupiter. Such things as these, however, did not affect the houses far away in the country, and timber houses of the genuine kind continued to be built during the course of the seventeenth century. In Hertfordshire and Essex plaster panels were to be found relieved by surface decoration of lines drawn thereon in more or less freely-treated geometrical patterns. After the revival of brickmaking, the panels were not infrequently filled in with brickwork, sometimes set in herring-bone patterns, and consisting of bricks some 2½ in. wide, and longer than our regulation brick. The introduction of the piece of bright colour which bricks afforded was often valuable, and added to the picturesqueness of the building. Large numbers of these timber houses and cottages were now remaining in our old villages and towns in disguises which might not at first sight be recognised. Although the construction was very substantial, and it was well known in our villages that these houses were warmer and more weatherproof than the great mass of the more modern cottages, still they must in course of time have required repair. The plaster filling-in could only exceptionally have lasted more than a century or two, and if the timbers, especially those standing on the ground, or having an end grain exposed, were neglected, and the damp allowed to get in, decay must have ensued. What a temptation, then, did those fronts present to the plasterer, who, thinking within himself "There is nothing like plaster," remarked aloud, "Lor', sir, you'd better let me plaster all over those rough and rotten old timbers [probably a little sap had gone off an arria or two]; it will never make a smooth surface." As if anybody in the world but the plasterer wanted a smooth surface! However, on went the lath and plaster all over the different stories, leaving nothing but the projecting strings, which he could not manage to cover up, and which, moreover, accorded more or less with the fashion of the period to show the original design. It was pretty much in that condition of plastered-up, all but the string-courses, the openings, and the gables, that such few old timber house-fronts as had come down to us in London were now to be seen. There were the houses in Holborn, where Middle-row once was; houses in Wych-street, Strand; and possibly a house or two still standing in Bishopsgate, at Aldgate, and where the famous inns once were in the Borough. All that gave real value to them as timber houses was covered up. Where that plastering process had been adopted in the country, though the front might be concealed, we often found the ends or hack still showing their old construction. He (the lecturer) had great respect for bricks and brickwork, and no desire to disparage the neat and trim formal brick fronts which, under the Dutch influence of William III., were adopted in this country, and were really "Queen Anne" architecture,—unlike, to the last degree, to some of the fantastic vagaries that now went by that name. Only he should prefer that the said formal brick fronts should be applied to houses of the same period. Very largely, as a matter of fact, they were built up and had incorporated with them old timber house fronts. Not infrequently, along the great roads out of London, and in our prosperous market towns, the brick house of Queen Anne, as one supposed, hid behind its ample parapet an old timber house. When one went round to the back the timber work was visible enough. Fashion led people as far as refronting their houses, but not as far as rebuilding them. There was a curious invention, much used in Lewes and its neighbourhood, for giving an apparent brick front to old wooden houses. This consisted of tiles which looked like bricks, having usually a black glaze; but which had, however, an upper part which was capable of fitting in behind the next course, through which nails for securing the tile to the boarding were driven. The illusion was very perfect, and many persons of intelligence who had lived in the town all their lives were quite unaware that these fronts were not really brickwork. Such tiles were also a good deal used at one time in Brighton and Worthing, but, being probably on a more slender fir frame, they had an uneven and shabby look. There was one mode of covering timber framing for which the lecturer felt great sympathy, and that was hy

weather-tiling. It had been used for centuries in the Weald, and of late years had been adopted very largely in our so-called "Queen Anne" work. As a protection against the weather it was very perfect. Its red, toning more gradually than the tiling on the roof, gave great variety of colour. Being itself picturesque, and fitted into the quaint shapes of the gables and other parts of the old houses, it added a charm to the buildings seen against the greens of the well-timbered country. In many parts of the Continent timber houses, designed on principles similar to those recognised in this country, were to be found. Normandy and Brittany were full of them; the Isle of France, Belgium, the Rhine, and parts of Germany, had many admirable specimens. Those best known in this country were chiefly town houses, some three, four, or more stories in height. They had the same framings and projecting floors. The braces, however, and the timbers generally were straight, as though their trees were of straighter growth, and the St. Andrew's cross was a constantly recurring feature. Lintels, with heavy mouldings, stopped at the ends, played an important part in the corbeling out of the stories, the weight of work over being in such cases carried on the principal joists, and not distributed over the lot. A good deal of curving and ornamental work was introduced in the brackets and lintels, and there were dormers of the most charming character to be found. One important feature not found in English work was the trussed barge, framed up of different timbers of no great scantling. A few weeks ago there was published in the *Builder*\* a sketch of a house-front in Rouen. The house had perished, but the front had been preserved, and was really a beautiful piece of joiner's work. The lecturer then proceeded to refer to Swiss timber houses, as to which he said that the bracketed paranas were very curious, and exactly opposite in principle to our English brackets. Some of the framed brackets under eaves were very strange. As the work was executed in practically the same material which we used now in this country, the details of the joints were not only curious, but worthy of the study of our own practical carpenters.

[The next lecture will be given on Wednesday evening next by Professor T. Roger Smith, who will treat of "Bricks and Brickwork."]

#### LEEDS AND YORKSHIRE ARCHITECTURAL ASSOCIATION.

"BUILDING WITH BEAUTY" was the subject of a lecture delivered by Mr. P. T. Baggalay on Monday evening before the members of the Leeds and Yorkshire Architectural Association, Mr. C. R. Chorley presiding. The lecture was in the form of a supposed conversation between architects of more or less experience, and in the course of the dialogue attention was called to the great variety of opinion, and even of differences, existing in the profession as to artistic matters. The inside of a house, one of the persons to the dialogue was made to say, might be for a man's self, but the outside was for the public; for an exterior was a matter of general interest. It not only helped to form the public taste, but would benefit or defile, according to its character, the whole landscape. What was really ugly and in bad taste was often regarded by the public as passable or inoffensive, and was sometimes praised for the very qualities for which it should be condemned. Practical matters, of course, must be attended to, and it was to be regretted that the designs which exhibited the most artistic skill were so often found defective in practical requirements. It should always be remembered, however, that in public buildings, beauty, both inside and outside, was of greater importance than in structures reared by private individuals. A noble and beautiful building was an illustration of the arts which a town was capable of producing. When a Government, imperial or municipal, recognised its duty, and set an example to its people in the admiration and encouragement of art, it had always found its reward in the great thoughts and noble aims and ambitions which resulted, and which dispelled those sordid and impure habits that undermined the lives of nations. Was not, the lecturer asked, the knowledge daily growing that the crutch on which the architect had leant

so long,—the crutch of imitation of the past,—was no guide, and useless to help him forward? Had not this knowledge caused some to kick away the crutch altogether? Was it not, then, possible to lay down a few principles on which every one could agree, and which might serve to guide them in building with beauty?

On the proposition of Mr. Connon, Mr. Baggalay was accorded a vote of thanks for his lecture.

#### BRITISH ARCHAEOLOGICAL ASSOCIATION.

At the meeting of this Association on the 16th inst., the Rev. S. M. Mayhew in the chair, it was announced that Sir James Picton, F.S.A., had been elected President of the coming Congress of the Association at Liverpool. The Rev. Dr. Hoopell sent for exhibition a series of photographs of some remarkable pieces of sculpture found at St. Andrew's, Auckland. They are of Saxon date, but vary considerably in style. They consist of fragments of shafts of crosses and other pyramidal objects, sculptured slabs, and the like. Some of the shafts are covered with interlaced foliage and figures of great beauty and delicacy of execution, in high relief, evidently executed with a chisel, and by an artist of ability. They open a new chapter in the history of early art. Mr. Loftus Brock, F.S.A., described a large number of jettons and abbey pieces, found in England, and also, for comparison, a series of French examples. A paper was then read by Dr. Woodhouse on the sepulchral epitaphs in Fulham Church, which was accompanied by the register which he had compiled of the whole of the inscriptions in the church and churchyard. After referring to many events in the old history of the parish, and of the changes which have altered its aspect, he passed in review the more ancient of the inscriptions, some of which still exist in the recently rebuilt church. The paper was illustrated by notices of several of the Bishops of London who are buried at Fulham. Dr. Woodhouse received well-merited thanks for his painstaking labour. A paper was then read by the Chairman on certain sculptures of Roman date found in London, and it was accompanied by an exhibition of Roman relics mostly found along the course of the Walbrook. A discussion ensued, in which Col. Adams and others took part.

"George Varrentrapp, M.D., Sanitarian and Philanthropist," was the subject of a lecture delivered at the Parkes Museum, on the 17th inst., by Dr. E. F. Willoughby, Dr. George Buchanau, F.R.S., in the chair. George Varrentrapp, the pioneer of sanitary progress in Germany, was born in 1809 at Frankfort-on-the-Main, where his father was a physician of repute. In boyhood he gave but little promise of the extraordinary industry and energy that marked his subsequent career, but it was at the university that his character, like that of so many other great men, first developed itself. At the age of eighteen he matriculated at Heidelberg, and afterwards went to the University of Strasburg. The outbreak of cholera in Frankfort recalled him from a tour through the principal cities of Germany, in which he had formed friendships with the leaders of thought and action,—political, social, and scientific,—and for ten years he assisted his father in his hospital and lunatic asylum, as well as in his private practice. In 1842, when thirty-three years of age, he succeeded his father in his appointments, and married, after having made a wider tour through Belgium, Holland, Great Britain, and Ireland, for the purpose of studying the arrangements and administration of hospitals, asylums, and prisons. He was soon afterwards elected a member of the town council of Frankfort, a position he held to the last, and which enabled him to carry out reforms in every department of municipal administration, the result of which has been to make Frankfort what it is,—the healthiest city in Germany, and, perhaps, of its size in the world. He initiated the movement in favour of sanitary reform in Germany; founded the German Society of Public Health, and the section devoted thereto in the Association of German Naturalists and Physicians, as well as the *Vierteljahrsschrift*, or quarterly journal of public health, which he conducted until his death.

\* See *Builder*, Feb. 10 last.

## THE ARCHITECTURAL ASSOCIATION.

The eleventh meeting of this Association for the present Session was held on Friday, the 18th inst., at 9, Conduit-street, Mr. J. A. Gotch (President) in the chair.

The following new members were elected, viz., Messrs. A. D. Toll, E. C. Arnold, A. J. Crichton, E. J. Stubbs, P. Goddard, and H. C. Flack.

Mr. H. Lovegrove then read a paper on "Architect and Contractor," the greater part of which we print on another page.

The Chairman, in opening the discussion, said Mr. Lovegrove had mentioned among other things that in the provinces quantities were taken out by the architect instead of by the surveyor, which proceeding he naturally and logically, from his point of view, objected to. On the other hand, the provincial architect might take a different view of the matter. But there was this to be said about quantities to be used in the provinces, that in small places the builders were unaccustomed to elaborate quantities, and were puzzled by them. He had had elaborate sets of quantities taken out by London surveyors, which were quite wasted on the provincial contractor, and there was a great deal to be said for quantities being taken out to suit the local understanding and customs. The country contractor was very different from the contractor in London. In the country the mason took the masonry and brickwork, the carpenter took the carpentry and joinery, and then there was the plumber, and it depended on circumstances as to which of the three men was looked upon as the contractor. It was, of course, more convenient to the architect to have only one man to deal with, but the advantage of the country system was the personal supervision of the man who was responsible for his own particular trade, and above all it was an advantage to have the plumbing work done by a competent man who had a personal acquaintance with it. As to the document which was the basis of the work, the contract, he had found it advantageous to have a printed contract, because it was obvious to a man at once that it would contain probably nothing but what was usual, and it could be grasped better than a written document of ten or twelve pages. There was no doubt that the contract the heads of which had been drawn up by the Institute was a much more favourable document to the contractor than a good many of the contracts used in works carried out under Government superintendence, some of which really appeared to deliver the contractor bound hand and foot into the power of the architect. It was absolutely necessary to have a certain sum allowed for contingencies, and he invariably regarded that as being an amount intended not to meet any extra orders on the part of the client, but rather matters which could not in the nature of things have been foreseen in the contract itself. In contracts also questions of great difficulty sometimes arose when mistakes had been made by the contractor; for instance, when he had made an error in casting, and had thus had the job. It was not easy to correct an error of that kind. Builders, after pricing out their quantities carefully and reasonably, sometimes took a percentage off in order to get the job, and what were architects to do in a case of that sort if they regarded it as a schedule of prices, because owing to the percentage taken off the total, every price ought to be somewhat less? It was a great help in considering tenders to observe whether they were consecutive or not, because if they ran evenly it was almost a certainty that they had been carefully priced out, and did not contain any glaring error.

Mr. E. W. Mountford proposed a vote of thanks to Mr. Lovegrove for his paper, which he said contained many ideas. Every point that had been touched upon was one with which he (the speaker) had experienced more or less difficulty. He agreed with Mr. Lovegrove as to the desirability when doing work for public bodies to have some formal contract, and in the case of a corporation to have it under seal, without which the document was not worth the paper it was written upon. Mr. Lovegrove naturally objected to architects taking out ordinary quantities. There was a good deal to be said on the other side, but that was hardly a question before the meeting. He had had some peculiar experiences of the manner in which quantities were taken out; but he could not agree with Mr. Lovegrove in considering all

mention of the "labours" as useless. Builders, he believed, read those, although they did not price them in detail, and from the amount of labour they saw mentioned they priced the material. The question of "provisions" in connexion with the quantities was very striking. A builder who did a large amount of work for a certain public body told him that when he began competing he was always at the top of the list; when he deducted 2½ per cent. he still found himself near the top; when he took off 5 per cent. he got about half way down; on deducting 7½ per cent. he was near the bottom; and when he took off 10 per cent. he was often at the bottom of the list and got the work. But in pricing up any "extras" at the end this man would get 10 per cent. more on these than he received for the actual work under the contract. Mr. Lovegrove had referred to the commencement of his paper to a certain society of architects; though that was not, perhaps, the place to express one's opinion of the said society, he would have liked to say a good deal on the subject. All he would say was that that body had done more harm to the profession during the short term it had existed than could be counteracted by all the good it would be able to do should it last for a hundred years.

Mr. Pryce Cunson seconded the vote of thanks, and remarked that he could not agree with Mr. Mountford upon one point which he had raised, viz., that when a builder takes off say ten per cent. from the summary, and thereby reduces his tender without adjusting the detail prices in the quantities, he could claim to deduct that percentage from any lump sum provisions when they came to be adjusted in settling up the accounts at the completion of the contract. Being a quantity surveyor, he, of course, had some experience on this point, and he could only say that he should not think of allowing such a claim. As to taking the labours on stone, builders who understood quantities at all looked most carefully at the labours, even if they did not price them out in detail, omitting to do this partly to save time, and partly because they did not like in some cases to give a detailed schedule of prices to measure up by. Mr. Lovegrove had spoken somewhat against quantities being made for the architect to understand; but, nowadays, the foreman often had the bills to refer to, and used them almost as largely as the specification; and that being so, it was a question whether it was not advisable to arrange bills of quantities so that they could be referred to as easily as possible. It doubtless made the bills longer, but certain surveyors in London acted on that principle, and personally he was in favour of it. On the other hand, he could, of course, only condemn the lumping system which had been referred to. Mr. Lovegrove had also referred to the advisability of getting a written order from the client, but in many cases the client seemed to think, if asked for it, that his honesty was doubted. He did not agree with Mr. Lovegrove as to the advisability of including in the accounts the fees for measuring up work. He always tried to get architects for whom he took out quantities to let the client pay direct. There ought to be nothing to be ashamed of in their fees. As to provisions, care should be taken that if rods of brickwork and so on were put in they should be very distinctly stated to be provisions. With regard to contingencies, it was a question whether it was not wise, especially for young architects, to let the client see plainly that every probable contingency had been included, but to let him understand at the same time that they could not foresee every possible contingency. There was a good deal in what Mr. Lovegrove had said with regard to checking the moneying-out and casting of the priced bills of quantities before using them as a schedule in pricing the accounts. It was a thing that should be carefully gone into, because mistakes affected the prices.

Mr. A. C. Blumer Booth said that Mr. Lovegrove was quite right when he spoke of civil engineers becoming the contractors for works, as well as making the designs for them, and that was not at all an exceptional state of things. The lawyer's contract was often full of words, though if examined carefully it would be found to embody pretty well the usual form, with more phraseology than the architect put into the clauses. As to "provisions," no work, even as low as 500l., should be entered upon without some small provision being put in to meet any points which were not noticed at the

time of making the drawings. "Extras" more or less, were always occurring, though sometimes they were the fault of the client. These were easy of adjustment, provided there was a properly priced and moneyed bill of quantities to form a good basis. It was an excellent practice to have a priced and moneyed-out bill to correspond exactly with the tender given by the builder, and deposited with the architect at the time of tendering, or shortly afterwards. It was a useful document for ascertaining the value of work done when granting certificates. Mr. Lovegrove had objected to quantities being made part of the contract, but he did not see why they should not be. The contractor undertook to do certain work based on the quantities, and anything not included must necessarily be an extra; therefore why should the contractor be asked to pay for that which the owner never expected, as far as he knew, to get?

Mr. H. W. Pratt said that though, in his opinion, the architect should not take out his own quantities, he should have a good grounding in the subject. He did not consider it wise or expedient that the quantities should form part of the contract. If a builder took the contract at a low price, and had doubts as to the quantities, it would mean that the whole work had to be measured over again, thus putting the client to considerable expense. The client was entitled to expect from the architect that the work should be carried out for the amount of the contract, or as nearly as possible, except for things that might afterwards arise. The best way to deal with quantities in respect of the contract was to have an understanding with the builder on tendering that the quantities should be accepted as the schedule of prices. There was no difficulty then in measuring up the extras and omissions, and valuing them afterwards. He was rather an advocate of the lump system of taking out quantities, and did not consider it was over-desirable to go into all the minutiae of little labours. The detailed method had been reduced to such a system that the large firms of contractors who employed good men to price out quantities understood it, but a good many builders did not. With regard to specifications, the members could not do better on starting in practice than to make up their minds that these should be thoroughly well written. If a general clause were given, the argument against it was that it might be vague, but it was possible to make a general clause which should cover a wide area, and yet at the same time be quite intelligible.

The vote of thanks was then put and carried.

Mr. Lovegrove, in replying, said he was afraid he had not made himself perfectly clear as to the commutation of the labours on stone. He did not mean to convey the idea that they were unnecessary, but he adopted a different system for country towns to what he did for London. Within a radius of 100 miles of the metropolis it was well to follow the London system, but for Lancashire or Yorkshire he would not take off the labours on stone. He arranged for the stonework and work of a similar kind being put together, cubing it, and if necessary, describing and illustrating it by sketches, but it would be waste of labour on a job in some remote country town to take off all the labour on stonework. At the same time, he did not mean to say that the measurement of the labours was useless. Another reason why builders did not price out the labours was that most of them got the work done by a sub-contractor. He preferred a lithographed form of contract to a printed one, because, the lines being wider apart, anything could be put in or ruled out more conveniently. As to the principle on which builders took off a percentage on the total amount of their estimates, he had not ascertained, in his experience, how it was arrived at, but he believed it was done in some such way as that in which architects arrived at the price per foot cube of a building for which they were sending in competition designs. He was always careful in settling up the extras and omissions to deduct the same percentage as had been taken off the contract amount by the contractor. He had touched lightly upon the society of architects which had been referred to, because they had been so kind as to invite him to many of their meetings, a privilege, however, he had not availed himself of (laughter). As to the fees being paid direct he would like them to be paid

thus, both for the quantities and the measurements; but then the client generally wished the surveyor to take less, while if the building was intended for philanthropic purposes, something was looked for by way of a donation. He did not see why they should object to have their fees from the builder, who was really only a bailee. The word "provisional" was the right term to use, although extraordinary ideas as to it were sometimes prevalent in the law courts, one barrister having even asked whether the "provisions" were for him (Mr. Lovegrove) when he was measuring up! (laughter). An eminent London architect considered that if the builder signed the specification and drawings a sixpenny stamp put on the tender was sufficient for all practical purposes.

### Illustrations.

#### EDINBURGH MUNICIPAL BUILDINGS COMPETITION.

**W**E give this week some further illustrations from the second and third premiated designs in this important competition. We shall have further illustrations to give from among the designs not premiated.

We may observe that all the illustrations of the Edinburgh designs which we have given up to this date have had to be photographed *in situ*, so to speak, under an unfavourable light; as, owing to the designs being retained for exhibition for three weeks, there was no means of giving any illustration of them at the moment except by sending specially to Edinburgh and having them photographed on the spot; but we believed our readers would prefer to have some knowledge of the character of the works selected as speedily as possible.

#### THE SOUTH PORCH, ST. NICHOLAS, LYNN.

The south porch of St. Nicholas's Chapel at King's Lynn is a favourite subject for illustration. The whole chapel is rich and worth study, more particularly, perhaps, on account of the small amount of material used in its construction; the walls are thin and almost all window, whilst the piers of the nave arcade are remarkable for their slenderness. The glass and the wood carvings for which the chapel was famous have almost all gone, but the benches that remain deserve some attention.

#### NAVE PIER, WEST WALTON CHURCH, NORFOLK.

The village of West Walton is situated about three miles out of Wisbech, and the church, though in a sad state of dilapidation, is a fine specimen of Early work. The nave piers, one of which forms the subject of our illustration, are characteristic of the period; the carving is full of vigour and of the Lincoln type. Many of the Purbeck marble shafts have disappeared, and others are much damaged; in fact, neglect and decay are everywhere apparent. It is to be hoped that some energetic steps will soon be taken to secure the building from further injury.

**Professor Aitchison.**—We mentioned in last week's *Builder* (p. 419), the appointment of Mr. George Aitchison, A.R.A., as Professor of Architecture at the Royal Academy. The *Athenæum* joins us in our congratulations, and adds,—"Although this chair has been vacant since Street's death in 1880, numerous 'outsiders' have lectured to large audiences at Burlington House on architecture and allied subjects, such as the Professor is expected to treat. The Professors of Architecture since the foundation have been as follows: T. Sandby, 1768-98; G. Dance, 1798-1805; Sir John Soane, 1805-37; W. Wilkins, 1837-9; C. R. Cockerell, 1839-53; S. Smirke, 1860-6; Sir G. G. Scott, 1867-72; E. M. Barry, 1874-9; and G. E. Street, 1879-80."

**Institution of Mechanical Engineers.**—The spring meeting of the Institution of Mechanical Engineers will take place on Monday, the 16th, and Tuesday, the 17th of May, under the presidency of Mr. E. H. Carbutt. H.R.H. the Duke of Cambridge will honour the Institution by dining with the members on the evening of the 17th.

#### HOUSE LIGHTING BY ELECTRIC BATTERY.

IN June last year Messrs. Woodhouse & Rawson invited a number of electricians and others interested in electric lighting to visit their factory at Hammersmith, to see the first installation of a chlorine gas battery. The idea at that time was a novelty, and Messrs. Upward & Pridham, the inventors, were complimented for their ingenuity, as they had produced the only really promising primary battery applicable to domestic lighting. After a lapse of nine months Messrs. Woodhouse & Rawson have again invited their friends to see another installation of even more interest, as it is an improved edition of their former installation; but this time they have fitted the more perfect apparatus in the basement of the large block of buildings in Queen Victoria-street, in which their offices are situated, and they have lighted up the rooms they occupy very brightly from it with small incandescent lights. The present installation accords altogether with the conditions under which a country-house or a single mansion in town could be lighted without any lavish expense, and for which the electric lights could be supplied at a cost not extravagantly exceeding the cost of gas, and without any serious difficulty or trouble. The installation which was shown last year had even then been working for some months; and in the interval Mr. Cunyelmane has had a similar installation fitted in his house at Fulham. Both are still in proper order.

The new battery may be regarded as of a permanent Leclanché type, in which the practical improvement consists in putting the manganese in a separate generator from which the chlorine evolved is transferred by pipes to the battery cells. In the old way of making chlorine by the action of sulphuric acid upon common salt, solid masses of sulphate of soda were produced, which were difficult of extraction without fracture of the containing vessel in which they were formed; but by the substitution of hydrochloric acid in connexion with manganese dioxide, assisted by the application of a small amount of heat, a residue is produced which is easily dischargeable through an ordinary tap. Hence the first stages of manipulation of the gas battery are simplified to the most primitive conditions. The apparatus may be placed anywhere that may be convenient. In the present case a well-hole of brick is provided with a pipe leading to a drain as a convenient means of discharge. Over this is placed a common earthenware pan for the manganese, and an earthenware jar with a tap for the hydrochloric acid. The battery is formed of glazed earthenware cells containing the ordinary carbon plates, surrounded with crushed carbon alternating with zinc plates in the usual manner, the chambers being filled with plain water. In the present installation several of these elements are congregated within a large earthenware pan, the whole being sealed down by a covering, an inch thick, of marine glue. There are two of these compound cells, and the installation is consequently denominated a "two-cell" installation. To work these batteries all that is required is to turn once a day a small quantity of the hydrochloric acid by means of the tap attached to its receptacle on to the manganese, and the necessary quantity can by means of a gauge be ascertained without the acid being either seen or handled. The gas will now be generated as long as there remains any of the hydrochloric acid to act upon the manganese. The gas passing through the cells one after another in series is taken up by the water to the extent of saturation, and the surplus gas passes to gasometers conveniently formed by up-ended earthenware drain-pipes connected together, and closed at top, except by a small pipe which connects one gasometer to another in the number provided for storage of the gas, the end pipe passing out of doors for the escape of any surplus gas which may occasionally be produced. As the chlorine is more than twice the weight of air, it flows from one gasometer to another by displacement, and its presence is made manifest by its yellow-green colour, seen through glass globes attached to the gasometers. The battery generates its electric current perfectly steadily and uniformly with no tendency whatever to polarisation. For the lighting of the mansion or house, the current generated by the gas battery is turned on to a series of accumulators,—in the present instance ten in number,

and of large size. Each of these is by a clock-work contact-maker charged by the current for half an hour, and in this way their efficiency is adequately kept up.

The advantage of the series of accumulators is that the battery can be in action all day, providing for the requirements of the lighting at night; and, as applied to country churches, or buildings in which the lighting is similarly intermittently required, the gas battery could be working continuously, charging a larger series of accumulators required for a considerable number of lights for a short period of duration. The whole installation works automatically, except the one supply of acid daily, and the occasional replacement of the zincs; but which is needed not more than twice in the course of a year. In this act there is no trouble, each zinc being successively withdrawn, and another put in its place. There are no fumes, no handling of corrosive materials, and if any primary battery at all is ever to be employed for domestic lighting, the present system stands the most promising in prospects of success. Such an installation of the "two-cells" capacity can be purchased for 56l., and, with the ten-storage cells included, will give 700 Watt-hours current at the incandescent lamps. Twenty-two lamps of ten-candle-power can be thus supplied, and these lamps run with so steady a current, are amply bright and sufficient for household purposes, and superior in illumination to ordinary gas-burners. The acid contained in the jar, and the manganese, are adapted for a fortnight's duty; and the spent manganese can, it is said, be re-converted at a cost of only one-tenth of its commercial value.

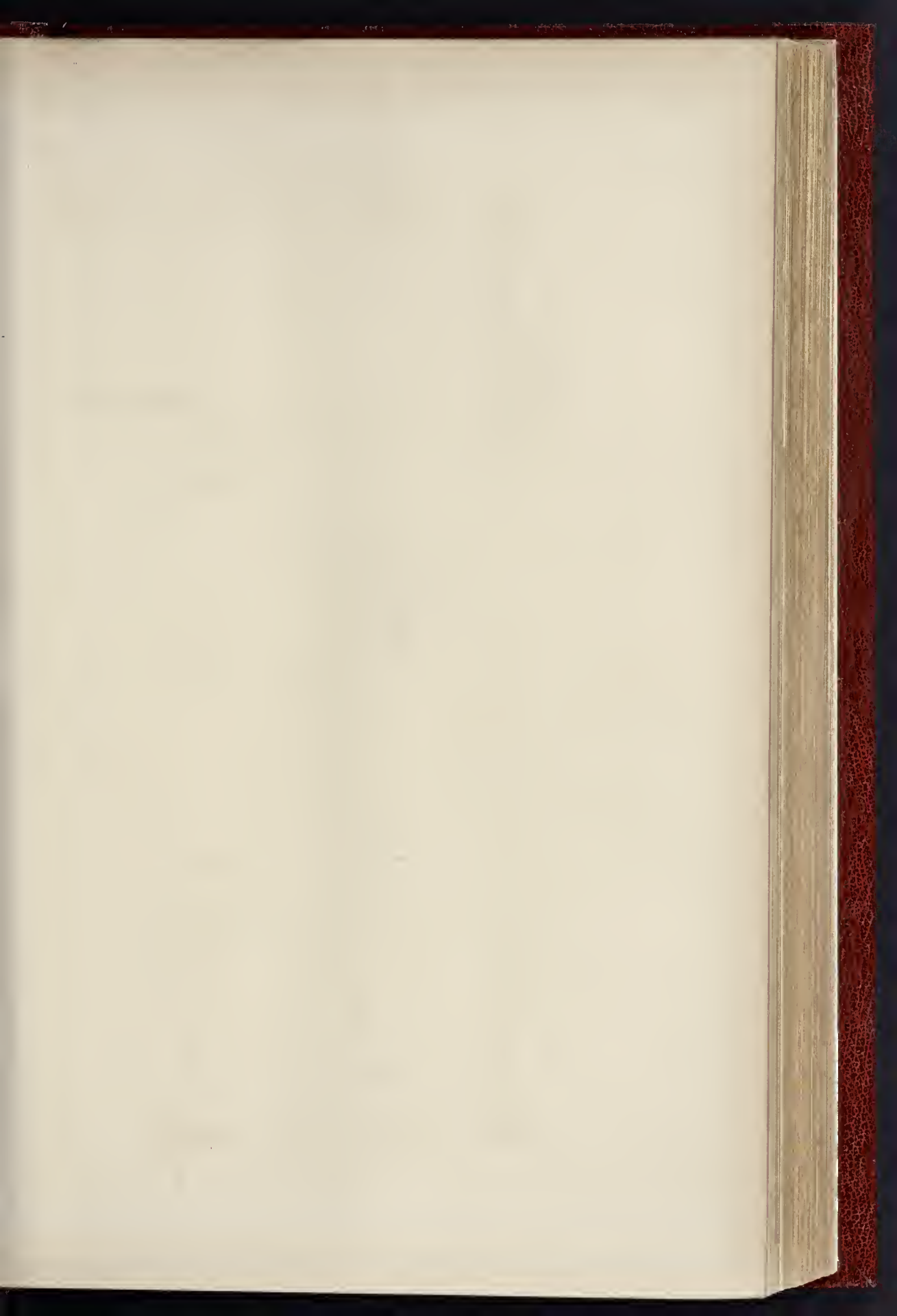
#### THE NATIONAL GALLERY.

##### VISIT OF THE ARCHITECTURAL ASSOCIATION.

The fourth Saturday afternoon visit of the Architectural Association took place on the 19th inst., when the new buildings at the National Gallery were visited. Mr. Taylor, of the Office of Works, who designed the alterations, attended and explained the buildings. The alterations consist of a new staircase, with two large galleries and cabinet rooms. The staircase has some very good marble work, with Naxian marble door-jambes, and giallo antico linings to the walls. Cipollino is used for some of the pilasters, and some New Zealand marbles for the bases of the columns. The roof of the large gallery adjoining the staircase is ingeniously arranged to avoid the use of girders crossing the lantern light: this was managed by means of iron cantilevers which cross the walls of the cabinet room and are bolted down in the wall. The lantern light in the second gallery could not be arranged in this manner, there being no means of getting the cantilevers tailed and bolted down. The new buildings will form the exact centre of the complete design; the work remaining to be done to complete this will take up some portion of the St. George's barracks. The general scheme of decoration, which is being carried out by Mr. Craze, is a red ground for the walls and olive green in the cornice; the colour treatment will be very much quieter in character than that in the late Mr. E. M. Barry's portions of the building. The rooms are lighted with large lanterns, which will not have glass ceilings as in the other galleries, but will be open right up to the top. No artificial light of any kind is provided, and the doorways are closed by jack-in-the-box iron doors, the revolving shutters being found to get out of order. It is expected that the galleries will be opened in June.

The members afterwards proceeded to inspect the new drainage works at the Houses of Parliament, which were fully described (with illustrations) in the *Builder* for Jan. 29 last. The whole of the work was carefully examined, and the action of the ejectors explained by means of a working model.

**A Rich City Company and an Open Space.**—According to the *Standard*, the Goldsmiths' Company have offered to contribute 5,000l. towards the expense of laying out and beautifying a recreation-ground of twenty-six acres on the Uxbridge-road for the parish of Acton, which the Local Board of that parish propose to purchase. The Goldsmiths' Company are owners of large areas of land in the district, and it is proposed to purchase the ground in question from that Company and the Ecclesiastical Commissioners.



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THE BUILDER, MARCH 26, 1887

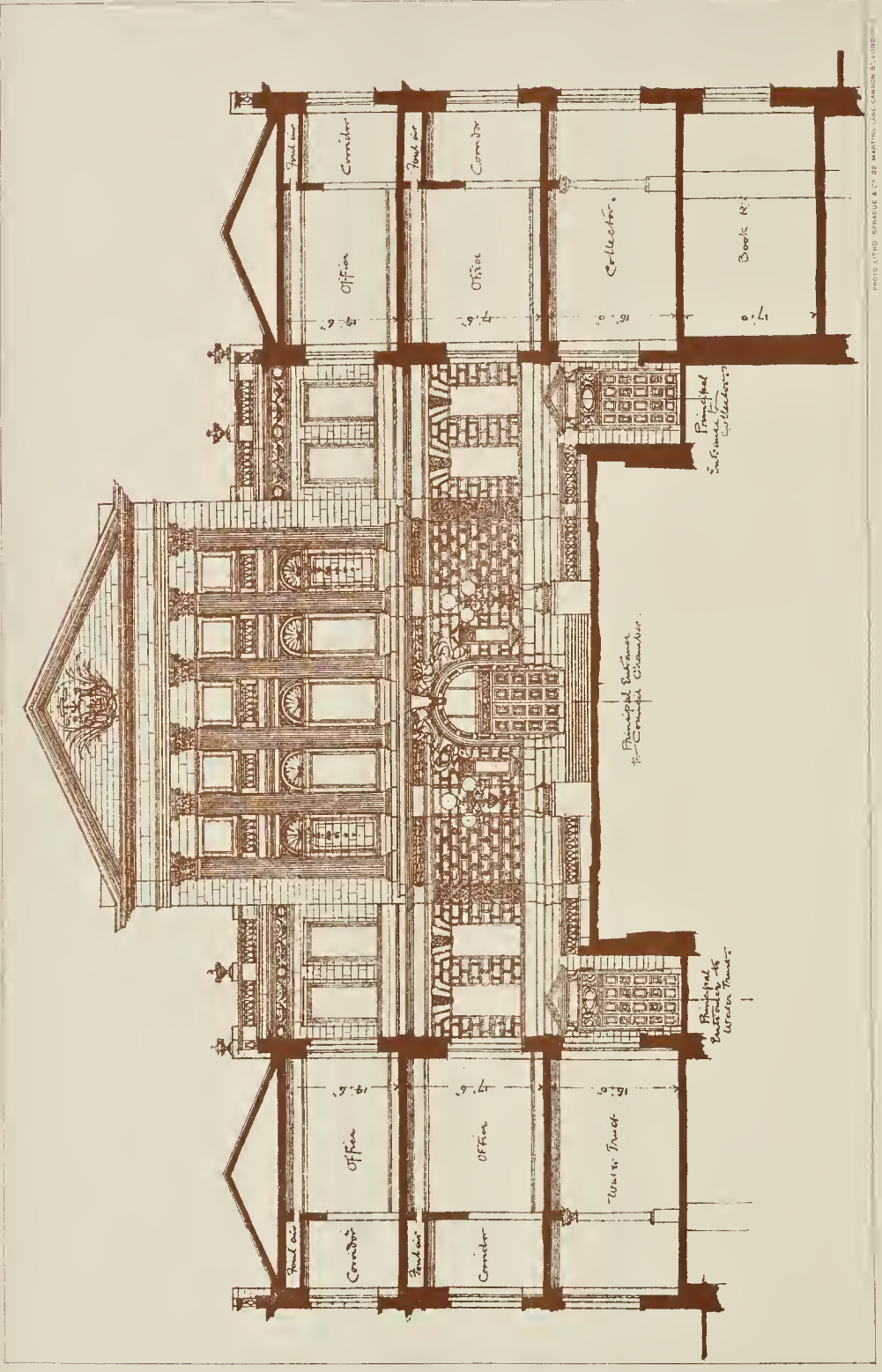
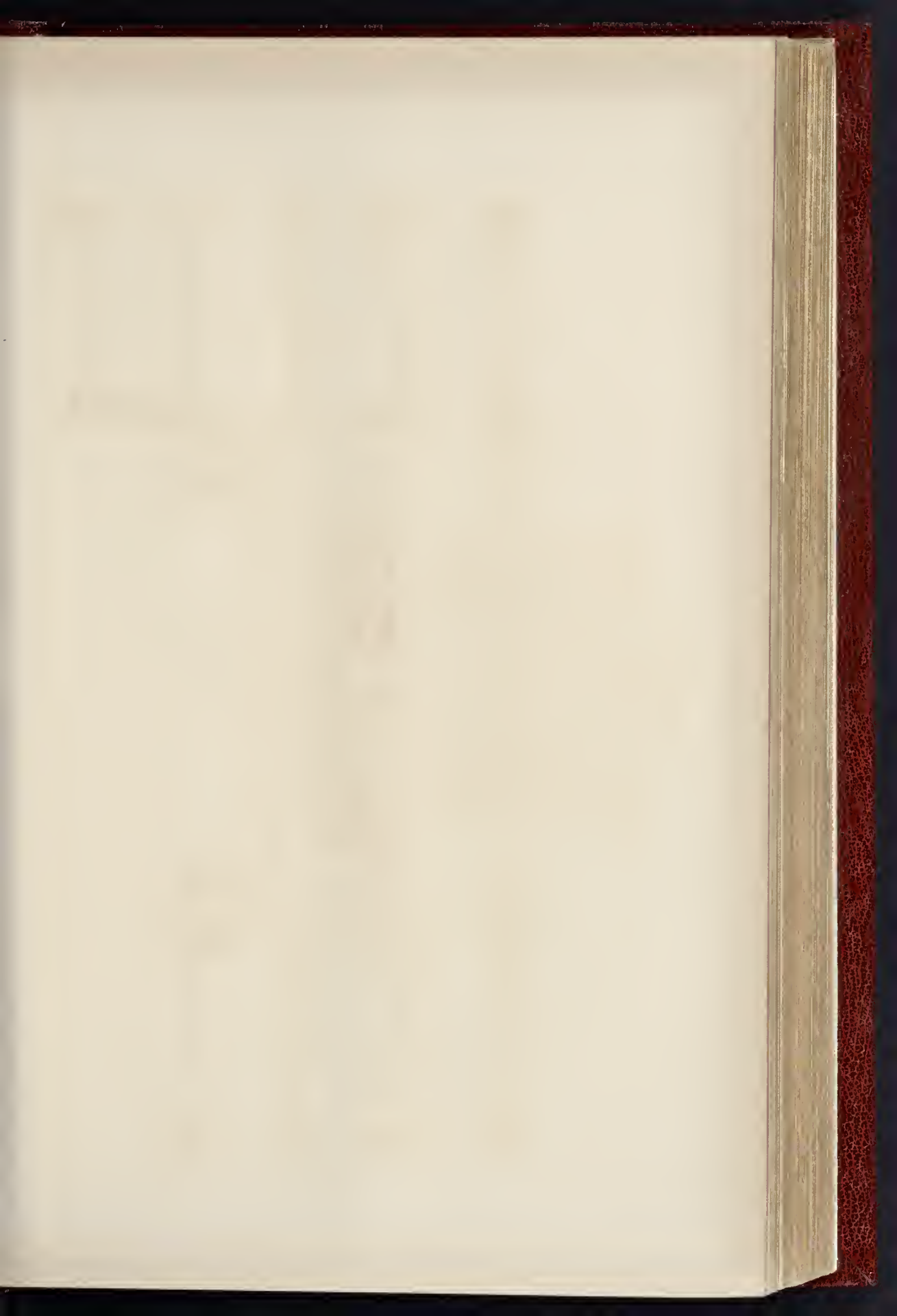


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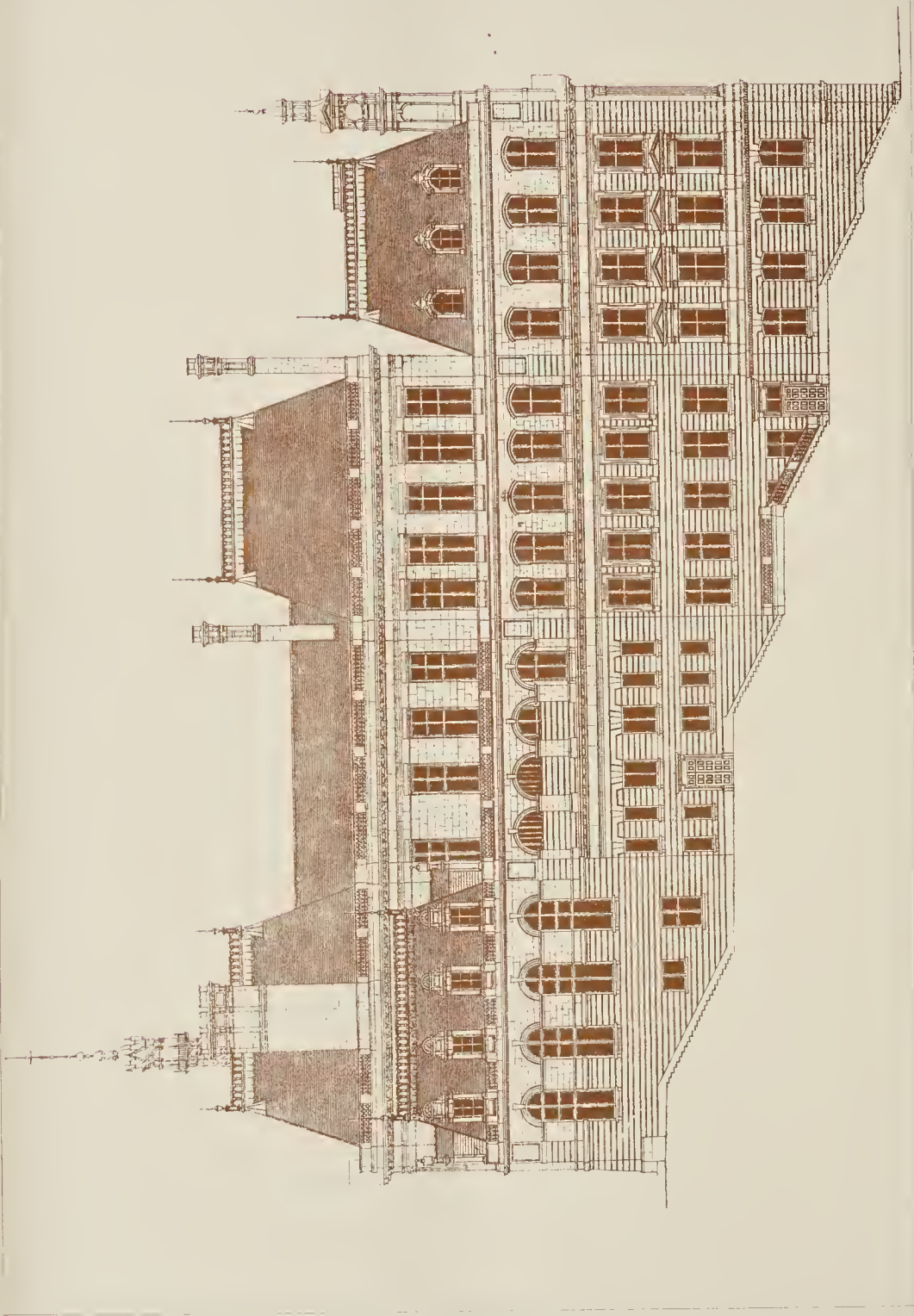
EDINBURGH MUNICIPAL BUILDINGS, SECOND PREMATED DESIGN.—MR. MALCOLM STARK, ARCHITECT

TRANSVERSE SECTION.



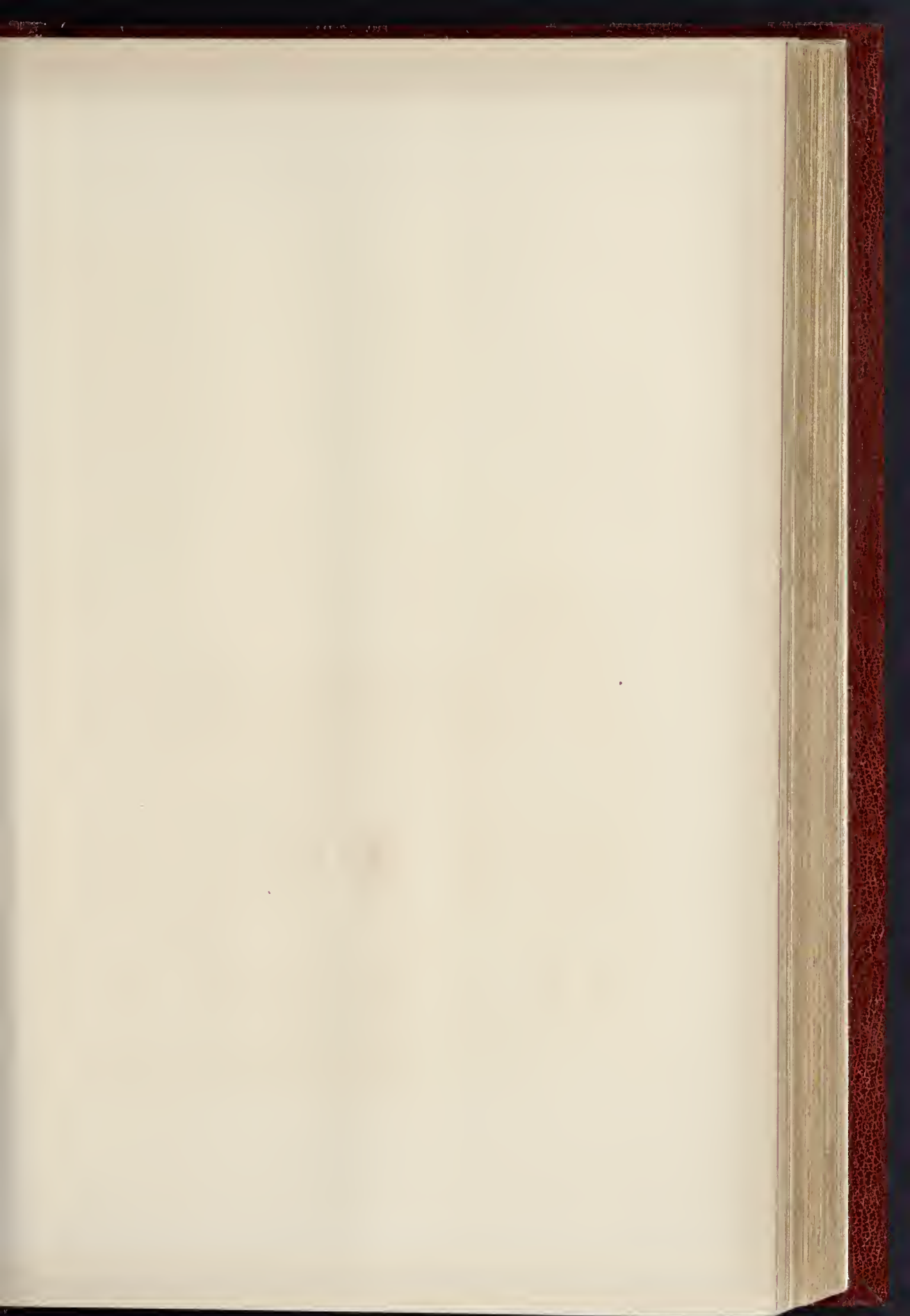
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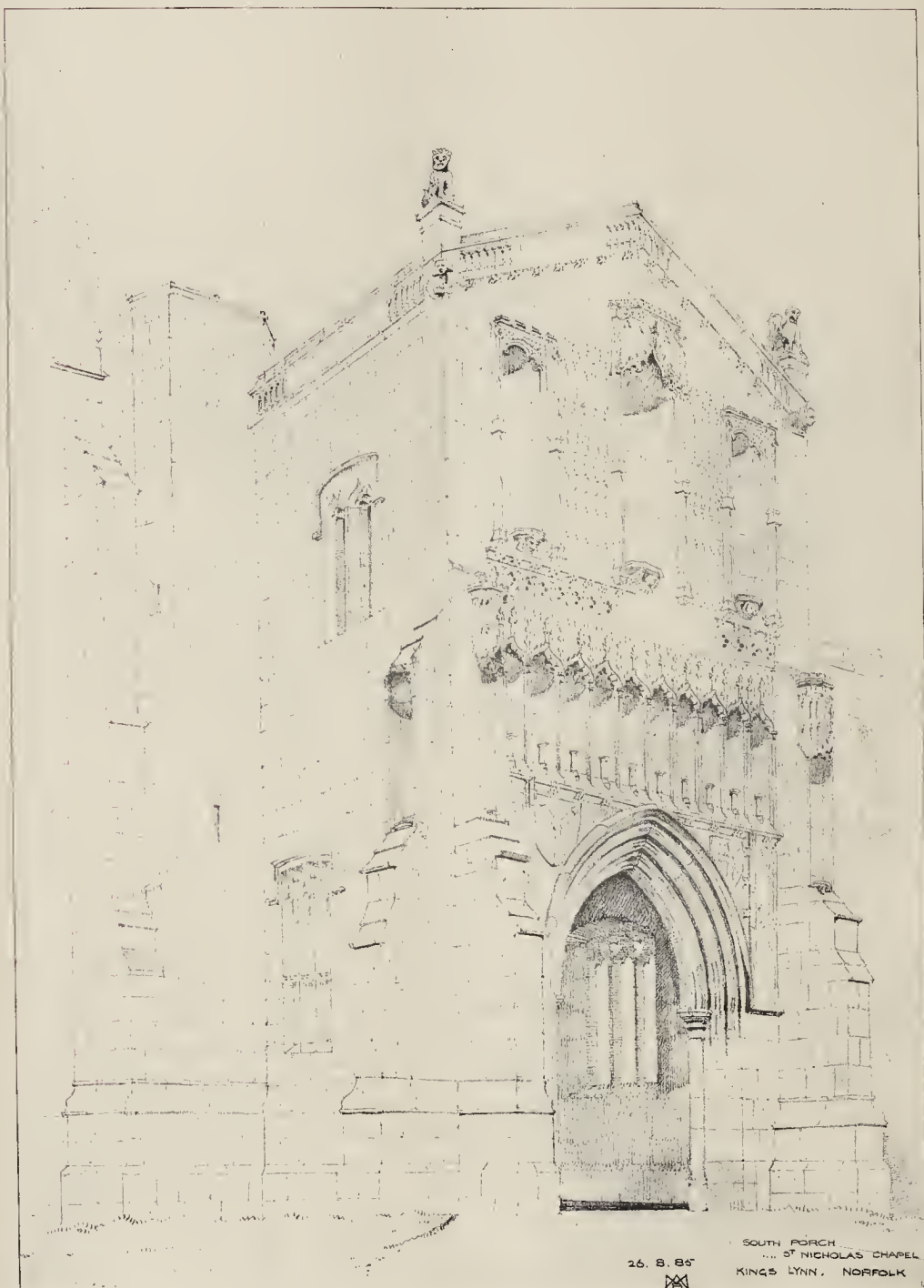
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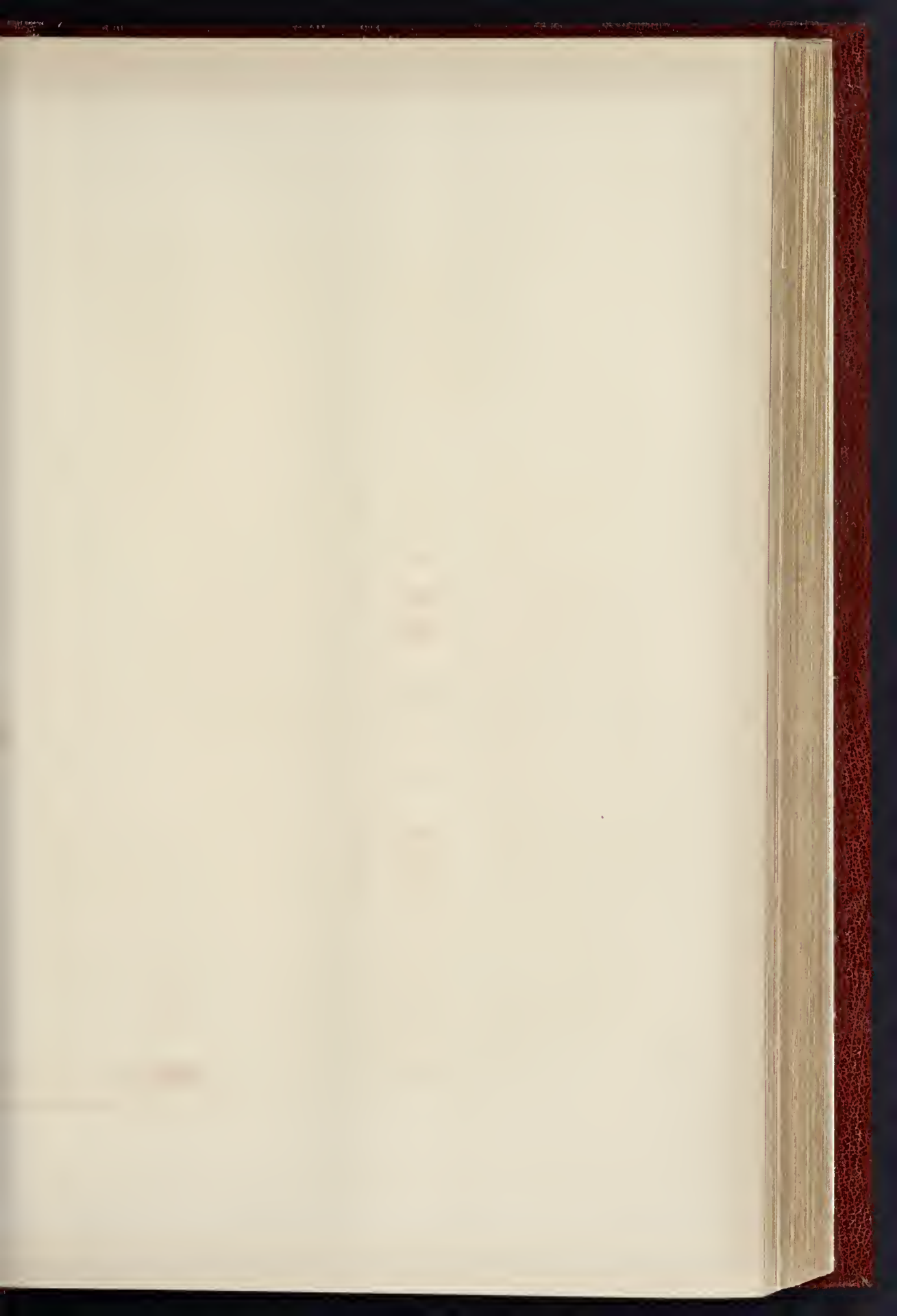
INK PHOTO, SPRAGUE & CO, LONDON.



NAVE PIER.  
WEST WALTON CHURCH

INK PHOTO, SPRAGUE & CO. LONDON

1890



DESIGNED BY MR. J. H. BURNETT



EDINBURGH MUNICIPAL BUILDINGS, THIRD PREMIAE

ELEVATION N



—MESSRS J. W. SIMPSON AND E. J. MILNER ALLEN, ARCHITECTS.

H STREET.

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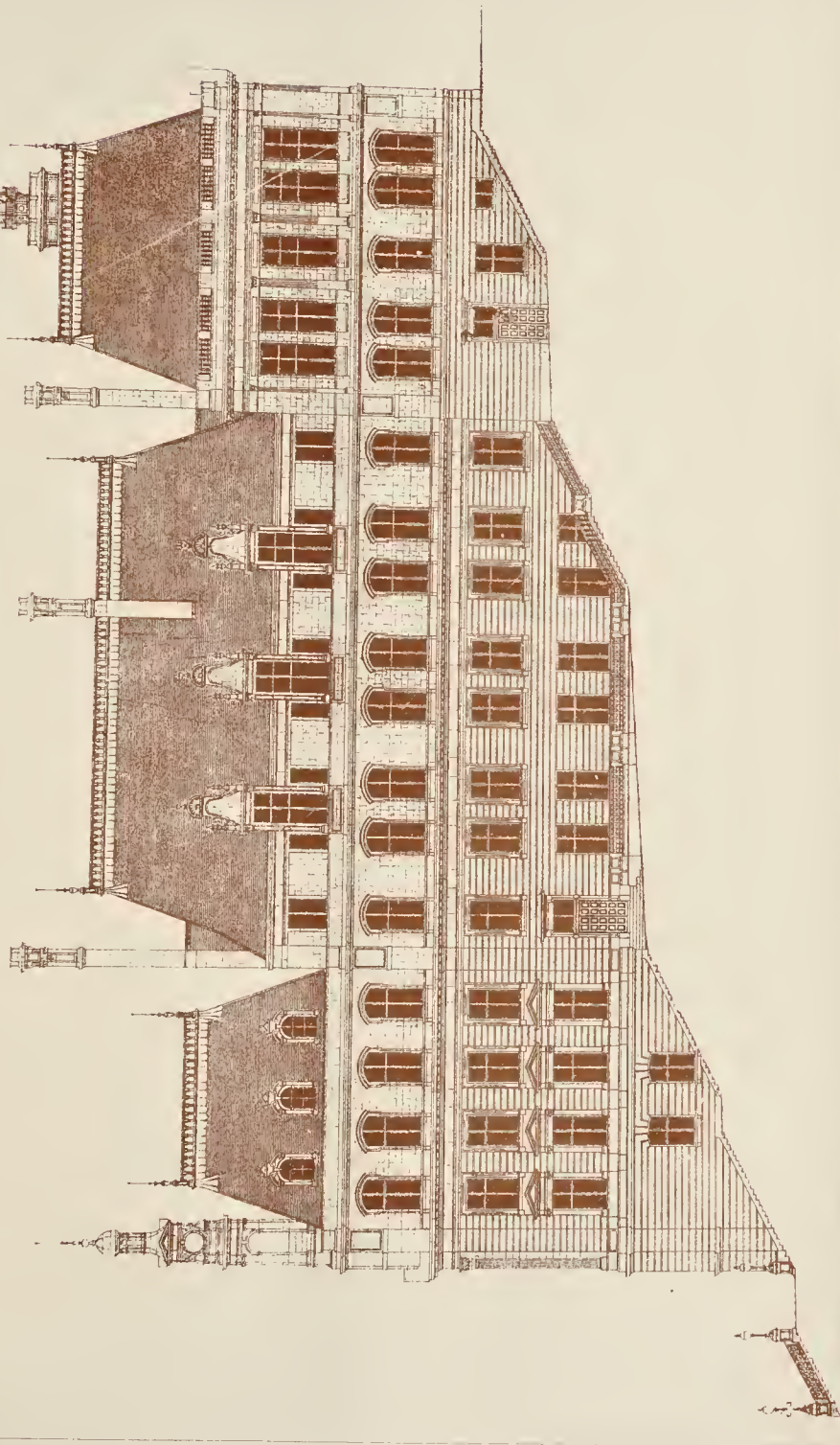


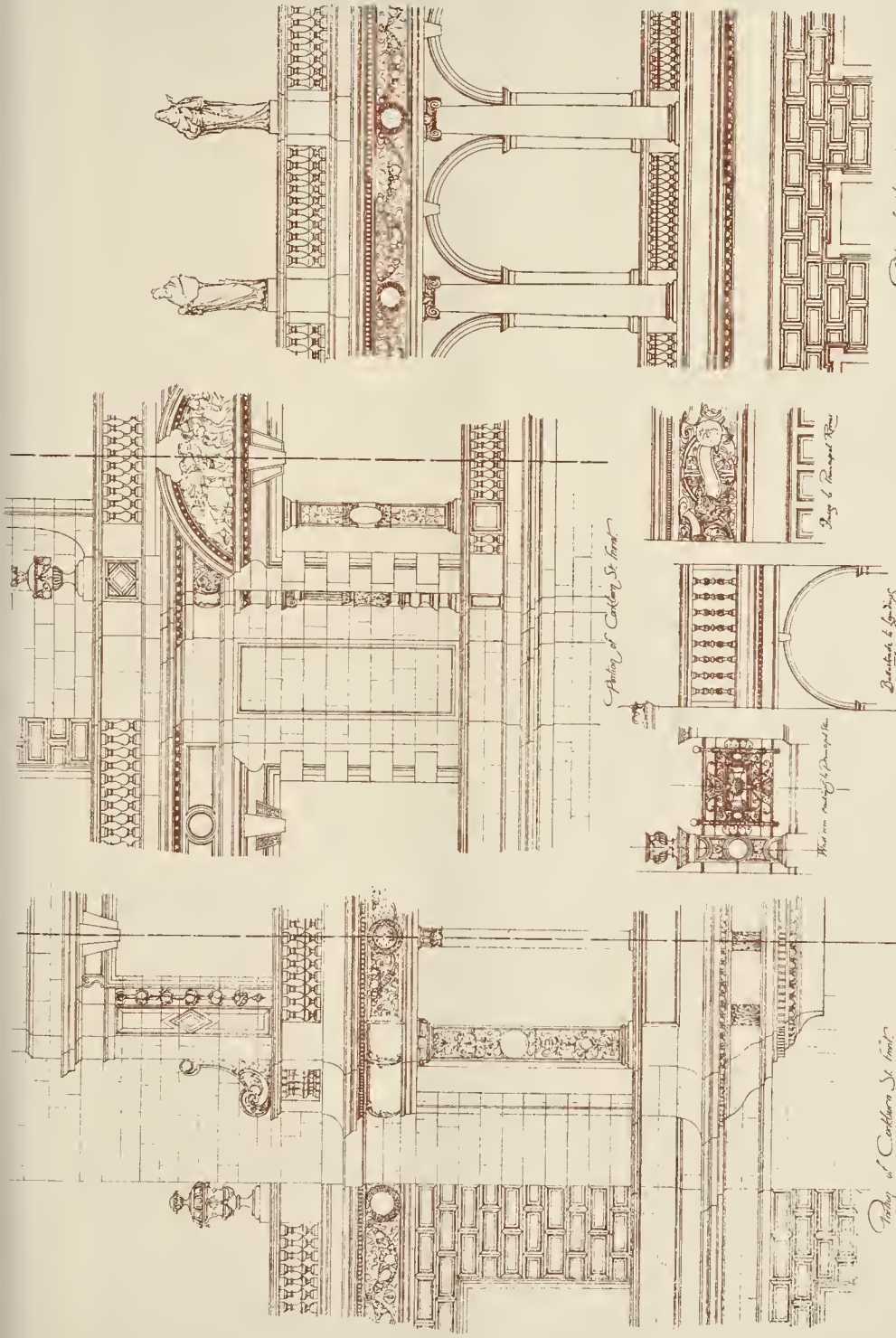
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EDINBURGH MUNICIPAL BUILDINGS, THIRD PREMIATED DESIGN.—MESSRS. J. W. SIMPSON AND E. J. MILNER ALLEN, ARCHITECTS.

ELEVATION TO WARRISTON CLOSE

1881

THE UNIVERSITY OF CHICAGO



*Architect of Carlberg St. front*

*Architect of Carlberg St. front*

*Architect of High St. front*

*Design of Recessed Portico*

*Decorative to go over  
in Upper Storey*

*Decorative to go over  
in Upper Storey*



PHOTO. LYING, SPRINGFIELD & CO. 22, MARKING LANE, LONDON, S.W.

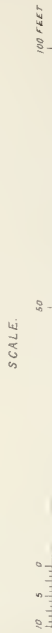
EDINBURGH MUNICIPAL BUILDINGS, SECOND PREMATED DESIGN.—MR. MALCOLM STARK, ARCHITECT.

1900

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EDINBURGH MUNICIPAL BUILDINGS,  
 THIRD PREMIAED DESIGN.  
 MESSRS J. W. SIMPSON AND E. J. MILNER ALLEN, ARCHITECTS.

PLAN OF FIRST FLOOR ABOVE HIGH STREET



THE THEODOLITE



FIG 30

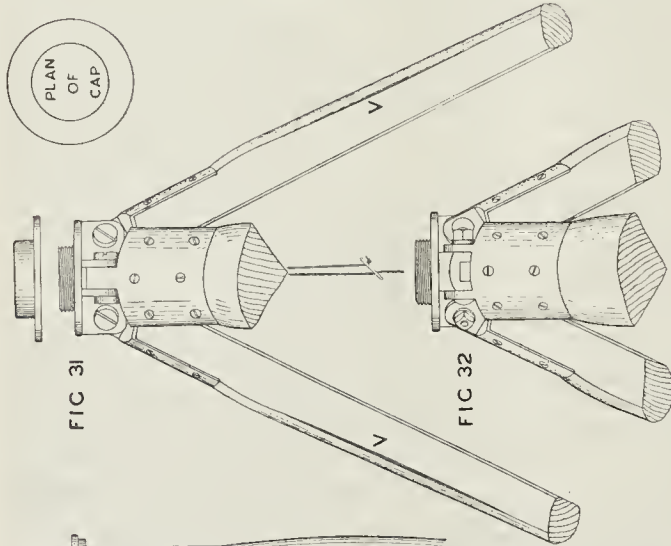


FIG 31

FIG 32

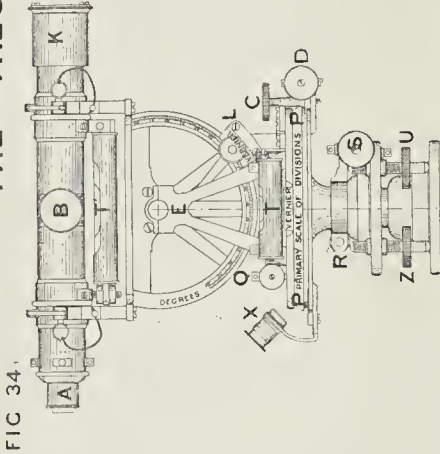


FIG 34

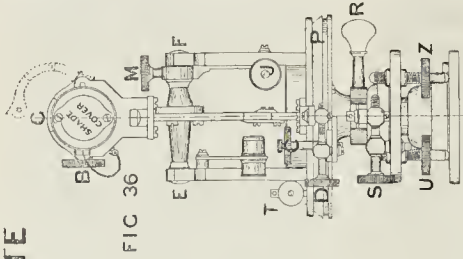


FIG 36

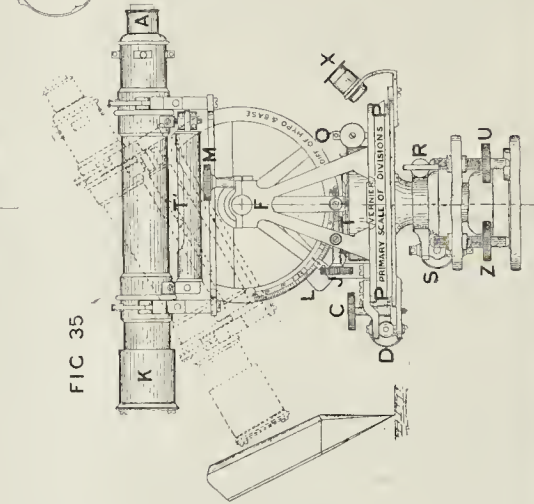


FIG 35

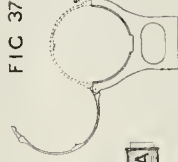


FIG 37

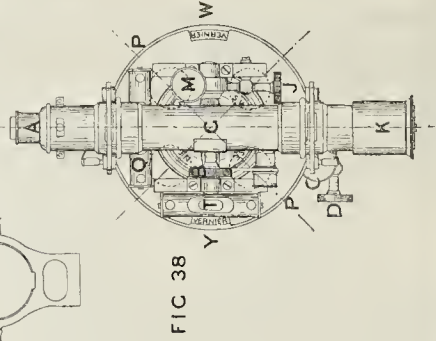


FIG 38

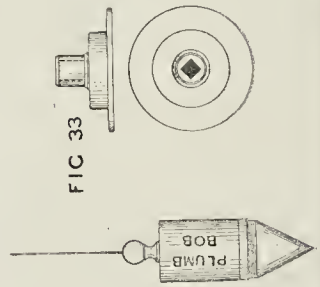


FIG 33

pose as a miaser's dial, in addition to the more extended usefulness of a theodolite.

In the daytime sufficient light is admitted into the telescope to see the cross wires in the diaphragm-plate distinctly; but in setting out tunnels underground, or when used at night in astronomical work, the wires would not be clearly seen. Fig. 4 exhibits a small oil lamp, which rests upon a side stand attached to one of the upright frames, marked F. When required for use, it is provided with a specially prepared wick. One of the trunnions upon which the telescope revolves is perforated in the line of the horizontal axis, and fitted with a glass stop-piece. By means of a small diagonal reflector, carried by an arm which is screwed into the outside tube of the telescope, axial illumination is obtained. The reflector and its connexion to the outer rim of the telescope are made as small as possible, so as not to impede the passage of the cone of rays in their conveyance from the object-glass to the cross wires. Thus, when the object observed is also illuminated, clear vision of the point desired along the line of collimation is obtained.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

3,018, Inspection Chamber for Drains. R. P. Beattie.

The subject of this invention consists of a chamber of glazed stoneware or other material having junctions at the ends and sides for connecting to the drain. A metal frame is secured on the top of the chamber, and is covered with another frame, into which is inserted a glass panel. The upper frame is made with a hollow rim, into which the lower frame fits, and is made airtight by packing.

3,019, Ventilators. R. Buffham.

By an arrangement of two wheels formed of segments of glass, and which form alternate spaces, ventilation is obtained, and controlled by the turning of one or other of the wheels. Rubber packing is used to make the joints water-tight, and to allow for contraction and expansion.

3,115, Coal Plate. G. Kyte.

This invention consists of a plate fitted with latch bolts, which engage beneath the lower edge of a fillet, and lock the plate into its socket. It is actuated by a tumbler, which falls by gravity when the coal-plate is dropped into position. It cannot be turned over, nor can it be opened from above, but is easily removed by pressure from below.

3,134, Cooling, Warming, and Moistening Air. J. Howarth.

This invention consists in an arrangement of chests or pipes, in a grid or such like means of warming and moistening air, the moisture being effected by the use of a syphon pipe, which saturates the air passing near or through it.

4,539, Fittings for Baths. A. Barn and John Macdonald.

The fittings which are the subject of this patent have reference to mixing the hot and cold water supply before it is used in the bath, both being turned on by one central distributing tap. A central chamber is also formed for receiving and mixing the hot and cold water, and distributing it to the different baths at any desired temperature.

4,824, Warming Buildings, &c. B. Verity.

According to this invention, a current of washed air is induced by the action of a jet or jets of water. A deflector breaks up the jet into fine mist or spray, which cleanses the air passing through it. When it is desired to warm the air, a boiler, heated by an Argand burner, is used.

4,837, Improved Wrench. H. Lucas and A. H. Bishop.

By this invention the adjusting jaw, instead of sliding over the leg or stem of the wrench, slides in a slot cut through the leg or stem, giving greater strength and convenience.

5,708, Hopper Wagons. T. Rodger and Others.

This invention consists in fitting a hopper into an ordinary railway wagon of such construction that on opening the door of the hopper at the bottom the whole contents of the wagon will run out by gravitation without the assistance of manual labour; while doors at the side are also added to facilitate emptying the trucks.

NEW APPLICATIONS FOR PATENTS.

March 11.—3,690, H. Owens, Rim Locks.—3,740, W. Edgington, Mower Mills.

March 12.—3,754, M. Hall, Portable Pipe Fitters' Work Bench to carry Tools.—3,757, W. Pittitch, Adjusting and Hinging Doors.—3,789, H. Hunt, Register and Other Fire Grates.—3,803, F. Frenzel, jun., Encrusting Tiles.

March 14.—3,817, J. Wright, Fire Grates.—3,822, W. Bull and Others, Hearth for Domestic Fireplaces or Stoves.—3,830, J. Gooch, Shop Fronts.

March 15.—3,834, F. Hinde, Fastening on Door Knobs, &c.—3,880, F. Abbey, Construction and Formation of Main Drains, Conduits, or Sewage Pipes.—3,912, J. Browne, Locks for Doors.—3,916, T. Williamson, Saw Sets.

March 16.—3,938, W. Day, Chimney Cowl.—3,942, A. Bayliss, Lock Bolt.—3,949, G. Quinn, Ventilator Cowl.—3,958, T. Chilton, Cast Metal Down Spouts, Soil Pipes, &c.—3,961, E. Young and G. Bainbridge, Ventilating Apparatus.—3,973, W. Duncan, Glazed Roofs.—3,983, A. Clark, Open Stoves or Fire Grates.

March 17.—4,001, E. Ledger, Shop Window Fittings.—4,005, A. Fielding, Artistic Pottery.—4,008, W. Wessensbury, White Lead.—4,023, W. Swigler, Stove for Burning of Old Paint.—4,033, R. Ninnes, Casement Stay.—4,046, P. Chinnery, Window Fasteners.

PROVISIONAL SPECIFICATIONS ACCEPTED.

18,896, J. Fagan, Ball-cock for Water-closet Cisterns.—31, F. Beauchamp, Fastenings for Windows, &c.—2,305, H. Donlon & W. Rix, Ornamenting Pottery, Tiles, or Glass.—2,452, W. Tuffee, Manufacture of Portland Cement, Bricks, Tiles, &c.—2,534, J. Stephens and R. Clark, Manufacture of Portland, Roman, and other Cements.—2,656, J. & J. Lind, Stoves and Fireplaces.—3,115, R. Groot, Fastening Knobs to Spindles.—16,956, W. Stevens, Ventilating and Flushing Water-closets.—235, S. Shields, Fixing Wood Block Floors.—944, J. Stewart, Flushing Valve for Cisterns of Water-closets, &c.—1,457, E. Tonks, Sash Fasteners.—2,503, J. Sutherland, Mowing Machines.—2,848, W. Kimberley, Plough and Sash Filter-Planes.—3,002, W. Lord, Window Fittings.—3,117, C. Gannaway, Shield for Ventilators.—3,168, S. Trickett and J. Noad, Hydraulic Cements, Limes, Mortars, or Concretos.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months. 5,893, H. Turner, Gas Kitchen Ranges.—15,953, G. Courtney, Kitchen Ranges.—2,315, H. Lake, Ventilating Apparatus.—6,943, E. Wright, Ventilating Rooms.—17,116, E. Moore, Curing Damp Walls.—1,753, J. Harrington, Sash Fasteners.—1,782, G. Harvey, Gutter Brackets.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

MARCH 14. By RICH BAOS. Little Hford, Forest-road—Manor Cottage, freehold ..... 2325 70 A plot of freehold land ..... 70

MARCH 15. By DEBENHAM, TEWSON, & CO. Highgate—1 to 8, Swaine's-lane, copyhold ..... 1575 230 231, Highgate-road, copyhold ..... 200

MARCH 16. By F. JOLLY & CO. Limehouse—45, East India-road, freehold ..... 500 650 43, East India-road, freehold ..... 650 245

MARCH 17. By G. BAYNE & CO. Plaistow—1, London-treasure, 91 years, ground-rent 5l. .... 245

MARCH 18. By F. STOEGER. Harrow-road—Three plots of freehold land ..... 375

MARCH 19. By HARRIS & JENKINSON. St. Christopher—The Fountain sugar estate, containing 172 acres ..... 3,000

MARCH 20. By C. P. SHREVEY. City—18, Jewin-crescent, 79 years, ground-rent 140l. .... 1,400

MARCH 21. By FULLER, HOSBY, SONS, & CASSELL. Lavenham—Freehold manufacturing premises ..... 1,950

MARCH 22. By HARMAN BROS. Dalston—61, Graham-road, 72 years, ground-rent 5l. .... 515 1,000

MARCH 23. By F. J. BERRY. Rotherhithe—21 to 23, Church, Bush-road, 39 years, ground-rent 4l. .... 450

MARCH 24. By F. J. BERRY. Rotherhithe—4 to 8, Martin's-terrace, 33 years, ground-rent 10l. .... 680

MARCH 25. By F. J. BERRY. Rotherhithe—17 and 19, Osney-street, 64 years, ground-rent 10l. .... 300

MARCH 26. By F. J. BERRY. Rotherhithe—23, Deptford Lower-road, 31 years, ground-rent 3l. .... 290

MARCH 27. By NEWSON & HARDING. Caledonian-road—Improved rental of 97l. a year, term 10 years ..... 800

MARCH 28. By W. A. BRAKEMORE. Westminster—12 and 13, Frederick-street, 10 years, ground-rent 60l. .... 185 470

MARCH 29. By W. A. BRAKEMORE. Westminster—37, Page-street, 22 years, ground-rent 470l. .... 470

MARCH 30. By D. YOUNG. Poplar—Ground-rents of 2l. 1s. 3d., reversion in 45 years ..... 108 555

MARCH 31. By HARRIS, BURNETT, & ELDREDGE. Willenden—1, 2, and 3, the Chestnuts, 97 years, ground-rent 18l. .... 830

MARCH 32. By HARRIS, BURNETT, & ELDREDGE. Willenden—4 and 5, The Chestnuts, 97 years, ground-rent 12l. .... 580

MARCH 33. By HARRIS, BURNETT, & ELDREDGE. Willenden—16 to 19, Melrose Villas, 96 years, ground-rent 24l. .... 1,160

By E. SIMMONS. Walworth—95, Westmoreland-road, 53 years, ground-rent 10l. .... 6330

Blackfriars—3 to 11, Thurlow-street, freehold ..... 1,675

Blackfriars—Ground-rent of 80l., reversion in 99 years ..... 1,600

Rotherhithe—8 to 12 even, DeLaford-road, 99 years, ground-rent 20l. .... 755

33 to 55 odd, Engelen-road, 94 years, ground-rent 54l. 10s. .... 2,280

Peckham—16, St. Mary's-road, freehold ..... 950

Old Kent-road—8 to 14 even, Haymerle-road, 80 years, ground-rent 25l. 4s. .... 510

Britain—1 to 4, North View Cottages, 41 years, ground-rent 5l. 10s. .... 85

Wandsworth-road—1, Westbury-street, 76 years, ground-rent 6l. .... 180

1, Crichton-street, 78 years, ground-rent 6l. .... 180

MARCH 18. By HAMPTON & SOXS. Portland-place—No. 36, with stabling, 19 years, ground-rent, 100l. .... 2,000

By ELLIS & SON. Regent-street—No. 177, an improved rental of 310l., term 34 years ..... 4,120

Camberwell—182, Camberwell-grove, 36 years, ground-rent 10l. .... 470

By F. HARRIS. Bromley, Kent—21 and 23, Farwig-lane, freehold ..... 310

MEETINGS.

SATURDAY, MARCH 26. Edinburgh Architectural Association.—Visit to New Municipal Buildings, Glasgow.

MONDAY, MARCH 28. Royal Institute of British Architects.—Mr. W. H. Crossland on "The Holloway Sanatorium and the Royal Holloway College." 8 p.m.

Society of Arts (Gaston Lectures).—Professor W. C. Unwin on "Machines for Testing Materials, especially Iron and Steel." 11. 8 p.m.

TUESDAY, MARCH 29. Builders' Clerks' Benevolent Institution.—Ninth Annual Dinner. (Holborn Restaurant, 8.30 p.m.)

Institution of Civil Engineers.—Further Discussion upon Col. E. Maitland's paper on "Gunn Steel." 8 p.m.

Birmingham Architectural Association.—Annual Dinner. WEDNESDAY, MARCH 30.

Carpenters' Hall, London Ward (Free Lectures to Building Artisans).—Professor T. Roger Smith on "Bricks and Brickwork." 8 p.m.

Civil and Mechanical Engineers' Society.—Mr. E. Nelson Boyd, M.Inst.C.E., on "The Panama Canal," 7 p.m.

Society of Arts.—Mr. A. Reckenzau on "Electric Locomotion." 8 p.m.

FRIDAY, APRIL 1. Architectural Association.—Members' Soiree. 8 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. E. W. Moir on "Hydraulic Appliances at the Forth Bridge Works." 7.30 p.m.

SATURDAY, APRIL 2. Architectural Association.—Visit to Lambeth Palace. 3.30 p.m.

Royal Institution.—Lord Rayleigh on "Sound." 3 p.m.

Association of Public Sanitary Inspectors.—Dr. Alfred Carpenter, J.P., on "Disinfection." 6.30 p.m.

Miscellaneous.

Exhibition of Marine Meteorological Instruments.—An interesting and instructive exhibition of marine meteorological instruments, organised by the Royal Meteorological Society, was opened on Tuesday, the 15th inst., in the Library of the Institution of Civil Engineers, 25, Great George-street. Specimens of almost every kind of instrument used for taking meteorological observations at sea were included in the exhibition; sets of instruments as supplied to the British, French, Dutch, and other navies being shown. There are numerous forms of deep-sea thermometers, including Johnson's registering metallic, the records of which are obtained by the varying expansion of brass and steel bars acting upon indices; Miller-Casella maximum and minimum; and Negretti & Zambra's reversing thermometer. Special interest attached to the instruments which were used on board the Challenger, many of which were constructed by Mr. Buchanan during the voyage of that vessel. The instruments and apparatus used at the Scottish Marine Station, Granton, near Edinburgh, and at the Lochbinn Marine Institute, Isle of Mull, were also shown. In addition to the above there were various forms of anerometers, rain-gauges, logs, current meters, clinometers, &c., for use on board ship.

The New Law Courts for Birmingham. Her Majesty the Queen on Wednesday last laid the foundation-stone of this important public building, of which Messrs. Aston Webb & E. Ingress Bell are the architects. After the laying of the foundation-stone, the architects were presented to Her Majesty. We gave a view and plan of the buildings in the Builder for July 31 last.

H. J. & C. Major, Limited.—The prospects of this new company, which has been formed to carry on an old-established roofing tile, pottery, and brick-making business, will be found in our advertising columns.

**Value of Building Land on the Thames Embankment.**—On Wednesday Messrs. Daniel Smith, Son, & Oakley submitted for sale, at the Auction Mart, the freehold building site on the Victoria Embankment, covering an area of about 8,836 ft., the buildings upon the site being at present occupied by Messrs. Woodfall & Kinder, the well-known printers. The property has a frontage of 82 ft. to the Embankment, and 50 ft. to Milford-lane, with an average depth of 120 ft. The existing premises, in the occupation of Messrs. Woodfall & Kinder, containing three stories, were included in the sale, and it was stated that as they were only held until Michaelmas of the present year, the purchaser would have possession at that time. In offering the property, the auctioneer pointed out that land on the Embankment, more especially between Somerset House and Blackfriars, where this property was situated, was daily increasing in value. It adjoined the offices of the London School Board, the land immediately adjacent to those offices having since been sold for a much higher sum than the School Board authorities gave for theirs. On the property being submitted the highest offer was 18,000*l.*, on which the auctioneer announced 25,000*l.* as the reserved price at which the property would be sold, but no offer of that amount being made, the property was withdrawn. We may add that new printing works and offices are about to be erected for Messrs. Woodfall & Kinder in Long-acre, Mr. W. S. Witherington, of Mark-lane, being the architect. Messrs. Patman & Fotheringham are the builders.

**Building around Epping Forest.**—The acquisition of Epping Forest by the Corporation has been followed in succession by the owners of several estates in the neighbourhood of Chingford and other localities adjoining the forest utilising their properties for building upon. On these estates new roads have been formed, and building has already been commenced. In connexion with one of these properties, known as the Hartwell Estate, situated in High-street, Chingford, Mr. Richard J. Collier conducted a sale of building sites on Saturday last, at the Royal Forest Hotel. The estate is near the new parish church, and within a short distance of the Chingford Railway Station. There was a large attendance at the sale. The number of plots offered was sixty-three, some of which have frontages to High-street, and others to a new thoroughfare named Warren-road, which has been formed through the centre of the estate. The plots submitted have frontages of 20 ft., with average depths of about 125 ft. Several of these were sold at prices ranging from 35*l.* to 40*l.* each. For a corner plot at the junction of High-street and Warren-road, having a frontage of 40 ft. and a depth of 150 ft., 95*l.* was offered, but this sum not amounting to the reserve it was bought in at 105*l.* It may be added that the building operations now going forward in the neighbourhood include the erection of a large new banqueting pavilion in the grounds of the Royal Forest Hotel, Mr. Morter, of Stratford, being the contractor. The Great Eastern Railway Company have also erected a much enlarged station at Chingford.

**Sugar in Mortar.**—In reply to inquiries as to the use of sugar in "chunam" (the marble-like coating of Indian rooms) and in ordinary mortar, a correspondent in the Ganjam district of the Madras Presidency kindly informs us that the natives rarely use sugar in mortar for building purposes, but they use a highly prepared mortar for plastering walls, ceilings, and verandah pillars, which takes a high polish and makes a capital imitation of marble. It will stand washing with soft-soap water, and is composed of the following:—100 lb. good slacked shell lime, 1*½* lb. country sugar (cheoney), the white and yolks of sixteen eggs, 4 lb. good butter-milk, 25 lb. well sifted cleaned fine sand, 1 lb. butter, 50 lb. water. These articles must be well mixed and placed in a covered tub, and allowed to remain so for three days before using. If this marble mortar could be tinted, it might be very useful in the inner walls of English houses, and in its white state it would come in for ceilings. Washable walls and ceilings of a permanent character are a great desideratum in this country for sanitary purposes, and especially in our smoky towns. Our correspondent gives the following composition as having been used for ordinary building purposes, and found very serviceable: 120 lb. lime, 240 lb. sand, 2 lb. Jaggery sugar, water in proportion.—*Produce Markets Review.*

**Lectures for the Instruction of Sanitary Inspectors.**—We have received the prospectus of a course of lectures and demonstrations which are to be given at the Parkes Museum on Tuesdays and Fridays during April and May. These lectures are intended for the instruction of sanitary inspectors. The following is a list of them:—April 15th, introductory lecture, "General History, Principles, and Methods of Hygiene," by Dr. Alfred Hill, M.R.C.S.; April 19th, "Ventilation, Measurement of Cubic Space, &c.," by Capt. Douglas Galton, R.E., C.B., F.R.S.; April 22nd, "Water Supply, Drinking Water, Pollution of Water," by Dr. Louis Parkes; April 25th, "Drainage Construction," by Professor H. Robinson, M.Inst.C.E.; April 29th, "Sanitary Appliances," by Professor W. H. Corfield, M.A., M.D.; May 3rd, "Scavenging, Disposal of Refuse and Sewage" [no lecturer's name given]; May 6th, "Food (including Milk), Sale of Food and Drugs Act," by Mr. C. E. Cassal, F.C.S., F.I.C.; May 10th, "Infectious Diseases and Methods of Disinfection," by Dr. R. Thorne Thorne; May 13th, "General Powers and Duties of Inspectors of Nuisances, Method of Inspection," by Mr. J. P. J. Sykes, B.Sc., M.R.C.S.; May 17th, "Nature of Nuisances, including Nuisances the Abatement of which is Difficult," by Mr. J. P. J. Sykes, B.Sc., M.R.C.S.; May 20th, "Sanitary Law,—General Enactments, Public Health Act, 1875, Model By-Laws," by Dr. Charles Kelly; May 24th, "Metropolitan Acts, By-Laws of Metropolitan Board of Works," by Mr. A. Wynter Blyth, M.R.C.S., L.S.A. A nominal fee only for the course will be charged to cover expenses, and students attending the course will be granted free admission to the Museum and Library from April 1st to June 1st.

**Tendering at the Antipodes.**—The Sydney Daily Telegraph of Feb. 5 reports that at a special meeting of the New South Wales Public Works Contractors' Association, the subject of maintaining the system of letting all public works by public tender and securing honest tendering was discussed, and the unfair action of the Minister for Works in Queensland in passing by the lowest tenderer for a Government railway and giving the contract to a seeming favorite, and thus making a direct blow at the purity of public tendering, was strongly commented upon, and the following resolutions were adopted:—

1. "That this Association strongly protests against the manner in which Mr. Miles, the Minister for Works in Queensland, has manipulated the tenders for the second section of the Cairns-Herberton Railway, and that his treatment of Messrs. Carey & Maund, the lowest tenderers, should be well noted by contractors for public works as a warning not to waste their time and money in tendering for Queensland works, and that the matter be referred for advice to the Association's solicitors as to what steps it is advisable to take on the subject, and, further, that this Association views with suspicion the action of the Minister."

2. "That the above resolution be circulated throughout the press of the Australasian colonies."

It was also mentioned at the meeting that no instance of such unfair dealing with tenders had been recorded against the Tender Board or the Minister in the colony of Victoria, but that it was quite possible that the liberties taken by Mr. Miles in this and other tenderings might be copied by other Ministers if public protest were not secured.

**Railways in Turkey.**—The Constantinople correspondent of the Daily News telegraphs:—"Negotiations have been going on for some time between the Porte and a French group of financiers for an extension of the railway from the Bosphorus to Ismid as far as Angora. Another group of English, German, and French capitalists had tendered for the same extension. The former proposals have now been definitely rejected, and as the Sultan is convinced of the urgent need of the railway in order to prevent famine, and to give work to the unemployed, it is believed that the project of the latter group will be immediately accepted, and the works proceeded with."

**The Baths at Buxton.**—With reference to the paragraph in our last (p. 454) in reference to the Buxton Baths, Mr. Smeaton writes to say that he not only fixed the baths, but also manufactured them, and that they are to his special patterns. We may take the opportunity of adding that the general building work was done by Mr. James Salt.

**"Colour: its Laws of Contrast."**—This was the subject of a lecture delivered last week at the St. Alban's Public Library, by Dr. R. C. Puckett, head master of the St. Alban's and Watford Schools of Art.

**Masonry Classes.**—The Class of Masonry which has been conducted by Mr. Lawrence Harvey at the City Guilds Institute came to a close for the present on the evening of Tuesday, the 22nd, after receiving the sanction of an official committee deputed by the Institute, composed of Mr. T. Anson, F.R.I.B.A., Mr. Barry, Mr. Cates, Mr. Aitchison, and Mr. Banister Fletcher. Mr. T. Anson having taken the chair, a testimonial, signed by all the members of the class, was presented to Mr. Harvey by Mr. Herbert D. Appleton, Hon. Sec. of the Architectural Association, and after Mr. Harvey had thanked the class for this recognition, every member of the deputation of the R.I.B.A. spoke in turn as to the advisability of having the class permanently established, and they promised to use their influence collectively and individually to bring this about.

**Proposed Statue to Mozart.**—It has been decided that a statue of Mozart shall be erected directly in front of the Opera House at Vienna. For some time past the different authorities had been unable to agree with regard to the site for the monument, but this difficulty has at length been happily removed, the spot selected being undoubtedly the finest and most appropriate for the purpose in the Austrian capital. A competition will shortly be initiated for the best design for the statue. Up to the present date a sum of 63,000 forins, or more than 5,200*l.*, has been raised by public subscription for carrying out the project.

**Metropolitan Board of Works.**—At the meeting of the Board convened for Friday, March 25, a few hours after these lines are published, the first business will be the election of a District Surveyor for South Islington, vice Mr. Rowland Plumb, transferred to the West Hampstead District. The Works and General Purposes Committee will present a report recommending several increases of salary, including that of Mr. John Hebb, Assistant Architect, from 600*l.* to 700*l.* a year.

**The Wenham Company (Limited).**—The directors of this company (the sole proprietors and manufacturers of the Wenham Patent Gas Lamp) announce that although the accounts of the company are only finally made up and audited yearly to the 30th of June, the business of the half-year ended December 31st, 1886, has resulted in a very satisfactory profit, which enables the Board to declare an interim dividend of 1*s.* per share for that period (10*s.* per annum) leaving a large disposable amount.

**Lifts.**—Messrs. Archd. Smith & Stevens are making a large one-ton lift for Messrs. Fry & Sons' new premises in the City-road. This lift will travel the full height of the building, and be fitted with Stevens & Major's patent "Robiano" safety gear. A similar lift has just been completed for Messrs. Brand & Co.'s new premises in Lambeth-road.

**Technical School and College Buildings.** Messrs. Whitaker & Co. announce for early publication a comprehensive reference book on this subject, by Mr. E. C. Robins, F.S.A., whose special acquaintance with the subject is known to many of our readers. Such a book is much wanted, and ought to be very useful. The work will be largely illustrated.

**Wesley Chapel and Sunday Schools, Camborne.**—The awards in this competition have been made. In the case of re-seating the chapel the plans of Mr. Oliver Caldwell, of Penzance, have been selected; and in that of the schools, to the plans of Mr. John Bood, Camborne.

PRICES CURRENT OF MATERIALS.

|                                      | TIMBER.   |    | £. s. d. | £. s. d. |    |
|--------------------------------------|-----------|----|----------|----------|----|
| Greenheart, B.G. ....                | ton       | 6  | 10       | 7        | 10 |
| Teak, E.I. ....                      | load      | 9  | 0        | 14       | 0  |
| Sequoia, U.S. ....                   | foot cube | 0  | 2        | 4        | 0  |
| Asp., Canada .....                   | 3         | 0  | 0        | 4        | 10 |
| Birch .....                          | 2         | 0  | 0        | 3        | 10 |
| Elm .....                            | 3         | 10 | 0        | 4        | 10 |
| Fir, Danish, &c. ....                | 2         | 10 | 0        | 4        | 10 |
| Oak .....                            | 3         | 0  | 0        | 6        | 0  |
| Canada, .....                        | 2         | 0  | 0        | 3        | 10 |
| Pine, Canada red .....               | 0         | 2  | 0        | 4        | 0  |
| " yellow .....                       | 0         | 0  | 5        | 0        | 0  |
| Larch, Danish .....                  | 4         | 0  | 5        | 10       | 0  |
| St. Petersburg .....                 | 2         | 15 | 0        | 4        | 0  |
| Waincoat, Riga .....                 | 2         | 15 | 0        | 4        | 0  |
| Odessa, crown .....                  | 7         | 0  | 0        | 8        | 0  |
| Riga .....                           | 5         | 10 | 0        | 8        | 10 |
| Deal, Finland, 2nd and 1st, s.d. 100 | 4         | 10 | 0        | 8        | 0  |
| " 4th and 3rd .....                  | 6         | 0  | 0        | 8        | 0  |
| " white .....                        | 6         | 0  | 0        | 8        | 0  |
| Swedish .....                        | 6         | 0  | 0        | 15       | 0  |



Table with columns: Item, £ s. d., £ s. d. Includes items like TIMBER (continued), Deal-White Sea, Canada, Pine, etc.

Table with columns: METALS (continued), £ s. d., £ s. d. Includes items like COPPER, British, cast and ingot, Sheet selected, etc.

Table with columns: CROSLY (Herts.), For procuring new mill buildings, etc. Includes items like C. Miskin, Macey & Son, etc.

CONTRACTS AND PUBLIC APPOINTMENTS. Epitome of Advertisements in this Number.

Table with columns: Nature of Work or Materials, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes sections for CONTRACTS and PUBLIC APPOINTMENTS.

Table with columns: Nature of Appointment, By whom advertised, Salary, Applications to be in, Page. Lists various public appointments.

Table with columns: TENDERS. Includes sections for ARNOLD (Notts.), BARKING, BRXHILL (Sussex), BROMLEY (Kent), CROSLY (Herts.), COODEN (Sussex), CROSLY (Herts.), CROSLY (Herts.), CROSLY (Herts.), etc.

**LEICESTER.**—For the construction of a stone weir (600 ft. long), canal lock, with flood basin and towing path, walls, and other works in connection therewith, on the River Soar, Leicester, for the Corporation of Leicester, according to plans, specification, and quantities by J. Gordon, M.Inst. C.E., Borough Surveyor:—  
 C. Baker & Co., Bradford ..... 27,498 19 7  
 Knight & Chawin, Sleaford ..... 25,930 0 0  
 J. Woodriss, Cullington, Bradford ..... 21,542 14 11  
 Jno. B. St. Leger ..... 23,674 15 9  
 Jno. Foll, Leamington ..... 23,781 18 0  
 W. J. McKenzie, Wansworth ..... 21,697 0 0  
 A. Kellest, Easting ..... 21,978 4 11  
 Whitaker Bros., Lends ..... 21,767 0 0  
 H. W. Pattinson, Sleaford ..... 20,776 1 9  
 B. Cooke & Co., Butterfield ..... 20,479 0 0  
 Nelson & Co., Cleethorpe ..... 20,378 18 1  
 James Dickson, St. Albans ..... 20,316 0 0  
 Pickhall & Sons, Merthyr Tydvil ..... 19,629 0 0  
 C. Bradstock, Southampton ..... 19,112 0 4  
 E. Tempest, Leicester and Reichey ..... 18,990 0 0  
 James Evans, Birmingham\* ..... 17,883 8 6  
 \* Accepted.

**LONDON.**—For paving works for the Vestry of St. George-in-the-East, for one year. Mr. G. Wilson, surveyor:—  
 W. L. Wheeler, Queen Victoria-street (accepted) ..... As per schedule.

**LONDON.**—For sundry alterations at No. 135, Pall-mal-road, for Mr. J. F. Haden. Mr. J. B. Wall, architect:—  
 T. D. Long ..... 6,140 0 0  
 F. Head ..... 236 0 0  
 John Leggett, Chelsea (accepted) ..... 225 0 0

**LONDON.**—For rebuilding Nos 283 and 281, White-chapel-road, for Messrs. Buck & Lickman. Messrs. Dunk & Geden, architects, Leadenhall-street:—  
 Ashby & Homer ..... 28,473 0 0  
 Cobb & Son ..... 6,444 0 0  
 John Grover & Son ..... 6,378 0 0  
 Charles Cox ..... 6,339 0 0  
 Samuel J. Ferrard ..... 6,174 0 0  
 James Marter ..... 6,167 0 0  
 J. & J. Greenwood ..... 6,137 0 0  
 E. Lawrence & Sons (accepted) ..... 6,047 0 0

**LONDON.**—For carrying out re-arrangement of seating at Olympia, Kensington. Mr. J. G. Backe, architect:—  
 D. Laing & Son ..... 23,193 0 0  
 W. A. Rhodes ..... 3,375 0 0  
 D. Brown & Co. (accepted) ..... 2,890 0 0  
 S. Yardley & Son (late) ..... 2,950 0 0  
 [Architect's estimate, 3,000.]

**LONDON.**—For the erection of a school room in Gordon-road, Peckham, for the Building Committee of the Nunhead Green Baptist Chapel. Messrs. Byrnes & Grierson, architects, Bedford-row, London:—  
 H. Pennack ..... 2,247 3 0  
 Spencer & Co. (accepted) ..... 231 0 0  
 R. Bayden (accepted) ..... 188 10 0  
 H. E. Cardozo ..... 154 10 0

**MARGATE.**—For erecting two houses with shops and bakehouse in Alexander-road, Margate, for Mrs. E. Gardner. Mr. Arthur H. Clarke, Margate, architect:—  
 Lockwood & Co., Westgate-on-Sea ..... 21,240 0 0  
 Clements, Margate ..... 1,240 0 0  
 Finch, Birchington-on-Sea ..... 1,160 0 0  
 Barton, Margate ..... 1,125 0 0  
 Rolfe, Margate ..... 1,120 0 0  
 Barwick, Margate ..... 1,050 0 0  
 Bowman, Margate ..... 1,028 0 0  
 Wales, Margate ..... 985 0 0  
 Wood, Heading-street (accepted) ..... 935 0 0  
 Doughty, Margate ..... 945 0 0

**PUTNEY.**—For enlargement of the channel and building channel side at St. John's Church, Putney. Messrs. Lee Bros. & Pain, architects, Adelphi-terrace. Quantities supplied:—  
 Lathey Bros. .... 22,291 0 0  
 Ariss & Son ..... 1,047 0 0  
 Ariss & Co. .... 1,950 0 0  
 Adamson & Sons (accepted) ..... 1,925 0 0

**MARGATE.**—For alterations to Plough Coffee Tavern, for the Directors of the Margate Coffee Tavern Co.:—  
 Martin ..... 2,105 0 0  
 Duckett ..... 103 0 0  
 Newby Bros. .... 98 0 0  
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### "Mycene Vases."



HEN in 1879 the "Mykenische Thongefässe" appeared, it was well known that the book, important though it was, was only an instalment of a larger work. The illustrations were strictly confined to such vases as had actually been found in the graves of the Mycene acropolis, and could therefore, in the strictest sense, from their provenance, be called Mycenean. The joint authors of the present book\* see their way to much larger issues; by localities as far apart as Athens, Syracuse, Corneto, and Phocis they have collected specimens of a kind of pottery analogous to that found at Mycene, and in the belief that the head centre of fabrication was Mycene, they have given to this scattered material the name of Mycenean,—in fact, they have added a fresh chapter to the history of pre-Hellenic fictile art. The work of classifying these materials was begun in 1878, just when the excitement of Dr. Schliemann's Mycene discoveries was at its height. Public interest centred, however, almost entirely on the more costly objects found, the ivory, gold, and other metals; the mountains of broken pottery were comparatively neglected; and as yet, as Dr. Furtwängler points out, in regards chronology, these vase fragments were of supreme importance. The gold objects were found in some only of the graves, pottery in all. Further, analogous pottery had been discovered elsewhere, so that materials for comparison were at hand.

The amount of material was colossal. The whole of the contents of the graves were brought to Athens, as well as all the most important fragments from outside the graves. A small mountain of broken bits still remains to be observed. The method of classification adopted was simply this: the whole of the fragments were first divided into two great classes, according to the technical procedure of the decoration. In Class I. the decoration is dull (Mattmalerei), in Class II. it is glazed. Class I. is much the smaller of the two. It falls itself into two groups: a, red-clayed vases; b, pale clay vases. At Mycene Class I. only appears in the lowest strata of graves, so at Thera and Tiryns. At Nauplia it does not appear at all. It is sparsely represented at Egina,

Orchomenos, Daulis, Amorgos, and Melos. Most authorities agree that this class of vases, with the Mattmalerei, is a development of the rudest kind found in the Cyprus graves. On this it shows a distinct advance, as it bears evidence of the use of the potter's wheel, and painting is employed for decoration in place of rude plastic ornamentation, stuck on, and scratched lines. Whereas the pottery of the kind described in Class I. is common to Phœnicia, Egypt, and other Oriental races, Class II., with the glazed decoration, is distinctively Hellenic, only Greeks and those who learned from the Greeks manufacturing it.

Drs. Furtwängler and Loeschke then proceeded to divide Class II. into four groups, according to the character of the decoration employed. Into these minutiae of classification we need not follow them. It is more important to note their views as to the origin of this "Mycene" pottery generally, and its precise place in the history of Greek art.

To begin with the question of where all this widely-scattered pottery was made. They state without hesitation that, spite of all minor distinctions, the general character of the work is so uniform that they are obliged to suppose a common *fabricque*. The difference between e.g. the vases of Mycene and Ialysos is no greater than that between Attic vases found in Attica and those found in the Crimea. Hence the conclusion obviously is that most of the places where these "Mycene" vases are found imported them. The import does not seem to have been contemporaneous, e.g. there is evidence to show it began earlier at Thera than at Ialysos. They also think it probable that at the place where the head manufacture was there may have been several workshops, each characterised by differences of manner, just as in the days of Attic pottery we have the different styles of different potters, who each set their several fashions.

Further, in accounting for different styles, the variable taste of purchasers had to be considered; e.g., it seems that by preference the Cyprians bought large kraters ornamented with chariot scenes, and wine jars decorated with concentric circles to imitate the grain of wood.

The head place of manufacture they hold to be undoubtedly Mycene, because there, and there only, have we an uninterrupted sequence of the different styles in their chronological development. At Mycene, further, we never find vases which have the appearance, as some have at Thera, Orchomenos, Cyprus, and other places, of being local imitations. Probably the manufacture took place all over the district of Mycene, but as the mature character of the ornament shows, the influence of the sea-coast must have been very strong.

Technique and systems of decoration alike show that the manufacture was in the main free from admixture of foreign influence. Naturalistic ornament prevails. Among favourite motives are patterns suggested by sea-waves, fishes, starfish, polypi, coral, sea snails, mussel-shells. Sea shells were, no doubt, worn for ornament by the makers of the vases themselves, and they transferred this simple system of decoration to their pottery.

Further, it is noteworthy that, whereas the gold ornaments, ivory, and the like begin to show evidence of foreign influence, the pottery remains true to itself, deep-rooted in local tradition. It enlarged its sphere of decoration by admitting the quadruped world, birds and men, and later by copying textile fabrics, but in all the long series of Mycene vases one never meets an Oriental hybrid monster, a griffin, or a lion, or even an Oriental vegetable motive, till the time when the Mycene style of pottery is all but extinct.

Still also essentially autochthonous as to motives of decoration in form and technique, the Mycene pottery came to borrow much from metal-work, and in this respect the comparison of the pottery and the gold work is highly instructive.

We come next to the important and difficult question of date.

First, we are obliged to own that, unless the whole of the pottery was imported from some locality unknown, it is pre-Doric in character. In order, however, to get some sort of definition into this vague chronology, it is necessary to consider the relation between the "Mycene" pottery and the pottery known as "Dipylon."

The dome-shaped building at Nicuidi was definitely closed when the third style of the second class of Mycene vases came into vogue. In the dromos we find pure fragments, which give evidence of a long-continued cult of the dead lasting on through the succession of several styles of vases, e.g., Mycene third style, Dipylon vases, proto-Corinthian, Corinthian, and Attic; these are clearly successive, though, of course, in part they overlap. Also, in the dromos of the dome-shaped building near the Lion Gate we find fragments of the third Mycene style mixed with Dipylon fragments, whereas no fragments of the fourth style are certain here. So also at Tiryns the third and fourth styles are weak, the Dipylon strong.

The conclusion is manifest; the third style immediately precedes, the fourth style is contemporary with, the Dipylon vases.

As regards the Dipylon vases, their full-blown appearance has always been difficult of explanation; there is no evidence of long apprenticeship to the art; the manner seems from the

\* Mykenische Vasen, Vorhellenische Thongefässe aus dem Gebiete des Mittelmeers. Im Auftrage des Kaiserlichen Deutschen Archæologischen Instituts in Athen. Herausgegeben von Adolf Furtwängler und Georg Loeschke.

first well assured,—we can have no development.

An interesting hypothesis to account for this is offered by the two authors. During the third Mycenaean style, *i.e.*, about the tenth century, there was, in all probability, an incursion of a Doric stock, who had recently attained to the "Bronze" stage of civilisation, and whose chief industry, except graving on metal, was weaving highly-conventionalised and developed patterns. This Doric stock learned from the Achaeans of Argos to make pottery with the wheel, and they then, having acquired the potter's art, introduced their textile patterns into the system of vase-decoration, specially the notable so-called "triglyph and metope" pattern. These patterns were, in part, taken over into the third Mycenaean style, and a few motives from the Mycenaean style were borrowed by the Doric makers of Dipylon vases.

Whether the first Dipylon vases were made in Argos remains an open question. Be this as it may, the great mass of the Dipylon vases were made at a further stage in the Doric wandering,—possibly, as is suggested by the motives of the sea fight and Pyrrhic dance,—at Crete.

We have thus arrived at a terminus *ad quem* for the Mycenaean vases. We have now to look for a terminus *a quo*. Here Egypt comes in to help. It has recently been made almost certain, by a process of reasoning we cannot here detail, that the Mycenaean sword-blades date about the time of the first Rameseids (about the sixteenth century). On the wall of a tomb of Rameses III. a vase is painted, which was evidently done from an original of the third Mycenaean style. We must suppose, then, that as the Mycenaean style was then in a late period of development the early specimens must be as early as the fourteenth century.

The peculiar merit, then, of this Mycenaean pottery is to give evidence of a *pre*-Doric civilisation and a *pre*-Doric art, a time when the Greek people were as yet untouched by Oriental impulse,—when their desires were indeed narrow, but prompted by that love of naturalism which was the mainspring of all that was ultimately best in Greek art.

The gold and ivory objects found in the graves show us this same people, but under foreign influence in direct relation by trade with all the wonder world of the East. But Greek art remained true to itself, and we are able still to feel the autochthonic impulse of naturalism, even where the technique is foreign. In the wide spread of exports from Mycenaean two places hold a position of special interest,—Rhodes and Attica. In each of these places not only is there a whole necropolis full of Mycenaean wares, but the very form of the graves and the manner of burial shows that the influence of Mycenaean was stronger here than that of mere trade: a colony must have been founded. Presumably this took place under external Doric pressure in the mother city of Mycenaean. With this, literary notices agree, and the fact that the name *Αχαια* is found in Rhodes.

After the Dorian invasion, Greece a second time went to the East to learn, and again, but this time with more lasting results, she incorporated Oriental elements into her own naturalistic art.

It cannot be doubted that between Achaean and post-Dorian art there is a gulf caused by some great ethno-political upheaval, but a few scattered links can be picked up to cross the breach, and such are the continuance of the glazed pottery, certain peculiarities in gem engraving, and some few ornaments and figured types. In conclusion, it is well said that if Diapheus and Scyllis came, as tradition has it, from Crete to Argos and Sicyon, they, the sons of Daedalus, came back to their old home and brought the arts of cutting, carving, and inlaying to the place where centuries ago they had been known, *i.e.* to this country of Mycenaean. The history of Greek art and of all Greece begins in the Peloponnese, and "the first chapter of that history is the story of the 'Mycenaean Vases.'"

We have given the theory of the book in some detail, both because the work from its

great size and cost is not easily accessible except in the largest libraries, and also because its importance in regard to the subject with which it deals can scarcely be over-rated. For the detailed support of the theory, which can only be rightly understood by constant reference to the splendid and accurate plates, we must refer our readers to the original.

#### "MODERN ORNAMENTATION."



HIS is the somewhat too comprehensive title given to what is really a collection of fifty plates of decorative design published by Dr. Dresser,\* and which is described in the preface as being "all original designs which are the work of the author, his assistants, and his pupils collectively." It is a proof of the degree in which Dr. Dresser has really created an atelier of design, that these plates produce the impression of being all by the same hand and devised by the same mind, in spite of the admitted fact that they are not so. The title of the work is hardly chosen; it is, of course, difficult to select a distinctive title for a work of this kind; but "Modern Ornamentation" is a title which certainly conveys the idea of a comprehensive work giving illustrations of all the various schools or manners of modern decorative design, rather than of a limited collection of designs put forth from a single studio. "Examples of Ornamentation," or "Suggestions in Decorative Design," would have been a title more correctly conveying the nature and object of the publication, which consists of fifty plates of designs founded on ancient types or on nature, or in a few instances distinctly original, that is, having no special precedent that can be pointed out.

The latter title would, in fact, have precisely tallied with what the author says in his preface as to the object of the publication: "However creative our minds may be, we are all glad to have the thoughts of others brought before us for our consideration, and by contemplating strange works, and, if I may so express myself, re-digesting them, we often originate things differing widely from what gave rise to the thought, and imbued with all the special characters of our own minds. In this way it is hoped the present work may be found useful."

This reflection as to the suggestiveness of any ornamental idea for the working out from it of fresh combinations, sometimes differing entirely from what first suggested them, is one entirely borne out by the experience of every designer. A mere subsidiary incident, the manner of turning a scroll or of filling up a corner in a design, may catch a new eye and give rise to the development of an entirely new idea. This is one of the forms of similarity between music and ornament; purely instrumental music being, in regard to its forms, a kind of pattern-designing in sound in accordance with certain proportions and principles; and thus, as in some well-known instances, a slight incident in sound,—a series of rhythmically repeated knocks at a door, or a turn in the song of a bird, has furnished a great musical designer with the suggestion for an extended and highly-elaborated composition.

These plates, then, are to be regarded as abstract ideas in ornament, not designed for any special place, process, or material, but simply as ornaments which may be adapted wholesale, if the manufacturer have absolutely no ideas of his own, or may furnish starting points and suggestions to be developed by each worker in his own way, and in reference to the material in which he is working. Taking them first as abstract ideas in ornament, without reference to material, we remember that when the first two out of the ten parts were sent to us some time ago, we were not favourably impressed with them as examples of the kind of thing of which the work was presumably to consist. The design on Plate III. especially,

with dummy suggestions of birds with rosette eyes, and which we observe is noted in the preface as a kind of thing that would make a grotesque border for the dabo of a smoking-room, repelled us notably; it looks more like a joke than a piece of real decorative design; and unfortunately it is a joke of which the humour is not very apparent. Some other designs in the book are open to the same objection; they are not only jokes, but rather poor jokes. The designs described as Celtic,—*i.e.*, based on Celtic motives,—show some of the oddity of that ancient and venerable school of ornament, but without its power and picturesqueness. Then, again, we have great doubts as to the system of trying to make ornament express a definite meaning, which Dr. Dresser has tried a good while ago on other occasions. Ornament which is imbued with definite meanings has unfortunately a great tendency to cease to be ornament. It certainly has ceased to be so in the "Evening" panel on plate 26, which is a mere kind of *olla podrida* of beetles, moths, and spiders, with a substructure of vegetation. We protest, "in the name of all the gods at once," against this kind of thing being regarded as decorative design. It appears to us inherently vicious.

There are, however, a considerable number of the plates which keep quite clear of these kind of "notions," and which, taken collectively, do present a large body of suggestions, many of them very good ones, for the filling-in of spaces and the devising and combining of diapers; and many of these, which are professedly based on known styles, are of value in another way, as suggesting the variations which may be played on the elements of those styles. There are not, we confess, many that appear to us to rise to the highest type of ornament; and we are rather inclined to think that this is an indication that it is a somewhat dangerous thing to put out ornament in the abstract, as specially invented and showing novelty either of idea or treatment. For there is then an almost irresistible temptation to the designer to, as it were, exhibit his cleverness; and cleverness is the note of these designs. There is a kind of *chic* about too many of them; a want of real feeling; a too-evident intention to make something clever; an intention which is realised, be it said; but then cleverness is not all we want in original ornament. Some of the designs display a larger and broader style than this, and a finer feeling; notably, the one we have selected for illustration (see lithograph plate in this number), and which is described as "a form of Italian Renaissance ornament." A great deal of the detail in this, however, is treated in a way quite new, and there is a largeness and breadth about it, a kind of enthusiasm in the design, which is very striking.

We alluded just now, in passing, to the idea that the craftsman might apply these designs, or suggestions from them, modified according to his own taste or to the material in which he worked. In regard to the latter point, however, few of the designs appear to be evolved with reference to the capabilities of any special material. A few of them are mentioned in the preface as suitable for execution in this or that material, but we hardly discern any decisive or necessary suitability, certainly not any of that inherent feeling for the material which is so important an element in decorative design. It is not sufficient, from our point of view, to say such a design may be suitable for stone carving; to be properly suitable it should have that sort of stone character in it, as if the idea of its working in stone were present to the mind of the designer from the first. The author may say he did not profess to publish designs for special materials, but only general motives. Our idea is that the motive itself should be partly governed by the consideration of the material in which it is to be worked.

**St. Pancras Workhouse.**—The Local Government Board have approved of the plans of Mr. H. H. Bridgman, submitted by the Guardians of St. Pancras for the reconstruction of the remainder of the workhouse, at an estimated cost of 50,700.

\* "Modern Ornamentation": being a series of original designs for the patterns of textile fabrics, for the ornamentation of manufactures in wood, metal, pottery, &c., also for the decoration of walls and ceilings and other flat surfaces. By Christopher Dresser, Ph.D., &c. London: B. T. Batsford. 1886.

## NOTES.

**T**HE House of Lords disposed of the first twenty-three clauses of the Railway Bill in two or three hours on Tuesday, but not without adopting several rather important amendments. They agreed to a proposal made by the Earl of Jersey for altering the constitution of the new Commission by appointing two Commissioners instead of three, with a Judge of the Supreme Court presiding on all occasions. A certain amount of indifference was manifested on the subject, for, although Lord Stanley contended that the clause as it stood would meet all the requirements of the trading community, and Lord Salisbury complained that the judges were already overworked, no division was taken. An addition to Clause 17 provides that the Commissioners shall not award damages in respect of any matter arising more than a year before the complaint was made,—a limitation greatly affecting the scope of this clause. Clause 17 provides that appeal shall lie upon questions of law from the Commissioners to the Court of Appeal, and from thence by special leave to the House of Lords. The traders look upon this double appeal with great aversion, but Lord Grimthorpe, supported by Lord Bramwell, proposed to add to the yoke by permitting appeal upon questions of fact also; and the amendment was only defeated by two votes. Lord Bramwell (who was probably the author of the *Times* letter signed "B.") had made a very unusual proposition in the House of Lords on Monday with regard to this measure. His Lordship urged that the South-Eastern Railway Company might be heard by counsel at the bar of the House in opposition to those parts of the Bill interfering with their existing Parliamentary powers; and unintentionally created much laughter by gravely alluding to the company mentioned as "my clients." This motion was, of course, negatived, as every opportunity will be afforded for the measure to be discussed in Parliament in all its bearings in the ordinary course before it becomes law, and Lord Stanley has met the various deputations which have waited upon him on the subject with answers very much to this effect. It will be seen that the most important clauses of the Bill have not yet been reached.

**T**HE result of the *plébiscite* on the Edinburgh Municipal Buildings Bill is an adverse vote of 13,426, and intimation has accordingly been given to withdraw the Bill. This result is only what might have been expected. The resort to a vote of the ratepayers in a matter involving additional taxation is not likely to be successful, unless in exceptional cases, where the individual wants of the voters is concerned. In the present instance those opposed to the scheme have been unscrupulous in circulating statements of the most mendacious kind, and in imputing motives where none existed. The resort to post-card voting was an entire mistake, into which the Town Council allowed themselves to be forced by avowed opponents to the scheme, who will doubtless rejoice at the result of their tactics, but it is a poor matter to be proud of. Something, it is clear, must be done, but the less done at present the better: it should only be in the nature of a temporary makeshift, leaving to a future time the carrying out of an efficient scheme. It is exceedingly unfair to the architectural profession that they should have been deluded into spending so much time and thought on a competition for a building, the erection of which seems to have been all along a more than doubtful matter. Why was not the *plébiscite* taken before designs were asked for, instead of after? The whole procedure in the matter has been most vexatious and unbusinesslike, and the architectural profession have really been made fools of in being drawn in to compete for a castle in the air.

**A** PRETTY long and rather acrimonious discussion took place in the House on Thursday last week, on what was called the Kensington Vestry Bill, which was to empower the Vestry to erect a Refuse Destructor on a site in their parish. The Bill was read a third time, but as a strong opposition was made to it on the ground that the destructor would be a nuisance, we made some special inquiries as to Whitechapel and the destructor there, which was referred to as a case in point. We are informed that the destructor there is to some extent regarded as a nuisance in consequence of the deposit which it makes of a small, fine ash from burnt paper, which, being very light, is carried up the flue by the strong draught before it is entirely consumed, and falls in a powder around the neighbourhood. It has been suggested that the mischief might be remedied or avoided by the application of a small subsidiary furnace at the junction of the horizontal flue with the chimney-shaft. The nuisance appears to be, at all events, within the category of preventable ones, and not a sufficient drawback to cause the abandonment of destructors just yet.

**D**ECENT falls of snow have brought into prominence several questions involving the extent of the duties of Vestries and Local Boards in the matter of the clearance of that wintry element. One or two important judicial decisions have been given on these points. According to a judgment delivered a few days ago by Mr. Justice Denman, it appears that local authorities are not liable for damages when an accident occurs in consequence of a vehicle being overturned by a frozen heap of snow left at the side of the street for a reasonable time after the fall. The successful defence was that snow must necessarily be heaped at the side of the street, and remain for some time, if the road is to be expeditiously made available for traffic, and that drivers, under these exceptional circumstances, ought to exercise increased care in driving through and turning the corners of streets, and so avoid the heaps of snow. The case came before the Court in proceedings instituted against the parish authorities of St. George's, Hanover-square; and the victory of the defendants will doubtless quietly dispose of the large crop of claims for damages which arose out of the previous fall of snow. Then the liability of Vestries to clear the snow from the footpaths round the enclosures in squares is also a matter of general dispute, and, in order to test the case, the Chief Commissioner of Police has, at the invitation of the Vestry of Chelsea, issued two summonses against that body for non-removal of snow from the footpaths described. The decision will be looked forward to with interest; for if judgment adverse to the local authority is given, it means that the first hundred men that can be got must be drafted away to perform the comparatively useless work of clearing these footpaths, and so binding the more pressing work of clearance of the main roads and bigways.

**S**HEFFIELD appears to be in the throes of an internecine quarrel about its water supply. It appears that the existing water company has within the last quarter of a century spent a couple of millions in providing that necessary article, though it has not been successful from a financial point of view, partly owing to the bursting of a huge dam in 1864, which caused an immense loss of life and property, and partly from the badness of the times, resulting in the shutting up and removal of various manufacturing concerns, and the consequent decline of the population. All this affected the company to such an extent, that the dividends fell from 5½, and even 7½, to 2½ per cent. One would have thought that a property, so confessedly in want of prosperity, would not have excited any jealous aspirants; but, curiously enough, the Sheffield Corporation has more than once sought to possess it, and on the present occasion is struggling in the House of Lords for powers to compel the water company to sell the waterworks to it. The object of the

company is to obtain an extension of certain increased rates, which was granted for twenty-five years in 1864, and which would naturally soon expire. A great incubus upon the water company has always been the large compensation that it has had to allow mill-owners. At present, the drainage area is 15,200 acres, yielding about 19,000,000 gallons daily, of which 9,000,000 is charged for compensation. From the engineering evidence, it looks rather as if the Corporation would not be able to do any better for the town than the company has already been doing.

**A** MEMORIAL, signed by many influential personages, has been presented to the Secretary of State for War, praying that the public may be no longer shut out from the Tower Gardens and riverside Promenade. The signatories, being some 5,500 in number, comprise the Lord Mayor, with several aldermen, common councillors, magistrates, local authorities and medical officers, guardians of the poor, clergymen and ministers, chairmen of dock companies, &c. They represent how greatly such a boon would be appreciated by the inhabitants of the densely crowded districts around,—Aldgate, Whitechapel, St. George's-in-the-East, Limehouse, Poplar, and Wapping. The promenade, it appears, was open until the outbreak of the war with Russia in March, 1854, when it was reserved as a loading-place for service stores. Its pristine uses for that purpose are clearly apparent from an inspection of the Fleming Van Den Wynngaerde's map of London (circa 1550), of Aggas's map, and of Haiward's and Gascoigne's Survey of 1597. Stretching from the Iron Gate to the Tower stairs, near to the Thames subway, it lies between the river and the moat, or ditch, beneath the outer ballium wall. Since visitors are now admitted into the Tower between the bours of ten and four only, and most of the Ordnance warehouses have been recently pulled down, there seems to be small reason why this privilege should not be restored. The public are, as a rule, excluded from the precincts beyond Bell, Wakefield, and White Towers, and, indeed, from all portions of the fortress where its ancient military architecture can be best studied. There may be good objections against these restrictions being relaxed, yet the posting of warders or sentries at Byward and Cradle Towers, and by the new gate next eastwards of St. Thomas's Tower (over Traitor's Gate), would restrain the too curious from trespassing from the promenade into the forbidden ground. A portion of the gardens which overlook the moat, that has been dry ever since 1843, is divided into plots for cultivation by members of the garrison. The south-eastern slip, by the site of the older Galleyman (Develin), or Iron Gate Tower, was used for awhile (1829-1847) as a burial-ground, but has just been appropriated for the northern approach to the Tower Bridge, now in course of construction.

**M**ISS OCTAVIA HILL, of 14, Nottingbam-place, W., appeals for subscriptions in furtherance of a highly-deserving project. Having reasonable hope of certain funds in aid of the erection of six cottages, that lady is anxious to secure, by purchase, a certain plot of land adjacent to the cottages' site. The ground in question is situated in Red Cross-street, Southwark; being close to the old "Cross Bones" burial-ground, which is now occupied as a builder's yard. On this ground Miss Hill proposes to establish a people's hall, to be open in both summer and winter, for "music, flower shows, reading-room, and library . . . and for concerts, lectures, parties," &c. The remainder of the ground would be laid out as a garden, and for this latter purpose a donation is forthcoming. The hall and land together will cost 2,500*l.*

**A** PUBLIC subscription has been set on foot for the purpose of restoring Preston Castle or Tower near Prestonpans, in East Lothian, N.B. Major-Gen. Sir Wm. Hamilton, the proprietor of the castle, has subscribed 50*l.*, and the Marquis of Eute and Lord Wemyss are also among the donors to the fund. The

lower dates from the end of the fourteenth century, and is in a very dilapidated condition, having suffered at least three burnings,—once by Hertford in 1544, by Cromwell in 1650, and again by accident in 1663. It is now a mere roofless and windowless ruin, partly overgrown with vegetation, but is said to retain some features of interest, among which may be mentioned the dungeon in the basement, which is stated to be nearly perfect. The amount required for immediate purposes is estimated at about 350*l.*, which appears to be more than enough for merely repairing the building, which is all that should be done. It is stated, as an inducement to subscribe, that arrangements will be made in the future for the admission of subscribers and such of the public as desire to inspect the tower. Preston Castle is illustrated in the first volume of Messrs. MacGibbon & Ross's work on the "Castellated and Domestic Architecture of Scotland from the Twelfth to the Eighteenth century," p. 317.

BY the sudden collapse on Saturday afternoon last of the Occidental Tavern, in Fountain-court (Savoy-buildings), Strand, Mr. Terry, the actor, can boast that he "has brought down the house" at a very early stage of his enterprise. For here he is about to open, next autumn, the new theatre for which Mr. W. Emden's drawings were passed by the Metropolitan Board of Works in April, 1886. The chief entrance into the theatre will be at what was Bland's gun-shop, No. 106, Strand. The court is so called after a once famous tavern of that sign in the Strand,—its site now that of Simpson's divan and dining-rooms,—where used to meet the Fountain Club, as politically opposed to Walpole. In one of his letters Dennis, the critic, describes a meeting here whereat "after supper we drank Mr. Wycherley's health by the name of Captain Wycherley." Strype speaks of the "one very fine tavern which had the sign of the Fountain," with its good rooms and wine; as also of the "alley that leadeth to Fountain-court, a very handsome place with a freestone pavement, and good buildings, which are well inhabited." Little the perfumer's was known as being next door to the Fountain; thence he removed, after a fire, into the premises since familiar to us as the shop of the late M. Eugene Rimmel. The Occidental Tavern, at the rear, has for some time past formed a chosen haunt of players and their associates. It was popularly known, too, as the Coal Hole; and there, as Procter tells us, Charles Kean would enjoy a steak, though ill at ease amongst "the dress and ceremony and good behaviour incident to 'company.'" Ceremony, however, did not distinguish the gatherings for which in earlier days the Coal Hole was notorious under the presidency, or rather misrule, of the *soi-disant* Chief Baron Nicholson, together with the libidinous accompaniments of his judge and jury. These entertainments found a later home for a period, in the Cider Cellars, Maiden-lane, and in Leicester-square, on the eastern side. The ruin of the tavern, itself some 250 years old, and of the two houses next thereto, has fortunately spared an opposite house, being No. 3 in the court, where lived the painter of the "Ancient of Days" and the "Last Judgment," the author of the "Songs of Innocence and Experience."

THE paper recently read by Mr. Percy Fitzgerald at the Society of Arts, and published in their *Journal* of March 18th, on "scenic illusion and stage appliances," besides giving some information interesting to the many persons who have little idea how stage effects are worked, touches upon one or two points in regard to the principle of the matter which are open to consideration. Mr. Fitzgerald raises the question, for instance, whether too elaborate and realistic modelling of architectural details in a scene may not in one direction defeat its own end, by imparting a look of flatness to those portions of the scene which cannot be thus modelled, and must rely on illusory painting on a flat surface alone. Mr. Fitzgerald, again, questions the idea that the proscenium is the fourth side of the room,

into which the audience look; he holds that the audience are in the position of an interested person on the stage, and that the fourth wall is behind them. In real life, such a spectator, he argues, does not see a complete room, but only a part of the room in which the action that interests him takes place, and on which his attention is concentrated. Therefore, the argument is, to put the spectator in the same position he needs not to be shown a *complete* room with one wall knocked away, but a portion of a room in which he is supposed (in a sense) to be. Mr. Fitzgerald is adverse to too complete a realism. He quotes Charles Lamb's dictum: "Not all that is optically possible to be seen is to be shown in every picture," and applies this as against the necessity of practicable doors. "By the old system the player went off or came on to the scene; that is, he passed, as it were, from the zone of action and merely disappeared at the wing." This reminds one of the delightful excuse for the want of stage doors made *per* Dr. Johnson's *Ghost* in "Rejected Addresses":—"Permanent stage doors we have none. That which is permanent cannot be removed, for, if removed, it soon ceases to be permanent." There was no realism in having the same door for the palace and the cottage. Mr. Fitzgerald's position, that no doors at all, and only a disappearance into the wings, is the arrangement best in harmony with the conditions of the drama, depends of course upon how much you choose to "make believe." The most realistic drama is make-believe to some extent; consistency is the main point. The modern domestic drama tends to be so very realistic in most senses that it seems to require the realism of doors to the rooms to keep up consistency. Dramas of more ideal kind may dispense with this kind of furniture, no doubt. There is one point in which, we may observe, realism is never successfully carried out on the stage,—architectural detail. It is nearly always bad, even in the most "regardless-of-expense" mountings of plays; the Gothic is poor weak stuff, and all sorts of vagaries are played with Classic detail; it may be realistic to the lay spectator, but it is not so to the architect.

THE monthly paper published under the title of *Scientific News*, with the rider "for general readers," of which two numbers have appeared, seems to answer well to its title, and to provide accurate information in a form intelligible to the non-scientific mind. Such a paper may do real service in bridging over the gulf between the scientific and the non-scientific public.

WE are glad to see, from the answer given by Mr. Ritchie to a question in the House on Monday night, that the Conservators of the Thames intend bringing house-boats under stricter sanitary regulations as to their discharges into the river, and that "any closet communicating with the river" will be an infraction of their proposed by-law. This is a step in the right direction, at all events.

THE report in the last week's number of *Nature* of Captain Abney's exceedingly interesting Friday evening lecture at the Royal Institution on "Sunlight Colours," should be read by every one who is desirous to assist his scientific perception in regard to the causes and meanings of variations of tone and colour under different conditions of sunlight and atmosphere. Landscape-painters, who are often too prone to slight the researches and opinions of the scientific student of nature, ought to find something to set them thinking in this lecture. One sentence in it, by the way, opens up far-reaching conjectures as to the possibly different ways in which different persons (painters included) see nature. Captain Abney says, after describing some of his ingeniously-contrived tests for colour perception, "We have tested several eminent artists in this manner, and about one half the number have been proved to see only three-quarters of the amount of red which we see. It might be thought that this would vitiate their powers of matching colour, but it is not so. They paint what they see, and though they see less

red in a subject, they see the same deficiency in their pigments; y see they are correct. If totally deficient, the case of course would be different." One question that suggests itself after this is, What is "correctness" in such a case? Probably we all see nature (and pictures) differently.

#### LETTER FROM PARIS.

ON Saturday night the Hôtel de Ville, blazing with electric light, will receive for the second time the guests of the Municipality; but in spite of the fifteen years that have elapsed since the commencement of the works, it is still necessary to hide by a *velum* the scaffolding of the Salle des Fêtes; the empty niches are waiting for statues, and the decorators have completed the framework only for the historical paintings which the City Council have not yet persuaded themselves to commission.

A step, however, has been made in this direction. After two long discussions, the Council, much divided between the principle of direct commissions and that of public competition, have at last decided on a middle course which is to satisfy all parties. A mixed committee of thirty members is to prepare a programme to be submitted to the Council. The committee will include the architects of the Hôtel de Ville (M. de Perthes and Formigé), the members of the Fine Arts Committee of the Municipality, twelve Town Councillors, and twelve members chosen by the Council for their special fitness. This committee will draw up a scheme of subjects and places for decoration, to be summarised under two groups, one for direct commissions and the other for open competition. "All's well that ends well," for we have now a committee practically composed of experts, instead of one purely political, and perhaps some part of the immense scheme of intended decoration may now be accomplished by 1889.

There is not much new to say about the Exhibition work this month: the work is going on, rather slowly it is true, partly kept back by the recent inclement weather. It is now settled that the special exhibition of Algeria will be placed along the Quai d'Orsay, on the right of the Esplanade des Invalides. The naval and military exhibitions will be situated opposite, on the left. Behind Algeria will be raised the pavilion of Tunis. It has been decided that the Exhibition is to be kept open, lighted by electric light, till eleven each night; and M. Paul Sédille has been appointed "chef du service" of the French and foreign installations for the Exhibition.

The Municipal Administration intends to take an important part in the Exhibition. It will occupy a site of 3,000 square metres on the terrace of the Champ de Mars, opposite the exhibition of the Beaux Arts. Its pavilion, surrounded by gardens peopled with a crowd of statues, will contain the documents and *matériel* of a number of public services. The total cost of this special exhibition will be about 600,000 francs, without counting the cost of the buildings themselves.

The last day of March was the last for receiving works for the *Salon*, which will include 2,500 pictures and 500 drawings. In the interim, before the *Salon* opens its doors, there is erected opposite the Palais d'Industria the statue which is to be raised in Algeria to the memory of Sergeant Blandan, who died in 1842, after greatly distinguishing himself in the combat at Beni-Mer. The statue is the work of M. Chas. Gauthier.

The *Salon* this year will have a special interest owing to the paintings of military subjects, commissioned from various artists by General Boulanger, and also by the presence of some of the paintings which are to decorate the new Sorbonne. Among these the most important is the cartoon of an immense composition by M. Puvion de Chavannes, 26 metres in length by 6 metres high,\* symbolising the ancient Sorbonne, and Eloquence recounting the Struggles and Triumphs of the Human Intellect. This main work, intended for the large amphitheatre, is to be accompanied by two subsidiary panels representing Philosophy, History, Botany, Mineralogy, Geology, and the Muses (.)

\* *L.*, about 55 ft. long by nearly 20 ft. high. How would the Hauging Committee at the Royal Academy greet an artist who offered them a picture of those dimensions?—E.D.

The cupola of the amphitheatre will be ornamented with allegorical paintings by M. Galland.

MM. Flameng and Chartran, on their part, are preparing for the grand staircase of the Sorbonne two vast allegorical compositions, representing one the records of French Literature, the other the records of Science. M. Flameng, who is to figure in the *Salon*, represents Abelard and his class of philosophy, with a view of ancient Paris in the distance. M. Benjamin Constant is also commissioned, for the Salle du Conseil Académique, to execute five large panels, of which the principal one is to represent the present rector, M. Girard, surrounded by the Deans and representatives of all the Faculties. In one of the Salons de Reception, a painting by M. Winckler will represent the laying of the foundation-stone of the Sorbonne. In one of the committee-rooms M. Lhermitte is to have two panels, one representing St. Claire Deville discovering aluminium, the other Claude Bernard lecturing on anatomy. M. Jobbé Duval is to paint for the "Salle des Actes" of the Faculty of Science the subject of "Science presiding over Modern Discovery"; and M. Olivier Merson is to paint, in the Rector's room, allegorical representations of the Sixteen Provincial Academies. Other painters who are to be employed in decorating other apartments of the building are M. Clairin, M. Roll, M. Cazin, and M. Lerolle.

Out of 150 students who have applied to enter "en loge" for the Prix de Rome, the École des Beaux Arts has selected ten, whose names we give in order of classification:—

|                                  |                           |
|----------------------------------|---------------------------|
| M. Tournaire, pupil of M. André. | M. André.                 |
| M. Chéname                       | M. Guadet.                |
| M. Lafon                         | M. André.                 |
| M. Bertone                       | M. Girardin.              |
| M. Sordais                       | MM. Danuet and Girard.    |
| M. Eustache                      | M. Girardin.              |
| M. Gustave Consin                | MM. Coquard and Gerhardt. |
| M. Houbes                        | M. Pascal.                |
| M. Raphael                       | M. Raulin.                |
| M. Comil-Lacoste                 | M. Girardin.              |

M. Darnot has been commissioned to propose the programme of the deciding competition, of which the subject is "a Gynnasium."

Another very important competition to take place shortly will, no doubt, give ample employment to French architects,—that for the monument of the French Revolution, which has found a determined supporter in M. Berthelot, the new Minister of Arts.

Adieu to the grand projects for the "emplacement" of the Tuileries; adieu to the idea of the splendid palace which was to unite the Chamber of Deputies and the Senate House in one building, in the heart of the city, and in close proximity to all the ministerial offices. All these plans are abandoned, and M. Charles Garnier has been obliged to give up his own views, for it is just on this site that it is proposed to erect this said monument, which may either be purely symbolical, or may be composed of various edifices united by monumental façades or porticos, and containing the statues and bas-reliefs relating to the history of that turbulent epoch. The precise scheme is not yet made known, but the vote asked for is twelve million francs, and 50,000 francs will be given in premiums in the competition.

The tomb of Berlioz, in the Montmartre Cemetery, is to be inaugurated. This funeral monument, the work of the architect Jouvain, is of great simplicity and of fine character. Above a tombstone in grey granite rises a stela adorned with inscriptions, of which the upper part carries a medallion of Berlioz under a garland and relieved against a gold ground. The medallion, a very good likeness, was executed by M. Godebsky. The opening of M. Formig's Crematorium, which was to have taken place immediately, is deferred for some months, as also the inauguration of the monument to Gambetta on the Place du Carrousel, at first fixed for the 14th July next, but so much of the sculptor's work remains to be done that the ceremony cannot probably take place before next year.

The new block of the St. Lazare railway station, to the progress of which we have from time to time referred, is to be opened immediately to the public. For some weeks back the façade has shown clear of its scaffolding, a simple, elegant, but eminently practical piece of architecture, doing great credit to its designer, M. Juste Lisch.

The centre of the new façade is occupied by three large openings, giving access to a stone staircase, conducting directly to the large *Salle des pas perdus* of the suburban railways. It is airy, well lighted, and with ample approaches and exits. The demolition has already commenced of the properties in the Rue St. Lazare, which will give place to the great court, behind which will extend a monumental façade 80 metres in length, uniting the pavilion in the Rue de Rome with that which M. Lisch is soon to erect at the angle of the Rue d'Amsterdam. The goods station adjoining the Pont de l'Europe, of which we have before spoken, is now completely finished and ready for service.

At the Museum of Cluny the decorators are putting the last touches to the exhibition gallery that has been constructed in the court, the floor of which gallery will be laid with a fine piece of work in marble mosaic, somewhat similar to that in the vestibule of the foyer of the Opera House. At the Palais de Justice, where the work has been suspended for a year, an effort is to be made to complete, for the Exhibition year, the portion of the building between the Sainte Chapelle, the Quai des Orfèvres, and the Place Dauphine. There is, therefore, a considerable amount of building work going on or in immediate preparation; but, unfortunately, the most important *chantier*, next to that of the Exhibition, remains closed; that, namely, of the Metropolitan Railway, the execution of which seems, by dint of Parliamentary delays, to be adjourned to the Greek Kalends.

In connexion with public works, we may note the curious discovery made recently in constructing, on the southern slope of the Butte Montmartre, a new water reservoir for the city. At a depth of about 5 metres the workmen came upon two large subterranean galleries running parallel in a straight line towards the extremity of the apse of the ancient church of Saint Pierre de Montmartre. These remains, the existence of which had been suspected by no one, appear to date from the commencement of the twelfth century, and were, probably, intended to place the church in communication with a Benedictine Abbey founded by Louis VI.

At the École des Beaux Arts an exhibition has been opened of the works of Ferdinand Caillard, whose death we announced in our last letter but one. The exhibition is a very interesting one, as making known to the public the talent of an artist of no ordinary attainments both as a painter and an engraver. The exhibition of the "Artistes Indépendentes," organised in a temporary building in the Cour du Carrousel, exhibits as little talent as last year. One can only commend the courage and hardihood of the exhibitors.

Another has to be added to the melancholy list of suicides among French artists,—that of Gustave Guillaumet. Domestic unhappiness is supposed to have been the cause of this tragic end, which could not, in his case, be attributed to want of success or to financial difficulties. Guillaumet was only forty-seven years of age. His instructors were Felix Barrin and Picot, and he obtained in 1863 the second Prix de Rome. After a long stay in Algeria, which had decisive influence on his career, he obtained medals at the Exhibitions of 1865, 1869, and 1872, and a "troisième médaille" at the International Exhibition of 1878. He was a decided Orientalist, a lover of the rich colouring and picturesque costumes of Africa. Among the works which obtained well-merited success may be mentioned especially his view of Laghouat, purchased by the State at the *Salon* of 1879.

The earnest artist Hillemecher is dead, at the age of sixty-nine years. He leaves two sons, who both obtained the Prix de Rome in music; a rather rare occurrence. He was pupil of Léon Cogniet, and after receiving medals in 1848, '57, '61, and '65, and a decoration in '69, he devoted his latter years to book illustration. His last work was a series of drawings in illustration of Shakspeare.

**Royal Birmingham Society of Artists.** The twenty-second Spring Exhibition of this society was opened at the Gallery in New-street on Thursday. The whole of the great round room is this time occupied by water-colour paintings.

#### ARCHÆOLOGICAL DISCOVERIES IN MOROCCO.

During recent years the Danish Consul at Beyrout, Herr J. Løitved, has collated a number of Phœnician, Roman, and Greek antiquities and casts of inscriptions in Morocco, chiefly from the site of the ancient city of Palmyra, which are of great archaeological and artistic interest. They are now principally in the possession of the well-known Danish Mæccenas, Herr C. Jacobsen, jun., the wealthy Copenhagen brewer, and have recently been the subject of research by the celebrated French Orientalist, M. Clermont-Ganneau, of the results of which we give the following particulars:—

The collection contains, among other objects, a mummy in perfect condition,—the first specimen of its kind,—found at the necropolis of the city of Zenobia, and some memorial busts in high relief. Among the latter those of the women are of most interest, on account of the clear details of toilette displayed,—as, for instance, the shape of the coiffure, the diadems, necklets, medallions, ear-rings, bracelets, embroidered garments, &c. The execution of the female busts is far superior to that of the busts of the males, the types of the former being very marked, and betokening a decidedly Jewish and Semitic origin, some being remarkably handsome. Fifteen of the busts have epitaphs, which are written in the Armenian dialect common in Palmyra, some peculiarities of which are very interesting, as, for instance, the names "Raitha" and "Hanuata," reminding one of the Jewish names "Ruth" and "Hannah," as well as "Caddatha," "Bathai," "Mols," and "Athihana." The fifteenth inscription is that of an altar, raised by a person named "Wabbattath" or "Walaha," for the saving of his brother in honour of a deity, who is designated with the vague description, "To him whose name is blessed in all Eternity." In this inscription, which was rather common in Palmyra, M. Ganneau considers that the omission of the name of the deity is purposely committed, just as it is prohibited to the Jews to pronounce the word "Jehovah," a superstition prevalent in the ancient world, chiefly prompted by a desire not to reveal to strangers,—a term at that time synonymous with enemies,—the true name of the deity of the city, in order that his aid should not be invoked. Below the inscription are carved two hands, a symbol of worship well known in Oriental archaeology. The latter inscription is dated in hieroglyphics from the month Sivan (June), of the year 502, in the era of the Selenides, corresponding with the year 191 of our own time.

Among other antiquities collected by Herr Løitved is a semi-column, about one metre in height, bearing the following inscription, in Greek:—"To the noble Lord Baal-Markod, also called Megrin, by command of the Aremthenian god, Maxinos has consecrated [this] in gratitude." The name of this god, by whose command the column was consecrated, is of interest, as it seems to refer to a hitherto unknown city of Aremtha. This column was found at the Maronite convent of Deirel Kaida, on the Lebanon, about ten miles east-south-east of Beyrout, which is believed to have once been the site of a temple consecrated to the god Baal-Markod. This assumption is supported by the discovery on this spot of several Greek and Roman inscriptions referring to this Semitic god.

Another inscription, unfortunately less complete, but still remarkable in several respects, was discovered by Herr Løitved at Masoub, near Ptolemais (St. Jean d'Acre). It is as follows:—"The Porticus towards west and north, which Elim, despatched by Moloch-Astarte and his servant, Baal-Hammon, have raised for Astarte in Akera, the Temple of Hammon, in Ptolemais, 26[th] year. The lord of kings, the highly famous Energetes, son of Ptolemaeos and Assinoc, the twin gods, of the people of Tyrens, 53 years . . . have also erected all the rest . . . which are in the land, in order that it may be them . . . [to eternal honour]." This inscription evidently concerns partially the building of a temple.

Several other inscriptions, of which Herr Løitved has taken casts, refer to various great and small secular buildings. Thus on a house in Bostra is an inscription as follows:—"Under the greatest esteemed Cones Hesycios, Megemon and Scolasticus, the dwelling of the general-in-

chief was raised from the ground, inasmuch as the greatly esteemed . . . and Cosmos have had the supervision of the same,—the 30 Indiction (September 1st) in the year 489" (B.C.) Another inscription informs us that Rufus Magnus has built the tower at his own cost, it being finished in Damascus in the year 683, i.e., 377 B.C.

At Djasim Herr Löitved discovered this inscription: "The Lord Marcus Flavius Bonnis, the most noble Comes of 1 Class and Dux, who has governed us mercifully, has established peace and security as well for travellers as for residents."

On the other hand, there are several inscriptions which refer to non-secular edifices. Thus there is an epitaph at Lihka, which states that "a man from the land of the Canates (Canaanites?), brave and wise, Zobedanes, has raised me,—a tomb like a temple. May Providence impart to his children, himself, and his tender wife constant happiness. May it be to me (my fortune) to receive the oldest first when they in happy old age have completed the course of life. Zamagedos has built (me)." The inscription forms three sentences.

An inscription at Irbid says:—"In the year 95 after the founding of the city Lucius Domitius Manorus has caused this tablet (or column) to be erected for himself together with the ornament thereon." The inscription dates from the year 193 B.C. At El-Heyat the following inscription was discovered on a stone:—"Proclus, son of Ammos, has at his own expense raised this Hermes for his son Agrippianos," and in the same spot is a similar inscription according to which this man also raised a Ganymede for the same son.

Finally the following two inscriptions found on the door-horns at Djasim may be quoted:—"Lord Jesus Christ, show your grace towards the whole family of Gerontios. Lord preserve . . ." and the second "Georgios, the pious lecturer . . ."

The number of antiquities and casts collected by Herr Löitved is about 200, and they embrace the period of the whole history of the country, from the time of the Phœnicians down to the first centuries of the Christian era.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The eighth ordinary meeting of this Institute for the present session took place on Monday evening last, Mr. E. P. Anson (President) in the chair.

##### *Architectural Photographs for the Adelaide Exhibition.*

Mr. Ralph Nevill asked permission to say a few words of explanation in regard to the photographs about to be sent to the Adelaide Jubilee Exhibition. Nothing, he said, could have been easier than to make a fancy ideal of what a thoroughly representative collection should be, but nothing could be more difficult than to realise that ideal. The collection which had been got together should not be judged by any fancy standard or ideal. The time at the disposal of the Committee was short, and when they set to work they found in existence only a small number of accessible photographs. They therefore came to the conclusion that it was of no use to waste their strength by trying to make it a thoroughly representative collection, but that they must do the best they could with the material before them. The various provincial associations willingly responded to the invitation of the Committee, and promised to do what they could in the short time at their disposal, but, unfortunately, when the time drew near they heard from Manchester and elsewhere that the weather had interfered very much with the taking and printing of the photographs. He believed this was the first official exhibition of architectural photographs, and many of the members might be sceptical as to the success of such an exhibition. Having said so much to explain why he deprecated the application of what would be an unfair standard to the collection, he would claim for it that it was of extreme interest and value, and, on the whole, very typical and representative of the prevailing tendency of the art in the present day. The number was limited to 100 photographs, and it would be ridiculous to suppose that the whole of English architecture could be represented by that number. He had always been very much of opinion that photographs were the truest illustrations of archi-

teature, after making allowance for all their shortcomings, while for interiors and details they were more correct than any drawings ever could be. He hoped that the day was not far distant when architectural photographs would be admitted to the walls of the Architectural Room at the Royal Academy.

Mr. Octavius Hansard proposed a vote of thanks to the secretaries of the Art Committee for the trouble they had taken in connexion with this matter.

Mr. Charles Barry, in supporting it, suggested that the Council, in sending this collection, should take advantage of Mr. Nevill's observations, and point out the difficulties that had been met with in forming the collection, and the impossibility of its being a purely representative one.

##### *A Carved Oak Beam at Colchester.*

A drawing was exhibited by Major Bale, R.E., Associate, of a curious carved oak beam in a house at Colchester, known as the Marquis of Cranly. The description of the beam will appear in the Transactions.

A vote of thanks was, on the motion of Mr. C. F. Hayward, passed to Major Bale for his communication.

##### *The Holloway Sanatorium and the Royal Holloway College.*

Mr. W. H. Crossland then read a paper entitled "The Holloway Sanatorium and the Royal Holloway College." The following is an abstract of the paper:—

The author prefaced his description of the College by a short account of the Holloway Sanatorium, Virginia Water, and of how it fell to his lot to execute that building. The author and the late Mr. J. P. Jones submitted a design for the Sanatorium in a limited competition instituted by the late Mr. Holloway, who acted in the matter under the advice of Mr. George Godwin, the late Professor Donaldson, and the late Thomas Henry Wyatt. That design was placed first by the professional assessors, and the joint authors proceeded to modify their design to meet the views of Mr. Holloway and of his advisers. Mr. Jones died suddenly, shortly after the commencement of the building operations, and the author was entrusted with the duty of superintending the carrying out of the work. He had to put on one side the whole set of working drawings and to prepare a fresh set, a change necessitated by the substitution of Portland stone dressings for cut and rubbed brick. When the time came for opening the Sanatorium, new Acts of Parliament for the protection of lunatics had been passed, and the Commissioners refused to pass the building as at first constructed. Consequently the whole of the internal arrangements had to be altered at considerable cost, and practically back to their original form. Passing to the main subject of his paper, the author then described the discussions held between Mr. Holloway and himself, at the time that the building of the Sanatorium was fully in hand, as to the best means of carrying out Mr. Holloway's intention of erecting a large college for the higher education of women, and as to the style of architecture most suitable for such a building. The result of these consultations was that Mr. Crossland was commissioned to measure up and sketch the châteaux in the valley of the Loire, more especially that of Chambord, with a view to the adoption of the French Renaissance style of architecture in the new college. That was done very thoroughly, and a design was prepared which was ultimately adopted for the new building, notwithstanding the pressure brought to bear upon Mr. Holloway by others interested in the new building, to adopt a style of architecture similar to that in which most of the colleges of Oxford and Cambridge are built. The working out of the design to  $\frac{1}{8}$ -inch,  $\frac{1}{4}$ -inch, and  $\frac{1}{2}$ -inch scales, and the preparation of the full-size details, occupied the author for two years,—when it was decided to employ a quantity surveyor to take out the "quantities" after a plan which had been agreed upon between Mr. Holloway and the author. He was anxious above all things to have the quantities made intelligible to himself, so that in case of disagreement on the questions of certificates, extras, or deductions, the point in dispute might be determined without the aid of the surveyor. The result of the method employed, viz., that of cutting the building up into blocks, had been that the contractor not

only has had no extras on either the original contract, or upon other contracts priced from the same bills, but had not even asked for an order for extras. Ten building firms were asked to tender upon the quantities thus prepared, and, in the end, Mr. Thompson, of Peterborough, was entrusted with the execution of the work, and had carried it out to the complete satisfaction of the author. A clerk of works, Mr. George Rogers, was appointed by Mr. Holloway, and was directed to confine his duties to the inspection of the actual works, and to undertake neither correspondence nor drawings of any description. He dispensed altogether with the luxury of an office, and during five years never passed a day, hardly even a working hour, away from the works. When the works were fairly started, the author had a bungalow built, and went into residence on the spot. For the next four years and a half he found himself leading the life of a Mediæval architect,—such a life as architects read about, but which few experienced. The author then briefly described the plan of the College.\* The scholastic department is contained in the two main blocks, and these are connected by rooms, cloisters, and balconies. The refectory and kitchen are arranged on the usual college plan, and are divided by the central hall or vestibule. The museum and library, also the recreation-hall, communicate directly with the two main blocks. These rooms, and also the refectory, are 100 ft. by 30 ft. by 30 ft. high. The chapel is 125 ft. by 30 ft. by 35 ft. high. Each student will have two rooms, study and bed-room, each 12 ft. by 10 ft., 10 ft. 6 in. high, and a common-room is provided for every six students, where they can hold tea-and-toast parties or other entertainments. The building is planned to accommodate 250 students, but on so liberal a scale that fifty may be added to this number, and, including servants, 400 may be set down as the actual accommodation. Some twelve months after the commencement of the works the author had to select and appoint a sculptor, and was fortunate enough to secure the services of the late Signor Fucigna, member of the Academy of Ferrara, who was willing, like the author, to live on the works, and to devote all his time to them. The illustrations of his work, which were exhibited, were sufficient to show the stamp of Signor Fucigna's genius, and that the profession lost in him a sculptor of rare ability, who did not think architectural sculpture too poor a ground for the exercise of his talent. The genius of such a man and of such sculptors as the late Alfred Stevens, and the Frenchman Briants, neither of whom was properly appreciated during his lifetime, might often be secured by prosperous men in the architectural profession, to the advantage, not only of themselves, but of the nation and of the whole world. The principal work executed by Signor Fucigna at the college consisted of the filling of the four pediments which formed centres in the two quadrangles over the principal staircases, the carving of a series of heads, forming keystones to the chapel and recreation-hall windows, the execution of the subjects in the chapel ceiling in very bold relief, and of various heraldic subjects and smaller panels in the heads of the windows, at various points all round the building. The only portions of the building decorated internally in colour are the central vestibule, between the dining-hall and kitchen, and the chapel. This latter has been decorated in oil colour and gold, the warm ivory-tinted free-stone used in the construction forming the basis. The strongest stroke of colour is applied to the lower division of the wall, forming a very rich and elaborate dado from the floor to the window sills. The flat wall spaces above this are of a soft green, broken by deep red in the niches between the windows. The wagon vault of the ceiling is treated with gold as a ground-work, but this is divided into panels by longitudinal and transverse belts, corresponding with the architectural divisions below, and in the panel spaces thus formed are circular medallions containing figures of the six Archangels, *e.g.*, SS. Michael, Gabriel, Raphael, Uriel, Zophiel, and Chamuel, with their distinctive attributes. These, like the subject on the semi-dome of the apse, are on line drawings. The groups of figures on the

\* A Ground Plan and four views of the College were given in the *Builder* for July 3 and July 10, 1886; and further illustrations and descriptions will be found in previous volumes. Plans, views, and descriptions of the Sanatorium will be found in our volumes for 1875, 1877, and 1882.



ceiling and in the apse are treated delicately in colour, somewhat in the manner of old ivories, that is, the colour is worked into the hollows of draperies, &c., and rubbed off the more salient surfaces, thus avoiding heaviness. The general scale of colour obtained by this means is not unlike that of the Sistine Chapel. In the apse, and in a line with the side niches, are three recessed arches, in which are placed standing figures of Our Lord, St. Mary, and St. Cecilia. Right and left of the organ, at the west end, are two medallions, each containing two angels singing and playing on musical instruments. The author then described the fittings, noticing particularly the baldacchino, the organ-case, the library fittings, and some wrought-iron gates, grilles, and low screens in front of the west chapel, the former made in walnut and oak, and the latter of wrought and welded iron, and without rivets or screws. The brass fittings, such as lamps, electroliers, and brackets, also made from the author's designs, are of a high class of workmanship. In the electric light installation there are ninety-six 32-candle power incandescent lamps, 216 16-candle power, and 100 10-candle power, making a total equivalent of about 750 10-candle power lamps, which may now be taken as the standard lamp. The principal portions only of the building, such as principal entrance, chapel, recreation-hall, dining-hall, lecture theatre, museum and library, kitchen and scullery, are provided with the electric light at present. The electricity is generated from dynamos driven from two engines of Messrs. Davey, Paxman, & Co.'s make, through intermediate gearing. The dynamos, two in number, are of American manufacture, one being held in reserve. Both are connected to the main cable, and are each of them more than sufficient for the present number of lights wired for. Edison screw sockets and lamps are used throughout. The heating of the building is effected by means of steam radiators, made of 1-in. wrought-iron pipes, fixed vertically in a hollow cast-iron base, with an entablature of ornamental design. A main 6-in. steam-pipe leads direct from the boiler-house to the centre of the main building, where a receiver is fixed, from which all branches are taken through reducing-valves. To insure the delivery of steam at all points, three pipes are employed,—one supply 4-in. bore, one return 3-in., both running in the same direction, and from the extremities a condensed water-pipe is led back to a container in the basement, from which the water of condensation returns by gravity to the boiler to be re-used. The steam plant power, the gas service, the water supply, the fire service, and the sanitary arrangements were then described. The drains pass around the building in straight lines from point to point, with manholes at all changes of direction and gradient. The sizes of pipes are 6 in., the main outlet being 9 in. in diameter. The soil-pipes and wastes deliver into inspection chambers, beyond which an interceptor trap severs connexion with the main drain. Flush tanks of 500 gallons capacity, built in brick and cement, are fixed at the head of each main drain. The building, Mr. Crossland stated, has been opened before it is in a really working condition. Several important additions, such as a laundry and a complete system of fire service, will be necessary before the whole will be completely finished. The author would in conclusion, he said, draw particular attention to three points referred to in his paper, viz., his experience of clients in general, and of Mr. Holloway in particular, as a model client; secondly, to the subject of quantities; and thirdly, to a subject that he had himself particularly at heart, the unity which he thought should exist between architect and sculptor on all works of importance. He thought that if architects who are entrusted with large public buildings were to associate themselves with some sculptor of equal ability, we should not only get more interesting buildings, but should be spared the shame and dishonour of seeing such men as Alfred Stevens and Brian Stables taken away without leaving more examples of their great genius for the benefit of succeeding ages.

In the discussion which followed,

Mr. David Chadwick, one of the Governors of the College, remarked that the completion of Holloway College was an achievement of which the Royal Institute of British Architects might well feel proud as the work of one of its members. Mr. Crossland had given a well-

deserved heed of praise to all the parties with whom he had been associated, and he had been fortunate in having a client with a long purse. At the same time, although he had almost unlimited funds to draw upon, he had achieved the success of completing the building without any extras. Whether regarded from an artistic or sanitary point of view, all the arrangements of the building had been carried out as perfectly as the appliances of the present day were capable of permitting. He (the speaker) looked upon the Holloway College as the most perfect building that had been erected during the present generation, and there was not a dark room or an unventilated corner to be found in the whole structure.

Professor T. Roger Smith, in proposing a vote of thanks to Mr. Crossland, remarked that he had always thought that the most useful papers that could be procured by the secretary from members of the Institute were accounts of important buildings. They were therefore extremely indebted to Mr. Crossland for his paper, and for filling the room with drawings and photographs which enabled them to form some guess as to the extent and dignity of the structures. He wished, for the sake of those who had not had the advantage of seeing the building, that some of the leading dimensions had been given, but having himself had an opportunity of seeing the building, that gave the architect an idea of the effect of great size. There were not in this country many very large architectural buildings. There were many small and moderate-sized buildings, but the number of structures in which the dimensions were of great length, and the effect of great extent, were to be studied, was small. Such buildings as Versailles, the Louvre, and the Tuileries, which gave one an idea of enormous size, were scarce in England, but the Holloway College was one, and if for no other reason than that, it deserved to be seen and studied by those who wished to appreciate that particular element. The style adopted was one which merited probably more extensive usage. There was no more beautiful version of Renaissance architecture than that of the time of François Premier in France, and which the late Edward Barry to some extent adopted. The Holloway College, however, was the largest and most important building in that style which had been erected in England, and on that account alone it was of extreme interest to architects.

Mr. William Woodward said Mr. Crossland had claimed that his peculiar system of taking out the quantities, he had avoided all extras, and he hoped, in replying, that a little more information would be given on that important matter. Men in practice, of course, were well aware that there might be great merit in a building being carried out without extras, or no merit whatever. The merit or demerit depended almost entirely on the manner in which the quantities had been taken out, and the way in which the building had been studied before it was commenced. He would therefore like to know whether, before the building was commenced, the drawings and details were fully completed? The name of Alfred Stevens had been several times mentioned in the paper, but there was considerable difference of opinion as to his work, and particularly with regard to the Wellington monument in St. Paul's Cathedral.

Mr. Henry Lovegrove supported the vote of thanks, and asked whether extras were avoided by some very heavy "provisions"? And he wished to know whether it was advisable that it should go forth from the Institute that it was desirable to advertise for surveyors at so much a day or week? Because, if that practice were sanctioned, they would have architects advertised for in the same manner.

Mr. Ralph Nevill asked whether the warning of the college was done by steam?

Mr. Crossland, in reply to some of the questions asked, said, that as to the quantities, he was at work with all his staff for two years on the plans, which were of the most detailed description, and these were placed at the disposal of the surveyor. The completed plans were bound up in three large volumes, and were never afterwards altered. In regard to extras, he had with him a copy of the quantities very carefully illustrated, and by the plans and sections he could show how it was arranged. Each story formed a separate bill of quantities, and though there was undoubtedly great repetition, the arrangement proved useful for checking, and that to a great extent

accounted for the accuracy of the quantities, and the non-existence of extras. Moreover, Mr. Thompson, the builder, had not only had no extras, but he had not even applied for an order for them. The clerk of works had not interfered with the drawings, and so had not needed an office; in fact, he (Mr. Crossland) had been his own clerk of works, living on the building. What the clerk had to do was to walk round and round the scaffolding ten or a dozen times a day, and one of the things which he did was to see that the perpend of the brickwork were as true as a line could make them. Mr. Crossland then gave some further particulars as to the lighting and warming of the building.

Mr. C. F. Hayward, F.S.A., said that the effect of the size of the College was very great, and the way it grew upon one was a proof of the character of the work itself. Though he himself had a rather stronger sympathy with work of the Gothic school, he could not help feeling that the design had been worked out in the spirit of true art. The alliance between architect and sculptor, and the high ground on which Mr. Crossland had placed the necessity for that union, was deserving of the recognition of the Institute.

The President, in closing the discussion, said that Mr. Crossland had with great personal modesty given the meeting the history of a most interesting building. He appeared to have led the ideal life of the architect, with a munificent patron, almost unlimited means, and having visited with his patron such interesting and picturesque monuments on the Loire as Chambord, Chenonceaux, Chaumont, and Blois, he came back with his mind full of the object he had to carry out, and able to devote his whole time to the development of his work. Mr. Crossland had been his own architect and clerk of works, and nothing could be more satisfactory to the architect than to have the means of carrying on his work in that agreeable manner.

The vote of thanks was then passed by acclamation.

The President added that Mr. Chadwick gave him authority to state that a visit to the College would be arranged to take place on Tuesday, the 3rd of May, during the coming General Conference of Architects. He also announced that a business meeting would be held on the 18th of April to consider the Schedule of Professional Practice and Charges of Architects.

**The Smoke Nuisance in London.**—The Bill introduced by Lord Stratheden into the House of Lords for abating the nuisance arising from the smoke of furnaces and fireplaces in London will have little chance of becoming law if he insists upon retaining the clause which includes private dwelling-houses in its operation. Lord Stratheden proposes to enable the local authority,—that is, the Commissioners of Sewers in the City, the Vestry in a parish of schedule A of the Metropolitan Management Act, and the District Board in combined parishes of schedule B,—to make bylaws, not only for regulating but even for prohibiting, the emission of smoke from any building. These bylaws might exempt from their operation buildings below a certain rateable value; or they might limit the hours within which they are to be in force; or they might contain any other restrictions thought expedient. By these bylaws reasonable penalties might be imposed on offenders against them. But without the Attorney-General's consent no proceedings could be taken for the recovery of a penalty by any one but the local authority. Before being of any validity the bylaws would have to be confirmed by the Home Secretary, and opportunity would be afforded to any person affected to send his objections to that Minister. Other bylaws might also be made under the Bill by the Metropolitan Board of Works as to new buildings. All fireplaces or furnaces intended to be used in these could then be required to be so constructed as to effectually consume, as far as possible, all smoke arising from them. While no reasonable man would object to the proposal to have new dwelling-houses provided with fireplaces consuming their own smoke, and in accordance with the aim of the Bill, any attempt to include existing private houses will result in its rejection, or at least in such a mutilation of its provisions as will practically render them inoperative.—*Iron.*

ELECTIONS OF DISTRICT SURVEYORS.

At the meeting of the Metropolitan Board of Works on the 25th ult., the first business proceeded with after the confirmation of the minutes of the previous meeting was the election of a District Surveyor for South Islington, in the room of Mr. Rowland Plumble, transferred to the District of West Hampstead. There were thirty-five candidates, not counting two who failed to put in an appearance. In accordance with the usual practice of the Board, a show of hands was taken on behalf of each of the thirty-five candidates who were present, with the view of retaining the six candidates who obtained the highest number of votes for the final contest, which was, in conformity with a motion made by Mr. T. W. Williams, decided by ballot. The candidates present were—Messrs. T. Battersbury, H. Blackhour, H. H. Bridgeman, J. W. Brooker, H. Cheston, P. Cowper, E. E. Eales, G. Edwards, F. R. Farrow, J. M. Ferguson, R. F. C. Francis, J. Goodchild, W. Grellier, F. W. Hamilton, J. Hamilton, G. Hamilton-Gordon, W. J. Harcastle, E. Haselhurst, A. Heyes, G. Inskipp, G. Jackson, N. E. Jennings, G. A. Lean, H. Lovegrove, E. W. Mountford, R. C. Murray, W. H. Nash, H. A. Pelly, C. G. Saunders, M. L. Saunders, W. Smallpeice, W. L. Spiers, W. H. Stevens, H. W. Stock, and E. Woodthorpe, jun., M.A.

The preliminary voting on these names placed the following six names highest on the list, viz., Battersbury, 32; Harcastle, 25; Lovegrove, 34; Saunders (M. L.), 33; Spiers, 26; and Stock, H. W., 32. The subsequent voting was as follows:—

|                 | 2nd  | 3rd  | 4th  | 5th  | 6th  | Final |
|-----------------|------|------|------|------|------|-------|
|                 | Vote | Vote | Vote | Vote | Vote | Vote  |
| Battersbury     | 9    | 15   | 16   | 15   | 30   | 21    |
| Harcastle       | 1    | 1    | 1    | 1    | 1    | 1     |
| Lovegrove       | 12   | 16   | 16   | 18   | 27   | 27    |
| Saunders (M.L.) | 14   | 13   | 16   | 15   | 19   | 19    |
| Spiers          | 3*   | 3    | 3    | 3    | 3    | 3     |
| Stock           | 3*   | 3    | 3    | 3    | 3    | 3     |

The ultimate result of this curious contest, in which, as will be seen, there were three "ties," was that Mr. Henry Lovegrove was declared to be elected.

The Works and General Purposes Committee have considered the reference made to them by the Board as to the future mode of conducting the election of District Surveyors, and have resolved to recommend:

(a) That the number of candidates be reduced to six, at a meeting of the Board, by one ballot, at which each Member may vote for six names out of the printed list; the result of such first ballot to be ascertained by scrutineers consisting of two Members of the Board, to be appointed for that purpose, together with the Clerk or his representative;

(b) That the six thus selected be balloted for, each Member of the Board voting for one candidate only, until some one candidate has the votes of a majority of the Members present, and that at each ballot the name of the candidate having the smallest number of votes, or the names of all candidates who have less than twenty per cent. of the total number of votes, be struck off.\*

Mr. Williams has given notice that when the report of the Committee comes before the Board he will move, as an amendment to the First (a) of the above recommendations:—

"That the number of candidates be reduced to six, at a meeting of the Works and General Purposes Committee, by one ballot, at which each Member may vote for six persons whose names are in the printed list; the result of such first ballot to be ascertained by scrutineers consisting of two Members to be appointed for that purpose, together with the Clerk or his representative; and that the names of the six persons thus selected be taken up to the Board at the following meeting, in order that the Board itself may make the ultimate selection."

NOTES FROM SWEDEN.

A NEW theatre, with very handsome appearance and fittings, called the Wasu Theatre, has just been opened in Stockholm. It seats 700 persons, and is lighted by the electric light.

The great new building of the Stockholm Telephone Company, in which the central station will be located, is approaching completion. The principal operating hall will be lighted from the roof, which is of glass, and at night the electric light will be employed. On the walls of the hall will be hung some fine

\* Both names dropped at this stage by resolution of the Board.  
 † To decide which of the three names previously voted upon should be dropped.  
 ‡ To decide whether Battersbury or Saunders should be dropped.

paintings illustrating great events in the history of science, and they will also be decorated with the coats of arms of the towns of Sweden which have adopted the telephone.

The well-known German circus proprietor, Herr G. Schumann, having petitioned the Corporation of Stockholm for permission to erect a large modern circus building in one of the central parts of the town, the sanitary committee of that body has refused the same, on the ground that, however carefully such an establishment be built and tended, an unpleasant and injurious smell therefrom cannot be avoided.

During the last two or three years attempts have been made in Scotland with cultivating saplings of pine and spruce brought from Sweden and Norway, and, as appears from a recent report from the coastal for those countries at Leith, with the most satisfactory results. Attempts to grow these trees from seed have, however, not been so successful, most probably, it is believed, from want of sufficient care. In consequence, several Swedish and Norwegian societies interested in this matter have decided upon sending competent persons to this country with a view to promote the import of saplings and seed from these kinds of trees. In Sweden, as is generally known, replanting goes hand in hand with de-forestation, though, of course, the former operations necessarily demand a longer time in showing results.

Formerly, the imports to Scotland of Swedish glass wares,—chiefly bottles,—was very considerable, but of late years it has fallen off greatly, owing to several works near Leith and Glasgow having imported a number of Swedish glass-blowers, who, as they work for lower wages than the English, enable the manufacturer to produce the goods at a cost less than in Sweden. This is felt as a serious blow to the Swedish glass industry.

A company has been formed in Scania, in the South of Sweden, for the purpose of manufacturing salt-glazed drain-pipes, paving-stones, tiles, &c., articles which have hitherto been imported from abroad. The company has purchased the well-known Skromberg clay deposits, which are estimated to last for several hundred years, for a sum of 25,000*l.*

Great satisfaction is felt in Sweden at the circumstance that the pedestal of the statue of Hugo Grotius, the celebrated Dutch lawyer, which was recently unveiled at Delft, is of Swedish granite. It was cut in Berlin, after a drawing by M. Garnier, the French architect, and weighs over half a ton, and is 12 ft. high. It is considered an illustration of the high renown which Swedish granite enjoys abroad.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.  
 ANNUAL DINNER.

The ninth annual dinner in aid of the funds of this Institution was held on Tuesday evening last, in the Venetian Saloon of the Holborn Restaurant, Mr. W. R. Freeman (of the firm of John Mowlem & Co.), President, in the chair, supported by so large a number of friends that an "overflow" party had to dine in another room. The usual loyal and patriotic toasts having been duly honoured (Mr. T. P. Rider proposing the "Army, Navy, and Reserve Forces," and Col. Trollope, of the Queen's Westminster Rifles, and Mr. George Burt, jun., of the Royal Naval Reserve, responding).

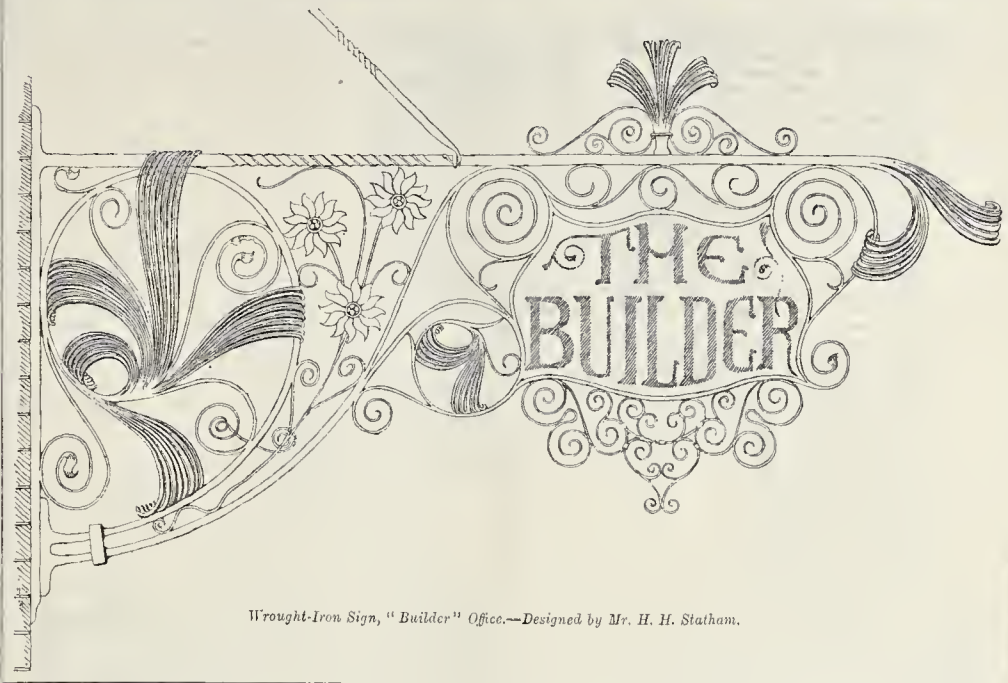
The Chairman, in proposing the toast of the evening, "The Builders' Clerks' Benevolent Institution," said he had to plead the cause of an Institution which he was able to say was very carefully and economically managed by a thoroughly earnest and painstaking committee, and which undoubtedly supplied a great want. He therefore felt that he should not plead in vain. The Institution was founded in 1866, and therefore it attained its majority in this present year of Jubilee. During its existence it had received a total income of about 8,500*l.*, and had expended, in pensions and relief, upwards of 3,000*l.* There had been in all twenty-five pensioners elected on its funds, the number on the books at the present time being fifteen. The male pensioners received, according to their necessities, from 20*l.* to 25*l.* per annum, and the female pensioners from 15*l.* to 20*l.* per annum. The Institution also afforded temporary relief to the extent of not more than 10*l.* in one year to as many deserving cases as possible, and it also provided

burial-money and other relief to widows of builders' clerks dying in distressed circumstances, every case being most carefully inquired into without delay. At the same time, care was taken to prevent the pauperising of the recipients of the Institution's aid. Personally he had great pleasure in advocating the claims of the Institution, for he was much indebted to builders' clerks for his business education, and had, indeed, served as a builder's clerk himself. The Institution was one which must commend itself to all connected with the building trade, but in a special manner to the clerks themselves, who should, he could not help thinking, support it in greater numbers than they did. The master builders took the kindest interest in its welfare, while the builders' merchants were liberal supporters. So convinced was he of the utility and absolute necessity of the Institution in these days of competition and the consequent sad vicissitudes of builders' clerks, that had no such Institution been in existence he should have done his part in founding one. Fortunately, that work had not to be done, for it was done twenty-one years ago, and the Institution had now arrived at manhood's estate; and as it had increasing claims upon it, it would probably want a little more scope and a little more cash than hitherto in order to enable it to fulfil its mission. On these grounds he warmly commended the claims of the Institution to the building trade and all connected with it, and asked the company to drink to the success of the Institution.

The other toasts were "The Architects and Surveyors," proposed by Mr. J. Howard Colls (President of the Institute of Builders), and replied to by Mr. W. E. Stoner; "The Builders," proposed by Mr. E. C. Roe, and coupled with the name of Mr. Joseph Randall (Kirk & Randall); "The Past Presidents," proposed by Mr. Edwin Brooks (Treasurer), and replied to by Messrs. Thomas Stirling and G. Hayward Trollope; "The President," proposed by Mr. G. H. Trollope; "The Visitors," proposed by Mr. G. C. Kentish, and coupled with the name of Mr. Stanton William Preston, Clerk of the Worshipful Company of Carpenters; and "The Committee," proposed by the Chairman, and coupled with the name of Mr. H. J. Wheatley, the indefatigable Secretary, who during the evening announced subscriptions and donations to the total amount of 38*l.*

ARTISANS' DWELLINGS  
 NEAR GROSVENOR SQUARE.

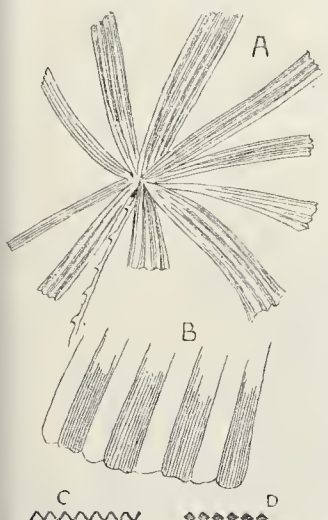
The Improved Industrial Dwellings Company (Limited), having acquired from the Duke of Westminster several sites lying between Oxford-street and Grosvenor-square, have commenced operations in earnest in that locality, and on Wednesday last a block of tenements, to be known as "Stalbridge Buildings," was opened by the Duke of Westminster. This block is situated in Lumley-street, and is to be followed by eight other blocks in the immediate vicinity. The block in Lumley-street contains accommodation for 46 families; the next, to be erected between Lumley-street and Balderton-street, will provide for 72 families; and the remaining seven blocks will provide for about 258 families. These, with the 38 families in Clarendon Buildings, Balderton-street,—erected in 1872,—will represent a total of nearly 2,000 persons of the working class resident on this part of the Estate. The cost of the whole will be about 80,000*l.* The general plans, elevations, and working drawings have been prepared in the Company's offices, and the buildings are being erected by the company's workmen. Each dwelling contains separate domestic conveniences, and the wood-work in the rooms is painted, grained, and varnished, and the walls neatly papered. Wash-houses are provided on the roofs. The company has, during the past seventeen years, erected in other parts of the Grosvenor Estate, 381 separate dwellings for about 1,900 persons. The company now possesses thirty-nine estates in various parts of the metropolis, chiefly in the Central and Eastern Districts, thirty-seven of which are completed for occupation by 24,000 persons of the working classes; and when the new buildings in Mint-street, Southwark, are occupied, and those on the Grosvenor Estate completed, there will be accommodation in the company's buildings for 23,000 persons. The total expenditure will then have been about 1,025,000*l.*



Wrought-Iron Sign, "Builder" Office.—Designed by Mr. H. H. Statham.

**THE "BUILDER" SIGN.**

The wrought-iron sign, of which a sketch is given, was one of the last things carried out at the forge of the late Mr. Alfred Newman before his lamented death. The long leaf-forms which are the principal feature in it are conventionalised from a spray of a tropical plant (*Licuala horrida*), sketched in the hot-house at the Botanic Gardens. The spray as originally sketched is given at A, and the end of a leaf, nearly full size, at B. It was at



first intended to make the wrought-iron leaves of the same kind of ridge-and-furrow section (C) as in the natural leaf, forming each leaf in an oblong shape first and then nipping the ridges close at the springing, as in nature. But it was found the metal in this form was too recumbent in regard to the bend and curl which it was desired to give the leaves, and the forgers suggested that a similar effect could be obtained by a section as at D, making each

ridge a separate piece, and the whole would then prove ductile and tractable, which was accordingly done. The sign is now fixed above the publishing office of the *Builder*. H. H. S.

**COMPETITIONS.**

**Board Schools, Bristol.**—At the meeting of the Bristol School Board on the 25th ult., the plans of Messrs. Hansom & Bond, of Clifton, were unanimously adopted for the new schools in Easton-road. Thirty-eight sets of designs were sent in.

**Wesleyan Schools, Forest Gate.**—We are informed that the building committee have selected the plans submitted by Mr. F. Boreham in this competition. Six designs were sent in.

**Wilkesden Public Offices.**—The successful competitors for the above, according to the award of Mr. Christian, are:—First Premium, "Favete Linguis," Mr. E. Harnor; Second Premium, "Plan," Messrs. Newman & Newman.

**The South Kensington Exhibition Sales.**—The second and concluding sale, by Messrs. Horne, Son, & Eversfield, of the materials of the galleries, courts, and annexes lately used for the successive exhibitions, took place last week, the sale occupying three days, and finally terminating on Friday, the 25th of March. The materials disposed of comprised nearly six hundred lots, the principal portion consisting of the materials of the Chinese pavilion and tea houses, the Maltese court, the Canadian and west galleries, and the ornamental bridges across the basins. The sale also included the office furniture and fittings, upwards of one thousand iron and pitch-pine garden-seats, and several hundred iron hurdles. The proceeds of the sale amounted to between 2,000*l.* and 3,000*l.*, which, added to 6,000*l.*, the amount of the first sale, brings up the total amount for these portions of the materials to between 8,000*l.* and 9,000*l.* The three days' sale, by Messrs. Wheatley, Kirk, & Co., of the engines, boilers, and other machinery, and the electric plant, realised upwards of 10,000*l.*; the aggregate proceeds of the varied properties on the grounds belonging to the Royal Commissioners amounting to between 19,000*l.* and 20,000*l.* The grounds have already been cleared to a great extent of the machinery and materials sold within the last month.

**Illustrations.**

**MODERN ORNAMENT.**

BY DR. DRESSER.

**H**IS fine and effective design is reproduced in accordance with the kind consent of the publishers that we should reproduce one plate from Dr. Dresser's recently-completed series of designs, published under the title of "Modern Ornamentation." The plate is slightly reduced from the size of the original, and the colour modified for convenience of printing in connection with other plates; the plate in the work being printed in a rich red tint.

Some general remarks on the work will be found in another column.

**DOORWAY, PALAZZO TOLOMEI, SIENA.**

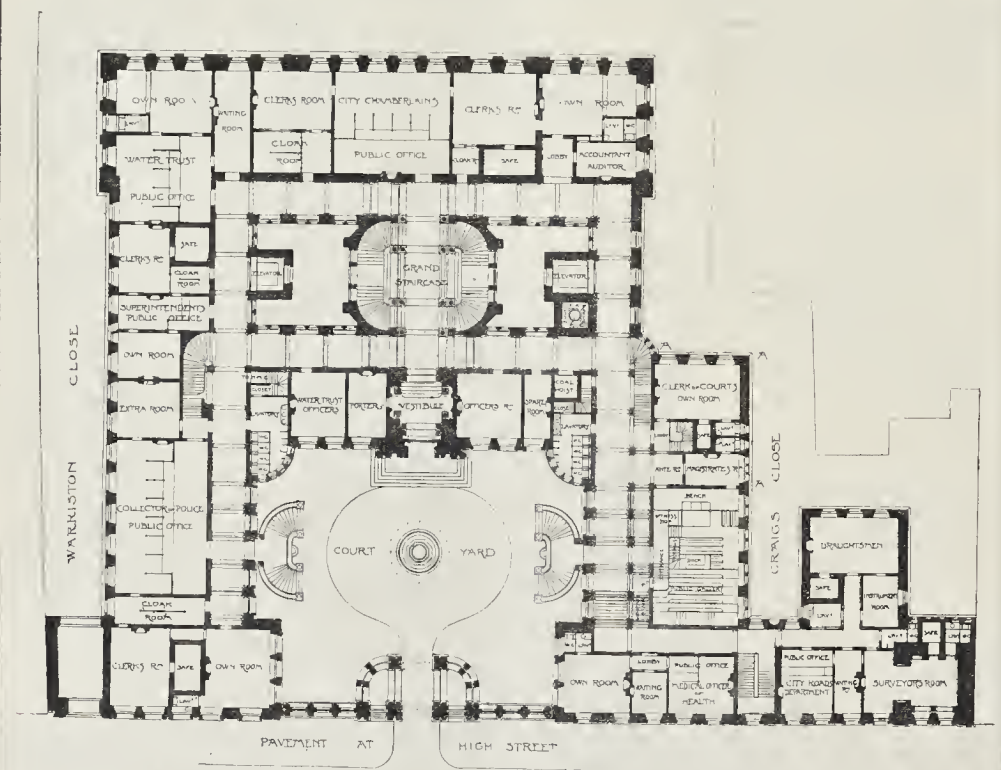
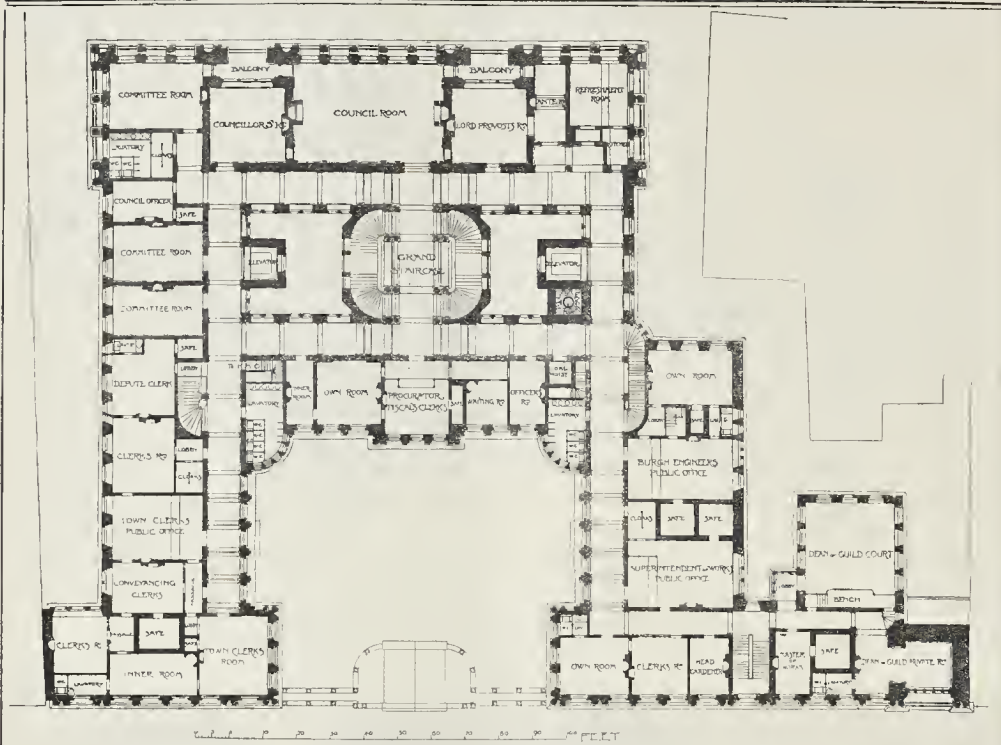
The Palazzo Tolomei is one of the smaller and less well known of those in Siena. It was built by Il Tozzo in 1295, and, notwithstanding subsequent alterations, is still a good specimen of the Italian Domestic Gothic architecture of the first half of the thirteenth century. This doorway seems, from the appearance of the tympanum, to have had its share of modification; but whether the rather incongruous ogg and dentil ornaments are original, or a later insertion, we cannot say.

**ST. GEORGE'S CHURCH, BECKENHAM.**

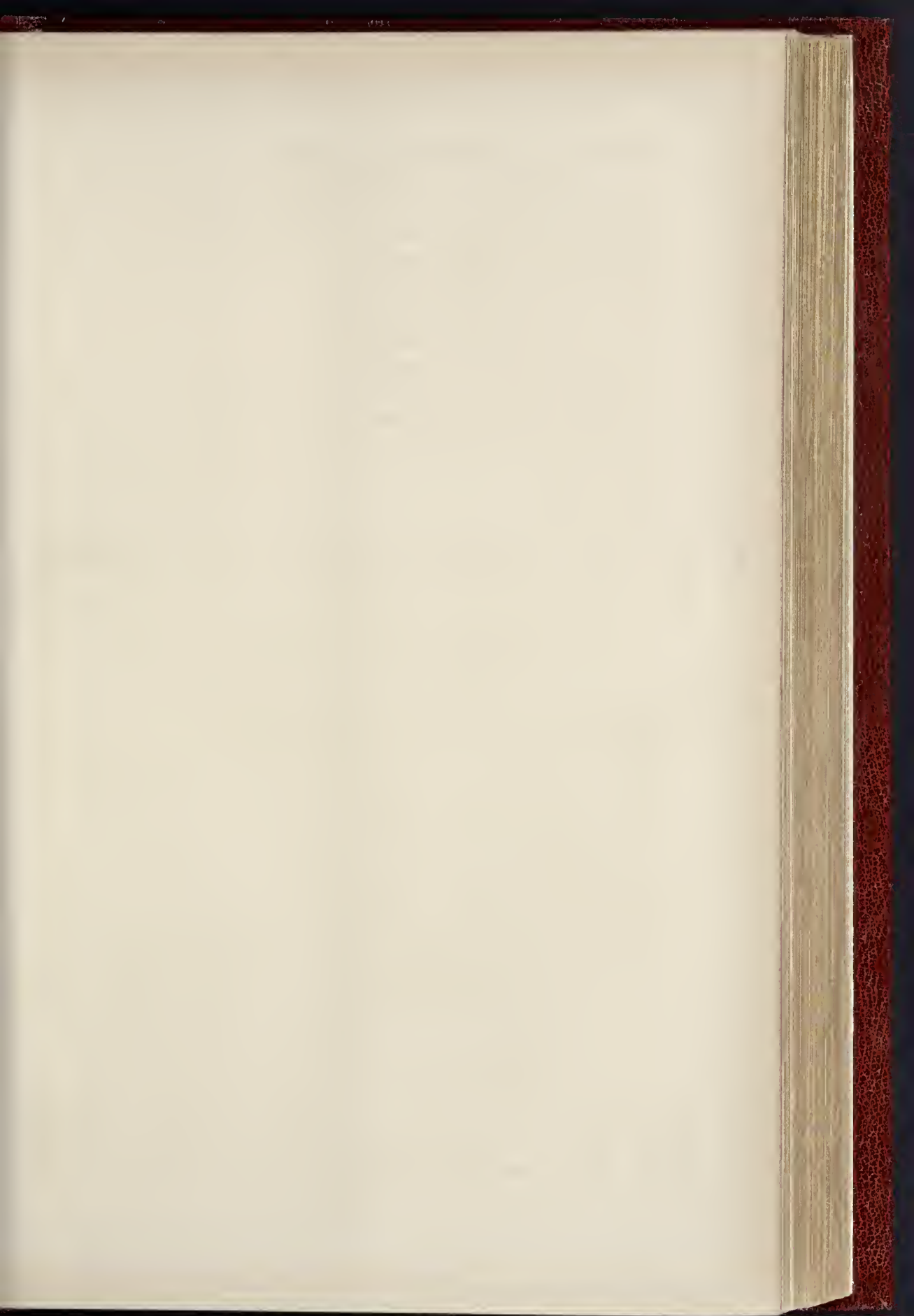
We give a view and plan of this church, which has been erected at a cost of about 16,000*l.*, exclusive of tower and spire, from the designs and under the superintendence of Mr. W. G. Bartlett. The walls are built in hammer-dressed rag; the chancel roof is of pitch-pine, and the other roofs of deal; the chancel fittings are of oak, the remainder of the fittings of deal, and the floor of wood blocks, excepting in the chancel, chapel, and passages, which are tiled. The roofs are covered with Broseley tiles. The builders were Messrs. Cornish & Gaymer.

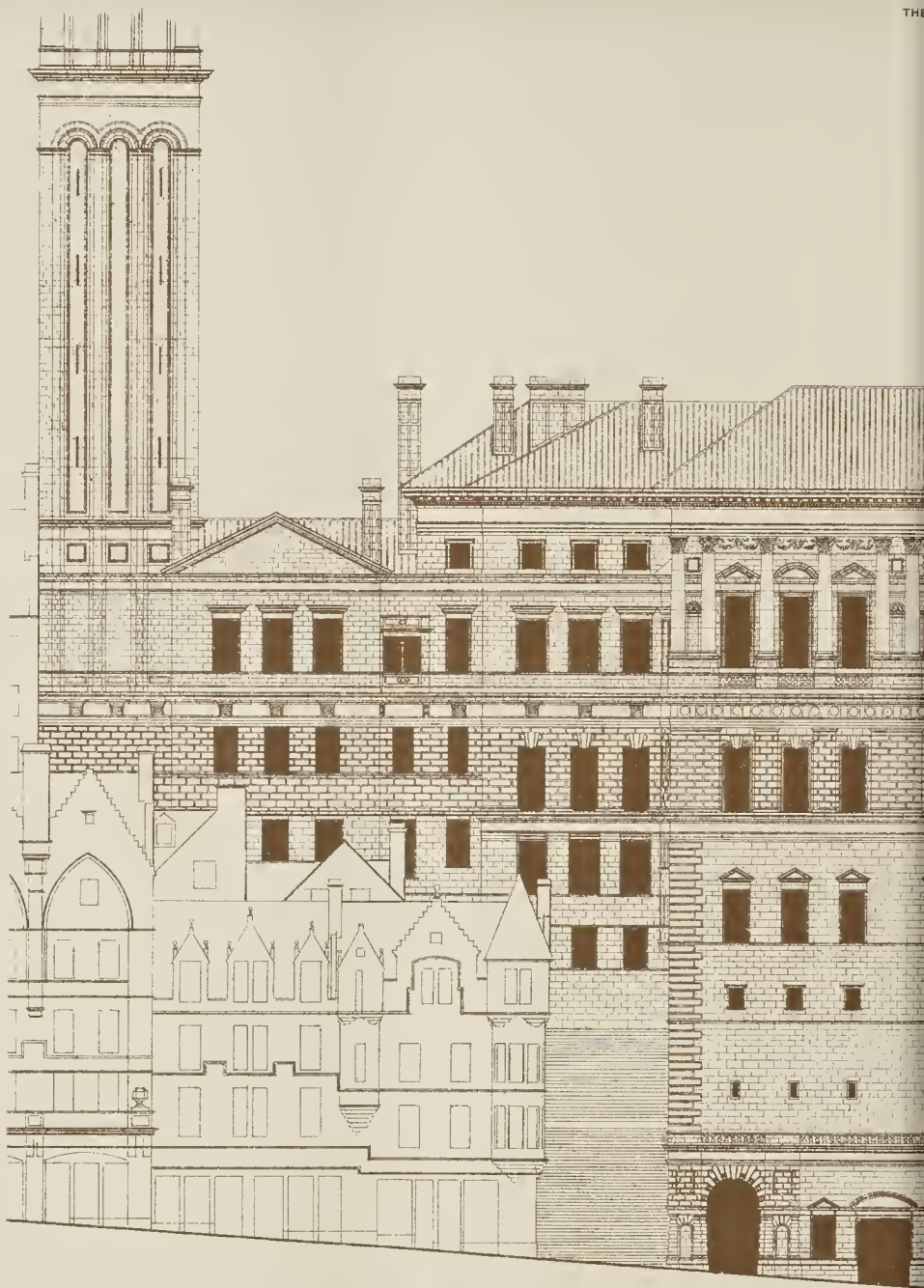
**EDINBURGH MUNICIPAL BUILDINGS COMPETITION.**

We give this week illustrations of the design submitted by Messrs. Morris & Hunt, under the motto "Ora et Labora." Our comments upon it will be found on page 312, *ante*, in the course of the article devoted to the designs in our issue of February 26th.



Edinburgh Municipal Buildings Competition.—Ground and First Floor Plans of Design submitted by Messrs. Morris & Hunt.





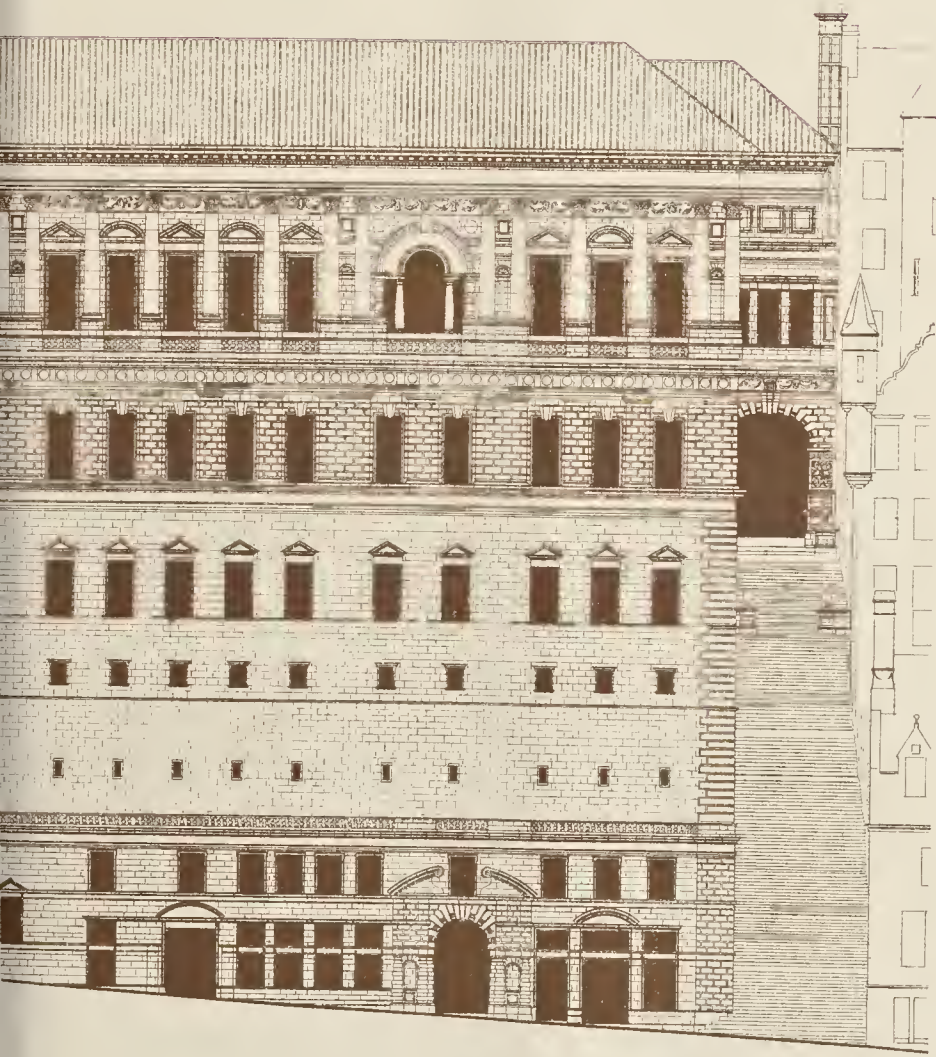
THE EDINBURGH MUNICIPAL BUILDINGS

# ELEVATION TO

THE NORTH SIDE OF THE TOWN HALL



EDINBURGH MUNICIPAL BUILDINGS



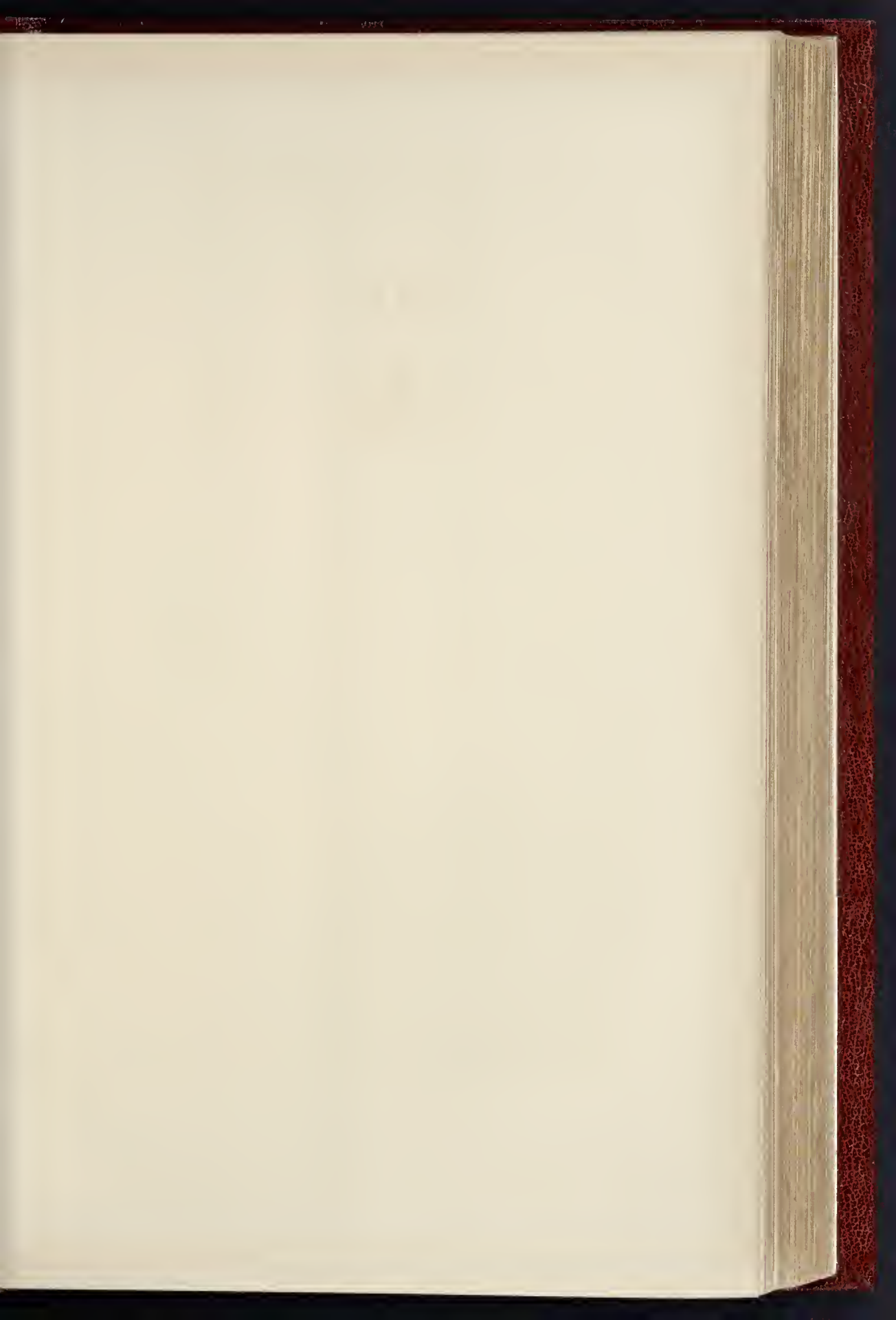
# WILKINS STREET



DESIGN BY MESSRS. MORRIS AND HUNT.

THE UNIVERSITY OF CHICAGO

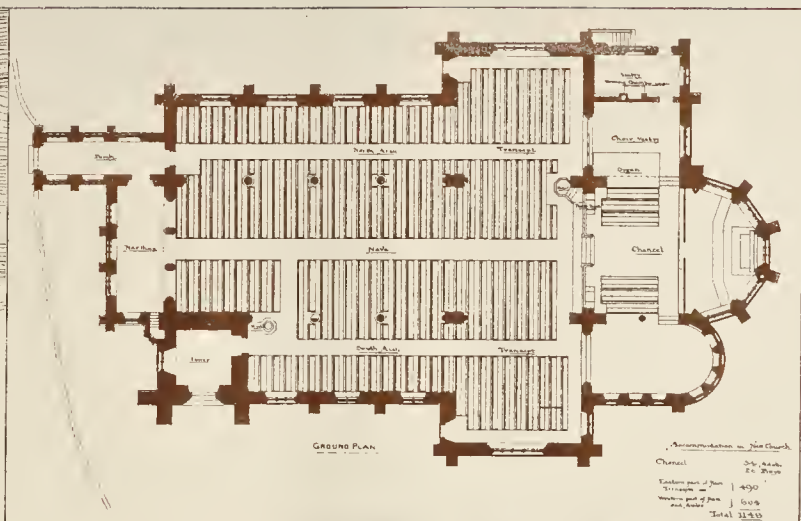






THE CHURCH OF ST. GEORGE AND MARY, BEECHING

CHURCH OF SS. GEORGE AND MARY, BEECHING



THE UNIVERSITY OF CHICAGO





MODERN ORNAMENTATION.—By DR. CHR. DRESSER.



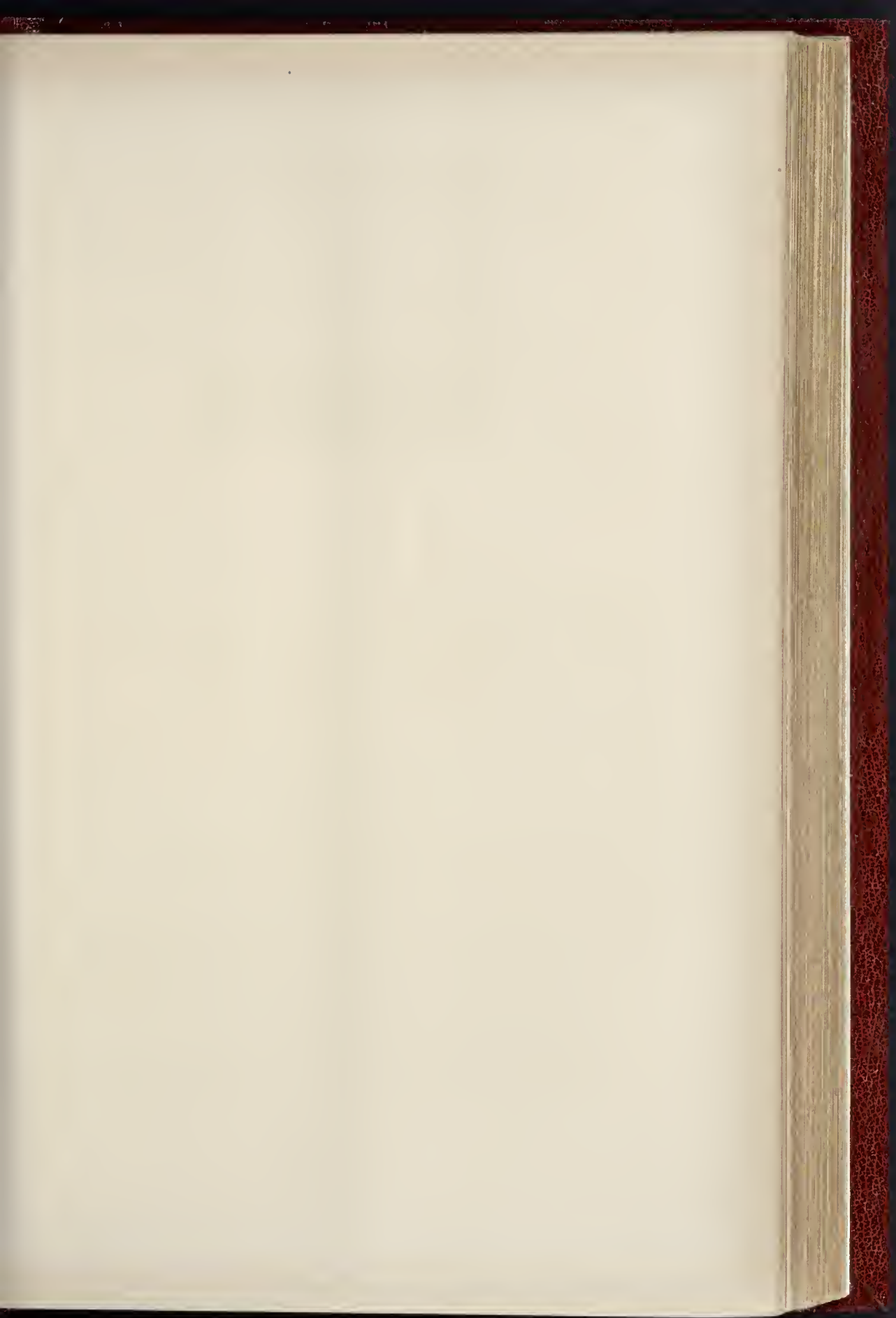
Waters & Bass Photographs 20 High Holborn

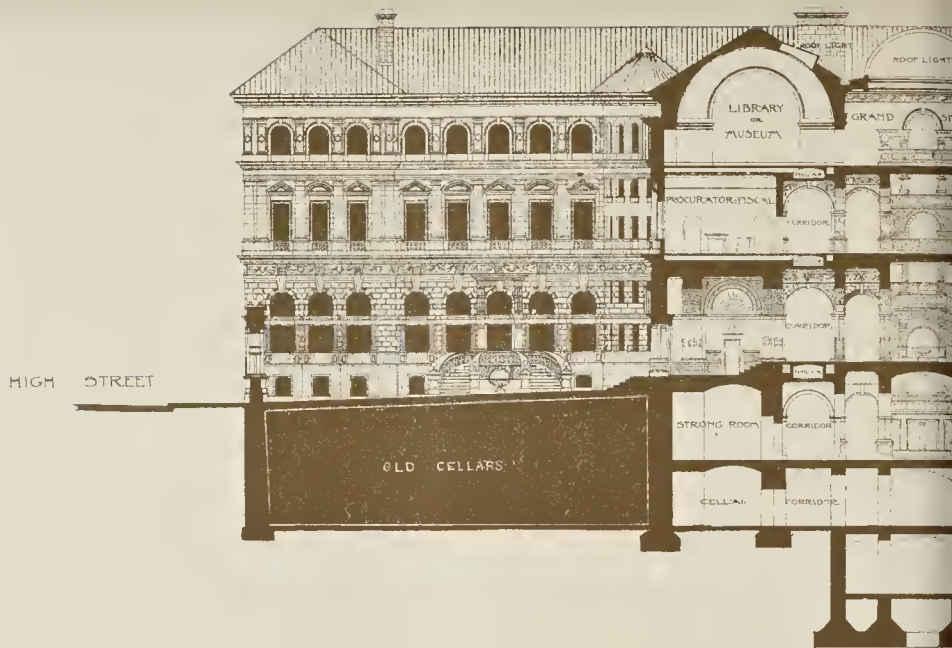
Wm. & A. Co. Printers 20 Queen Street W.C.

A SKETCH IN SIENA.—By MR. REGINALD BARRATT.

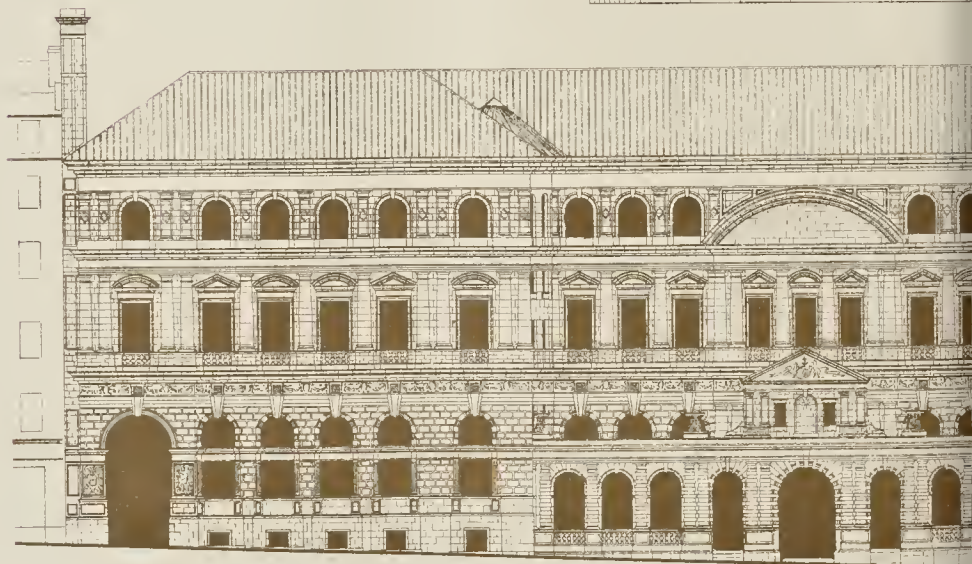
THE HISTORY OF THE UNITED STATES







SECTION THRO' GRAND STAIRCASE



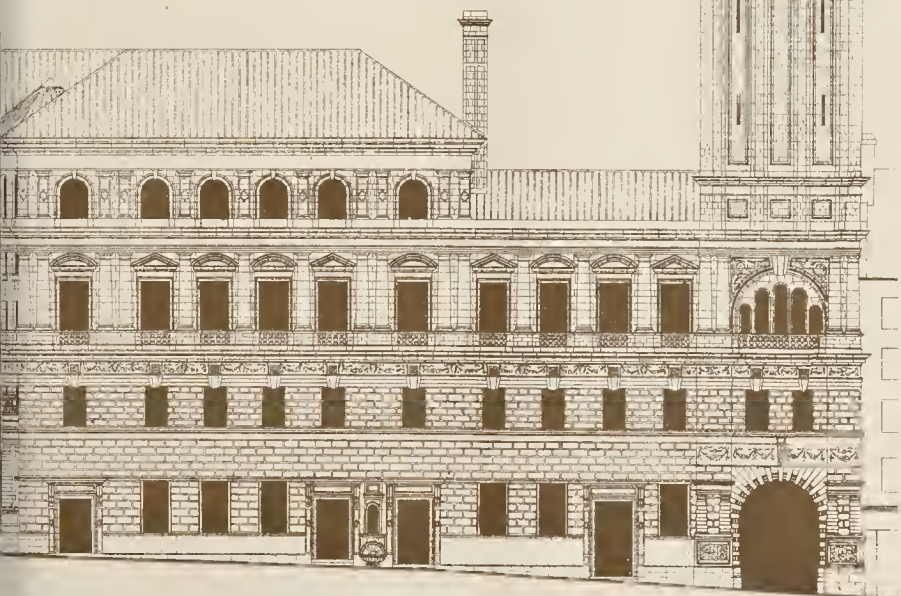
ELEVATION TO

F. Kell & Co. Lith. & Printers 8, Fournival St. Hooper London, E.C.

EDINBURGH MUNICIPAL BUILDINGS COMPANY

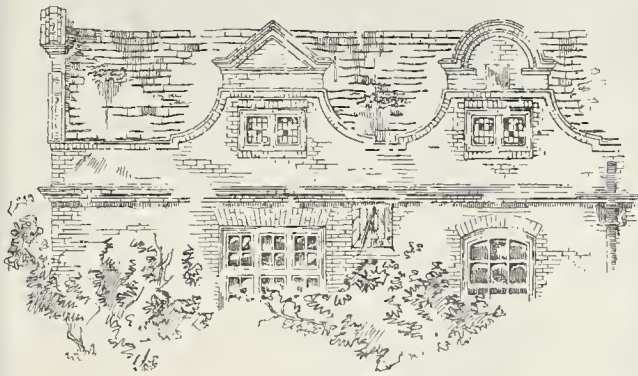


& COURTYARD



HIGH STREET

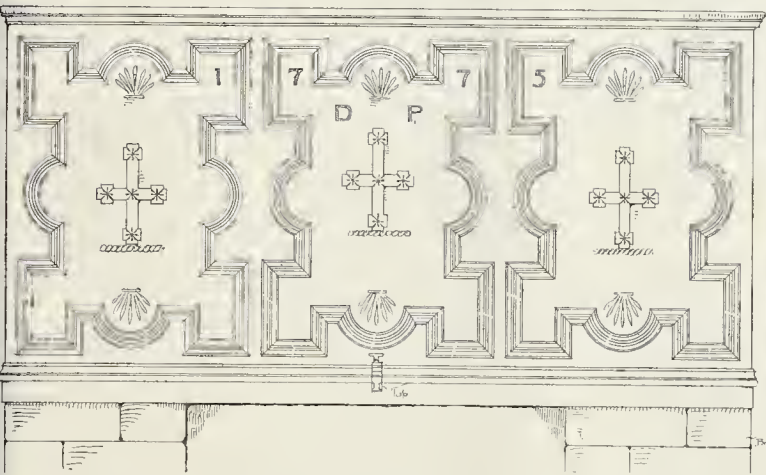
THE UNIVERSITY OF CHICAGO



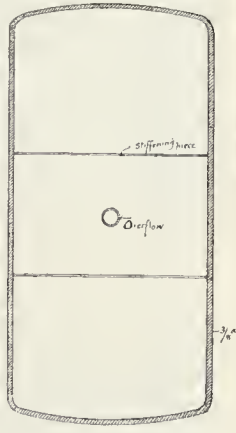
Part of the "Queen Anne" Addition, Fairfax House.  
From a Sketch by Mr. J. Alfred Jones.

FURTHER NOTES ON FAIRFAX HOUSE,  
PUTNEY.

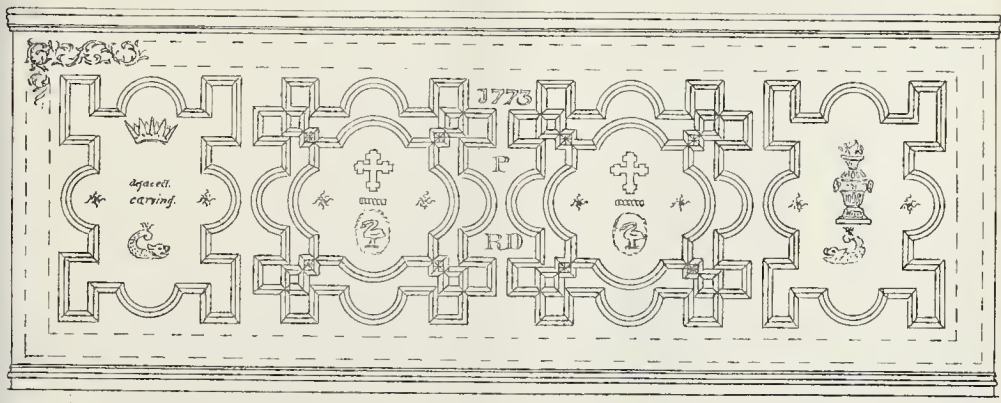
We give some more facts and sketches about this old house, the demolition of which has excited so much regret. In regard to its supposed occupancy by General Fairfax, the real story we believe to be in this wise:—When king Charles I. lay at Hampton Court, in the year 1647, the Roundhead forces made their head-quarters at Putney, with the double purpose of keeping the king under control and of over-ruling the capital, together with the Parliament. Fairfax's chief officers are said to have met in council around the altar-table of St. Mary's, the parish church by the ferry-stairs. At this crisis Ireton, in his capacity of Commissary-General of Victuals, possibly found lodging at the so-called Fairfax House. That house shortly afterwards passed to one John Petteward, in whose family,—still large land-owners of the parish,—it for many generations remained. John Petteward acquired it in virtue of his marriage with Sarah, daughter and heir of Henry White, then of Fairfax House, who



Lead Cistern in Yard, Fairfax House.—Drawn by Mr. B. F. Fletcher.



Plan: Half-Scale of Elevation.



Lead Cistern in Garden, Fairfax House.—Drawn by Mr. E. H. Paskes.

served as sheriff for the county in 1653. Ireton also lodged at Putney House,—dating from 1533,—in the Upper Richmond-road, which was lately demolished. This was the famous Putney School of some generations since, and a reputed home of the Duke of Hamilton, as also of Louise de Querouaille, the Duchess of Portsmouth. Fairfax is said to have stayed here for some months; but there is good evidence to show that the house he *did* occupy was one which, by name of "The Palace," in commemoration of Queen Elizabeth's visit there, stood to the west of old Putney Bridge. That house had been rebuilt, 1596, on the site of a mansion of the Welbecks, by John Lacy, citizen and clothworker, and his Company's arms were carved in the drawing-room ceiling. In 1647 it belonged to the high sheriff, Sir William Wymondsold. It then passed to Sir Theodore Jansen, whose trustees sold the property to Mr. Paul d'Aranda, and continued in possession of his family until about ninety years ago.

The oldest portions of Fairfax House were apparently of no earlier date than say the end of the sixteenth century. The interior wood-work of the oak panelled room,—Queen Elizabeth's breakfast parlour,—is of the Restoration epoch. Additions were made to the main fabric in Queen Anne's reign, their date being recorded on one of the two sun-dials on the walls, one of which is shown in the accompanying illustration of this portion of the house, from a sketch by Mr. J. Alfred Jones, who has also forwarded to us for publication the two measured drawings of the decoratively-treated lead cisterns. We understand that the present possessor had leased the site of the house with its spacious and well-wooded garden at the back for building purposes, and that the lessee proposes to lay out a new road through the middle of the property, to erect shops along the wide street frontage, and cover the ground with rows of low-rented houses.

#### LECTURES AT CARPENTERS' HALL: BRICKS AND BRICKWORK.

PROFESSOR T. ROGER SMITH lectured on this subject at Carpenters' Hall on Wednesday evening last, his discourse being the fifth of the present series of free lectures on matters connected with building given under the auspices of the Carpenters' Company. The lecture was illustrated by a large number of drawings, lent by Mr. James Brooks, Mr. Waterhouse, R.A., and Mr. Stevenson, besides some from the collection at University College and others prepared for the occasion. There were also specimens of bricks lent by Mr. Brown, of Norwich and London, and from the collection at University College. Mr. A. Preston (Past Master of the Carpenters' Company) occupied the chair, and there was a good attendance.

The lecturer commenced by giving an interesting historical sketch of the manufacture and use of bricks by the Egyptians, Assyrians, and other nations of antiquity. With regard to the Romans, he said they made bricks everywhere and used them constantly. They were fond of mixing two or more materials together, as, for example, building walls in concrete and inserting brickwork at intervals, in horizontal layers, to act as courses of bond. They also erected buildings of which the walls were wholly of brick. They turned arches of wide span in brickwork, and they frequently laid in their walls, at regular distances apart, courses of bricks on edge, and courses of sloping bricks, to which antiquaries have given the name of herring-bone work. The Roman bricks were interesting as records, for it was customary to employ the soldiers on brickmaking, and to stamp the bricks with names and dates, and thus the Roman bricks found in this country gave us some information as to the military commanders and legions occupying different parts of England at different periods. After the Roman time brickmaking seemed to have almost ceased in England for many centuries. It was true we found remains of a certain number of massive brick buildings erected not long after the Norman Conquest; but on examination it turned out that these were put up at places where there had been a Roman town, and were built of Roman bricks obtained by pulling down previous buildings. About the time of the Tudors, say the reign of Queen Elizabeth, the making of bricks was resumed in England, and many dwelling-houses and some few churches were built of good brick-

work in that and succeeding reigns. We found in such buildings as Hampton Court Palace, St. James's Palace, and Chelsea Hospital, examples of the use of brickwork in important buildings near London at later dates. The Fire of London, in 1666, gave a sudden check to the use of timber in house-building in the metropolis. Previously to that date the majority of houses had been of a sort the most ornamental examples of which were copied in "Old London" at the recent Colonial Exhibition. The rebuilding after the Fire was largely in brick; and in the suburbs, in the latter part of the seventeenth and eighteenth centuries, many dignified square brick mansions, with bold overhanging eaves and high roofs and carved ornament, entered through a pair of florid wrought-iron high gates, were built, some few of which still lingered in Hampstead and other suburbs. The war-time at the beginning of this century was a trying time for builders, with its high prices and heavy taxes, and some of the good-looking brick buildings of that day turned out to have been very badly built when they were pulled about for alterations. With the rapid and wonderful increase in population and wealth in this metropolis during the last fifty years a vast consumption of bricks had taken place, and a year or two back it was reported by the Commissioner of Police that the extensions of London equalled in a year seventy miles of new house property, practically all of brick. Bricks were heavily taxed in the war-time which had been referred to, and the tax was levied before burning. There was a maximum size for the raw brick, which it was supposed served to keep bricks uniform, and the expectation was entertained that when the duty came off many fancy sizes of bricks would be used. That had not, however, turned out to be the case. The duty had been entirely taken off for years; but the differences in the size of bricks in England were little more than what was due to the different rate of shrinkage of brick-carb under burning. It must not, however, be supposed that they had always, and in all countries, been of about the same dimensions. The size and proportions of bricks had varied extremely in different countries and in the same country at different periods. Some bricks of unusual shapes had also been employed from time to time. Other countries besides England possessed districts which from various circumstances had been more or less densely built on, but did not yield much stone or timber; and, accordingly, brickwork was to be met with in many localities. Holland and Belgium, for example, were countries where brickwork was largely used; and the old connexion between Holland and England led to the introduction among us, in the reign of William III., of the Dutch style of building, which had been in our own day revived under the rather incorrect title of "Queen Anne" architecture. Another great brick district existed on the plains of Lombardy and the northern part of Italy generally, and beautiful brickwork, often with enrichments in marble, was to be found in such cities as Milan, Pavia, Cremona, and Bologna. Many cities and towns in Northern Germany were also brick-built, and furnished good examples of the successful treatment of the material. In some of these German buildings, indeed, difficult pieces of construction, such as we were in the habit of thinking could only be executed in stone, were successfully attempted in brick. For example, they executed large tracery windows in that material. Great brick gables, often with the stepped outline known as crow's-feet, were an excellent architectural feature of these German brick-built towns. In parts of France, also, ornamental brickwork was from time to time made use of, but not extensively. Good brick earth was not simply clay, but a God brick earth was not simply clay, but a compound substance; and what was essential was that it should burn hard, or, in other words, partly vitrify under the action of heat. The brick-earth was usually dug up in the autumn, left for the frosts of winter to break it up, and worked up in the early spring. The moulding was to a very large extent done by hand,—sometimes in a wet mould, sometimes in a dry sanded mould,—and the bricks were first air-dried, often under some slight shelter, as the rain or frost damaged them when first made; and then when that process had made them solid enough to handle, they were burned, and sorted into qualities. The ordinary, or stock, brick of London and the neighbourhood presented a peculiarity the origin of which was not known,

and which was not met with, so far as the lecturer knew, in other parts. Very fine coal or cinders was mixed with the brick-earth, and when the bricks were fired the minute particles of fuel scattered through the material would all of them burn, and serve to bake the heart of the brick. Stock bricks were burnt in a clamp made of the raw bricks themselves with layers of fuel, and erected on earth slightly scooped out near the middle, so that as the bricks shrank they dropped together and did not fall over sideways. Most other varieties of bricks were kiln-burnt. Having described the various types of brick-making machinery, the lecturer said that the sorts of brick that were to be met with in the London market were very varied. To enumerate them all would make a tedious list; to describe them all would be equally tedious. He would endeavour, however, to give some idea of the most conspicuous of them, and would begin with that family of bricks of which the London stock brick was the type. It had been said these were clamp-burnt, and almost all the internal brickwork,—and not a little of the external,—of the metropolis was of stock brickwork. A good London stock brick was an excellent brick for general purposes, but could not be called beautiful. When a clamp had been burnt its contents were found to have been unequally fired, and were part of them under-burnt, part well-burnt, part over-burnt. They were sorted accordingly into "shuffs," "grizzles," "stocks" of two or three qualities, "shippers," and "burrs." Several sorts of malm stocks, which were superior in colour and texture, were made, and were used for facing-bricks and for cutting; and what were called pavions, which were dark and strong bricks, were also made. The London stock was erroneously but usually described as grey; it was really of a pie-crust yellow of various tones. Sometimes it was the same colour when cut, but the hardest stocks were of a dark, dirty purple or brown, or sometimes nearly black inside. A stock brick was rarely quite square or quite true; its surface was often disfigured by black specks and small pits, and a stock of them often looked uninviting; yet a skilful bricklayer, by throwing out the worst, by placing those of bad colour or much out of shape in the heart of the wall, and by bringing to the front the best end or side of those bricks which formed part of the face, could always make the bricks in his work look far better than in the stack. Another important group was the group of Suffolk and Norfolk bricks, red and white. These were very largely employed as facing bricks, and for arches and cut mouldings. Moulded bricks were also to a large extent made of the same material. These bricks were brought to London in large quantities; they had a sanded face, were mostly square, true, and of uniform colour, but they were usually porous, soft, and absorbent. Still, they were in great demand as facing bricks, and the moulded bricks enabled the architect to produce many architectural effects at a moderate outlay. These fields furnished many sorts of bricks, which were called rubbers, and which were employed (as malm stocks also were) for arches of the more elaborate sort, where each brick is cut to its shape and rubbed true, and for mouldings, and even sometimes for carving. Mouldings that were formed by cutting the bricks could be got more perfectly true than when moulded bricks were used; but the expense was greater, and when it was done the material was less durable, for the softer sorts of brick were naturally used for cutting, and the moulded face was less sound than the original burnt face of any brick. Red bricks such of London; but the best came from some distance. Red Suffolk bricks had been alluded to; there was a considerable importation of red Farchan bricks, brought all the way from the vicinity of Portsmouth; these were good both in quality and colour. Good red bricks were also now made at Ascot, and were being used to a considerable extent in the metropolis. A strawberry-coloured brick from Linton had been extensively used at Hampstead. It was hard, and of a colour which contrasted well with stone, but not very pleasing used alone. Glazed bricks of all colours were obtainable: they were usually very hard and square, and the use of them where an impervious glazed face was required,—as, for example, in a good stable,—was better than the employment of glazed tiles, in the use of which there was always a possibility of part of the lining becoming loose or falling off.

There was a difficulty in obtaining a large quantity (of some colours, at least) exactly uniform in tint. Bricks with a very hard face, but not glazed, were obtainable. What was called a washed brick was now made in various colours, adapted for the lining of interiors, and there were hard bricks of a very pale straw colour, known as Beatt's patent bricks. These bricks had the peculiarity of being pierced with holes about  $\frac{1}{2}$  in. in diameter, passing quite through the brick, and they were extremely hard, partly because these holes permitted the hot air and smoke in the kiln to approach very near to the interior of the brick. The lecturer was of opinion that the glazed or dull qualities of hard bricks might with great advantage be often introduced into London streets. What we wanted was something that would wash. The rough surface of stocks or Suffolk facing bricks caught the blacks in the London atmosphere, and gradually got dark and dull. But a perfectly hard face was washed clean by every shower. To return to the bricks in the London market: we had fire-bricks made of fireclay, and almost vitrified and capable of standing intense heat. These were used for lining furnaces, ovens, flues, &c. Then we had almost, if not quite, as refractory a material in Staffordshire blue brick used,—in various forms,—for paving channels, jambs of archways, &c. There were also small bricks called clinkers, chiefly used for stable-paving. Dutch clinkers, formerly imported largely from Holland, were small, rough bricks laid on edge, and affording a good foothold for the horse. Adamantine clinkers, made of gault clay, were much used; they should have chamfered edges, otherwise they made too smooth a floor for a stable. Many other varieties were obtainable in London, and were more or less used, but these were the most prominent. In many parts of England special varieties of brick were to be found, and every here and there one met with a good brickmaker who was able to produce good moulded or embossed or ornamental bricks, such as those which were supplied years ago by Mr. Gunton, and more recently by Mr. Brown, both of Norwich, or by Mr. Cooper, of Maidenhead. It was of importance to those whose business it was to look after or engage in building operations, that they should early learn what to look out for in each material. He (the lecturer) therefore made no apology for trying to put before his hearers the points of a good brick, and in so doing he should partly quote from a memorandum published now a good many years ago by the Manchester Society of Architects. A good brick was uniform in size; standard, 9 by  $4\frac{1}{2}$  by 2 $\frac{1}{2}$ ; weight about 7 lb. each, = 110 lb. per foot cube; was rectangular, true faced, but only one end and one side need be smooth, had no print or sinking on either face, but a hollow on one or both beds. When saturated with water, a brick should not absorb more than 20 per cent. of its own weight of water, should absorb it reluctantly, and part with it freely at ordinary temperatures. It should be uniformly burnt, should be sound, free from cracks, flaws, stones, lumps of any kind, but especially lumps of lime; should be of a good colour for its sort (whether red, yellow, or white), should have a metallic clang when two bricks were struck together; when broken should be sound right through; should be tough and pesty in texture, not granular; and should require repeated blows to break it rather than one hard blow (such bricks would withstand cartage and handling best).

So much for bricks. To make brickwork, however, another ingredient was required, namely, mortar or cement. All mortars, and, in fact, all the cementing materials used (except bituminous ones) in bricklaying had lime as their base, and depended upon the setting quality of quicklime, which had to be mixed with sand or some suitable substitute for it, to make mortars. Limes and cements were far too wide a subject to be dealt with as part of an evening's lecture on another topic, and no doubt they would hereafter form the subject of a lecture or lectures. Ordinary brickwork might be divided into brickwork in mortar and in cement, but there were many qualities of mortar and several sorts of cement. Mortar made with what were called fat or rich limes,—that was to say, nearly pure limes, such as was got by calcining marble or pure chalk, set slowly, with difficulty, and was rarely tenacious. Burnt clay or brick reduced to powder improved

the setting of such lime, especially if the two materials were calcined together; so would an admixture of cement. Mortar made with what was known as slightly hydraulic lime,—that was to say, lime containing a small proportion of clay, such as the grey-stone lime of Dorking, Merstham, and that neighbourhood, set well, and was tenacious and strong. Mortar made with hydraulic lime,—that was to say, lime with a considerable admixture of clay, such as the lias lime,—set under water or in contact with wet earth. It was best to use that lime ground to powder, and not to mix so much sand with it as was used with stone lime. A sort of mortar called selenitic mortar, the invention of the late General Scott, had been made use of in many of the buildings of the School Board for London, and was first employed on a large scale in the erection of the Albert Hall. Its peculiarity consisted in the addition of a small dose of plaster of Paris (sulphate of lime) very carefully introduced, and intimately mixed. The result was that the mortar so made set rapidly, and was very hard. It was claimed that a larger proportion of sand could be used with selenitic than with ordinary lime, thus counterbalancing the extra expense occasioned by royalty under the patent, and by the special care required in mixing. When a limestone contained from 20 to 40 per cent. of clay, it became what was called a cement, and its behaviour was different from that of limestones with less clay. Brickwork in mortar would always settle and compress to some extent. Not so brickwork in cement, which occasionally expanded, but was never to be compressed. That quality, and the rapid setting, tenacity, and strength of brickwork in cement made it a most valuable material to use in those buildings or parts of a building where great steadiness and strength were wanted, and in the sewerage and dock work where there was water to contend with. A good many cements made from natural stones used to be employed, such as Medina, Harwich, Atkinson's, or Roman cement. The last named was the only one which was now much employed, except locally. It had the quality of setting with exceptional rapidity, and was on that account sometimes the best material to employ; but for almost every purpose the artificial compound known as Portland cement was preferable. Portland cement was made largely near Rochester. Its materials were simple and cheap. They might, without much departure from the truth, be said to be Thames mud and chalk; but the process of manufacture required care and thoroughness. The article supplied, when of the best quality, had great strength, and was quick-setting, and was far better than what was manufactured from stones in which the ingredients existed in a state of nature. In England we slaked our lime and made use of it while it was fresh; but in Italy and parts of France it was customary to slake the lime long before it was wanted, and to deposit it in a pit and cover it up with earth. In that condition it was left for months,—in Italy for a year,—and when taken out it was still, but still a pasty substance. It was beaten, and more water added, and it was then made into mortar with sand. It was claimed for mortar made in that way that it was exceptionally strong.

Now that he had considered bricks and partly considered mortar, it remained to pay some attention to brickwork. The simplest and most familiar work for a bricklayer to do was to build a wall. In doing that his object should be to make it as stout as possible for the thickness, and that stoutness could only be obtained by interlacing the bricks. If they were simply laid on the top of each other the wall would be no more than a row of disconnected piles of bricks liable to tumble down. When the whole were so adjusted that throughout the entire wall the joints in one course should rest on solid bricks and should be covered by solid bricks again,—in short, when the whole should break joint,—then the wall was said to be properly bonded, and had as much stability given to it as it could possibly possess. There were two systems of bonding in use in London, known as "English bond" and "Flemish bond." English bond was the method which we found followed in ancient brickwork in this country. In that system a course of bricks was laid across the wall, showing their heads at the surface, hence called "headers," and next above came a course of bricks stretching lengthways of the wall, called "stretchers," and so on alternately.

With the Dutch fashions came in Flemish bond, in which, in each course, a header and a stretcher alternated. In either case, at the corners, a quarter-brick called a closer has to be used in each alternate course to complete the breaking joint. There was not much to choose between these methods where the walls were only one brick thick; but where they were thicker the English bond had a decided advantage, for in walls built in Flemish bond of one and a half brick thickness or more there must be a few broken bricks, or bats, and there was a strong temptation to make use of many. If that took place, the wall was unsound. Many of the failings of brickwork in London houses arose from the external walls, where they were  $1\frac{1}{2}$  brick thick, being virtually in two skins; the inner 9 in. did the whole of the work of supporting floors and roof, and when it began to fail, the outer face bulged off like a large blister. He had known cases where that had occurred, and where there was no header brick for yards, so that one could pass a 5 ft. rod into the space between the two skins and turn it about. That was rather less easy to accomplish with English bond, and there were other advantages in the use of that bond which made it decidedly preferable, and it was now coming back into very general use. There were some odd varieties of bond, such as garden-bond and chimney-bond; but of these he only wished to draw attention to what was called cross-bond. The name was not quite a happy one. Diagonal-bond was hardly better. The thing itself was to be often met with on the Continent, and it was almost unknown here; but it would be worth introducing, as the effect of it was very good. French cross bond, otherwise diagonal bond (*liaison en croix*), was English bond, but with the peculiarity that in every fourth course one header was made use of in the stretcher course at the quoin. The result was that the stretchers broke joint with each other, and all the joints ranged themselves in diagonal lines, and if in any part of the work headers of a different brick were introduced, the appearance of a cross was at once brought out; and even without that, the diagonal arrangement of joints was very perceptible and pleasing. The lecturer next entered in detail into a description of the many other kinds of work which the bricklayer has to do, such as the formation of fireplaces, flues, and chimneys, and the execution of underpinning, &c. He described very fully the methods to be observed in the construction of arches, treated of the question of strength of brickwork, and, in conclusion, enumerated some of the best specimens of modern brickwork produced by architects and engineers.

The concluding lecture of the series will be given on Wednesday evening next, when Professor A. H. Church, M.A., will discourse of "Wood: its Chemistry, its Decay, and its Preservation."

#### ARCHITECTURAL SOCIETIES.

*Edinburgh Architectural Association.*—The usual fortnightly meeting of this Association was held in the Professional Hall, George-street, last week, when Mr. Scott Dalgleish read a paper on "Trondhjem Cathedral, with special reference to its Restoration." After sketching the rise of the ancient capital of Norway, Trondhjem,—in German Drontheim, that is, Throne-home,—the paper referred to the career of St. Olaf, to whom the cathedral is dedicated. Both the town and the church had strong claims on the regard of Scotsmen, seeing that for several centuries,—from the middle of the ninth till the very close of the fifteenth,—the Bishops and Archbishops of Trondhjem were the ecclesiastical superiors of the Bishops of Orkney and of the Bishops of Sodor and Man. The striking fact was that the ecclesiastical supremacy continued for two hundred years after the civil jurisdiction of the kings of Norway over the Scottish Islands had been given up. The fame of St. Olaf, which yearly attracted many pilgrims to his shrine, caused the extension of the town, and led to the erection of the cathedral. The building was begun by Olaf III., who reigned from 1066 to 1093, and who founded the bishopric of Trondhjem. His church corresponded with the choir and the chancel of the present cathedral. The transepts and the chapter-house were the work of Eystein, the third Archbishop, who ruled from 1158 to 1188. The style of archi-

teature down to that date was the Romanesque. Eystein's successors, between 1188 and 1248, rebuilt the whole of the eastern part of the church in the English Pointed style. That accounted for the mingling of Romanesque with Early English features, which was the most noteworthy fact in the architectural character of the edifice. The fourth and last period in the history of the original building dated from 1248, when the nave was begun by Archbishop Sigurd. Before the close of the thirteenth century the completed church must have stood forth in all its splendour. Its period of decadence followed quickly on its completion. It was destroyed by fire in 1328, and on four other occasions between that year and 1719 it suffered from "the devouring element." It suffered still more from the Reformers who committed assault and battery upon it in their efforts to adapt it as a place of Protestant worship. At the beginning of the present century, the nave was a roofless ruin; and the transepts were fitted up with galleries and wooden pews as a parish church; and in the other parts of the building the delicately-carved stone-work was obscured by plaster, paint, and wooden partitions. The towers, the statues, the altars, the rose-window in the western gable, were gone. The present restorations were begun in 1869, and already good progress has been made, but so elaborate was the scale on which the work had been projected that it was expected to extend over other thirty or forty years. The chief features in the restoration of the octagonal choir, of the chapter-house, and of the chancel, were described in detail, and were illustrated by beautiful photographs. The restoration was being carried out on the soundest principles, the old models, both in plan and in detailed ornamentation, being strictly followed. It had been undertaken as a national enterprise, and its cost was estimated at not less than 250,000*l.*, drawn partly from Government grants and partly from local and private contributions. The present grant amounted to 2,500*l.* a year, while a sum of 1,250*l.* a year was drawn from the profit of the Savings Bank of Tromsø. The Norwegians were, on the whole, a poor people, and that they should voluntarily tax themselves to that extent for the erection of a national memorial, was, the lecturer remarked, a noble testimony to their patriotic feeling, and to the depth and correctness of their devotional feeling.—On Saturday afternoon last, the members of the Association, to the number of about eighty, visited the new Municipal Buildings at Glasgow, which are now nearing completion. The visitors were conducted over the buildings by the architect, Mr. W. Young. We gave a view of the principal elevation of the buildings in the *Builder* for Nov. 11, 1882.

*Glasgow Institute of Architects.*—The annual dinner of the Glasgow Institute of Architects took place on the 26th ult. in the Royal Hotel, when a company of about forty sat down. The chairman was Mr. David Thomson, and the croquiers Messrs. W. F. Salmon and James Sellars. The President and Council of the Edinburgh Architectural Association; the President, Vice-President, and Secretary of the Glasgow Architectural Association; Mr. William Young, architect, London; and other gentlemen, were present as guests. In proposing "The Glasgow Institute of Architects," the chairman made an interesting speech, calling attention to some of the subjects the Institute had had under consideration during the past session. The toast of "The Lord Provost, Magistrates, and Town Council" was proposed by Mr. William MacLean, and replied to by Mr. W. F. Salmon; "Kindred Societies" was proposed by Mr. J. J. Burnet, and responded to by Mr. Blain, President of the Edinburgh Architectural Association, and Mr. M'Nab, President of the Glasgow Architectural Association; "The Allied Arts" was given by Mr. T. W. Stevenson, R.S.A., sculptor. Mr. Young's health was proposed by Mr. David MacGibbon, of Edinburgh, and responded to by that gentleman.

*Glasgow Architectural Association.*—The last of the present series of lectures was delivered on the 23rd ult. by Mr. T. L. Watson, F.R.I.B.A., his subject being "The Crypt of Glasgow Cathedral." The President, Mr. M'Nab, occupied the chair. After some introductory remarks on the unique position among the crypts of British cathedrals held by the subject of his paper, the vaulting ribs, as per-

haps the most interesting feature, were considered in detail. The lecturer congratulated the members on their intention of fully measuring and delineating the whole cathedral. At the conclusion, after some remarks from Mr. Gildard, a vote of thanks was awarded to Mr. Watson.

*Manchester Architectural Association.*—At a meeting held at the Diocesan Buildings last week, Mr. Frank Mee, Vice-President, in the chair, the following officers were elected for the session 1887-1888:—President, Mr. A. H. Davier-Colley, A.R.I.B.A.; Vice-Presidents, Mr. Frank Mee and Mr. F. R. L. Edwards; Committee, Messrs. F. W. Ward, P. E. Barker, T. Chadwick, A.R.I.B.A., E. Hewitt, A.R.I.B.A., J. H. Woodhouse, W. Perry, H. E. Stelfox, W. M. Law, and J. Horsfall; Treasurer, Mr. A. H. Davier-Colley; Librarian, Mr. J. S. Hodgson; Registrar, Mr. Frank Mee; Hon. Sec., Mr. J. D. Mould. Mr. Stelfox then read a paper entitled "The Work of the Association," in which he criticised its doings and questioned if it was fulfilling to the best of its abilities the objects for which the Association was formed. A discussion followed, in which the following members took part:—Messrs. F. W. Ward, R. Booth, A. Leresche, J. A. Coe, H. Dolphin, and the Chairman.

#### CASE UNDER THE METROPOLIS MANAGEMENT AND BUILDING ACTS, 1882.

At the Lambeth Police Court, Mr. J. P. Smith, builder, of Coleman-road, Camberwell, was summoned by the Metropolitan Board of Works for that, at Dowlas-street, Camberwell, he did fail to fulfil the conditions annexed to the consent of the Board to the erection of houses in the said street, and dated the 27th day of March, 1882, by not erecting the houses in conformity with the letter of application, and as shown on the plan accompanying it, contrary to 45 Vic. c. 14, s. 9.

Mr. Thomas Burton, solicitor, appeared for the Board, and Mr. Forrest Fulton, M.P., and Mr. Bourcier for the defendant.

Mr. Burton stated the facts were as follow. The defendant had applied to the Board for their consent to the erection of houses in Dowlas-street, beyond the general line of buildings in that street. After the consent had been given, he formed a new street, called Rainbow-street, two of the houses of which had side windows in that street, but the front doors were in Dowlas-street; and this he had done in total disregard of the plan, as assented to by the Board as to Dowlas-street. He called Mr. Millward, the surveyor of the Board, who proved these facts.

Mr. Fulton, for the defence, said he relied upon the De Vere Gardens case, as being a case on all fours with the present one, and asked for the summons to be dismissed, with cost.

Mr. Chance, the magistrate, said he would consider the case of the De Vere Gardens, and adjourned the matter for that purpose, but he did not think it applied.

Upon the adjourned hearing, Mr. Chance, in giving judgment, said the De Vere Gardens case did not apply to the present case, and he should find the defendant 40*s.*, and 8*s.* costs.

#### "A BOOK ON TIMBER WANTED."

SIR,—Referring to the letter in your last number [p. 484] on this subject, it may be as well to remind your readers of "Lastett on Timber and Timber Trees" (Macmillan).<sup>\*</sup> Of course, Barlow's work is well known. New books will add little to our knowledge without reliable experiments on timbers of the scantlings used in practice. That the constants derived from small scantlings are misleading, and therefore useless, may be readily demonstrated by comparing them with the actual breaking-weight of beams, as shown by any of the existing experiments on those of ordinary size. For instance (Clark), a sound red deal beam, 6 in. by 6 in. and 7 ft. 6 in. between the supports, broke with a weight in the centre of 65½ cwts.

Taking Hurst's formula, we have  $W = \frac{C b d^2}{L}$ , where C is stated to be 4 cwts.,  $b, d$ , breadth and depth in inches, and L length in feet. Result, 115.2 cwts.

Again, taking Barlow's figures:  $S = 1,200 \text{ lb.}$ ,  $\frac{4 \times 1,200}{12} = 37 \text{ cwts.}$

The division by 12 is consequent on length being taken in feet. Result, 103 cwts.

<sup>\*</sup> An admirable work, but not exactly the kind of book suggested in Mr. Aitchison's letter.—En.

It is somewhat surprising that the handbooks continue to give these high constants, as it is perfectly well known that those derived from selected pieces 1 in. or 2 in. square are entirely inaccurate for larger scantlings, even of the best timber. In Molesworth, twenty-first edition, p. 122, K is given equal to 14 cwts. for deal; and as K is the same co-efficient as Barlow's S,  $4K = 56 \text{ cwts.}$ , which, divided by 12 (the length here being in inches), gives 4½ cwts., yielding a still higher result.

Now Stoney says "The few experiments on large timber indicate that the values of S must be reduced to very little more than half those given in the table when applied to practices of large size, such as occur in ordinary practice." Again, Col. Seddon, "Builder's Work," Appendix 3, says,—"I have discarded all the records of experiments made on pieces under 2 in. square as not only untrustworthy, but actually misleading."

A few words may not be deemed superfluous on the various moduli in use. One is obtained from the breaking-weight of a beam 1 in. square and 12 in. long, loaded in the middle and supported at each end. Let us call this  $m$ . Another is the "modulus of rupture"  $M$  or  $f$ . This is the case of a beam loaded as above  $= \frac{3WL}{2bd}$  (using the symbol  $\omega$  for area of cross section or  $bd$ ). The first modulus  $m$  is  $\frac{1}{3}$  of  $M$  or  $f$ , the modulus of rupture.

Another is  $S$ , the "coefficient of rupture," which is obtained from the breaking weight of a cantilever 1 in. square and 1 in. projection. This applied to a beam loaded in the middle and supported at each end  $= \frac{WL}{4bd}$

The constant C being equal to 4 S for a beam as above, we have to sum up,

$$C = 4S = \frac{2}{3}f = 12m.$$

If the example we commenced with be taken, it will be found that C is from experiment 29 cwts., the length being taken in inches, or in feet  $\frac{29}{12} = 2\frac{3}{4}$  cwts. in lieu of 3.57, 4, or 4½ cwts.

The discrepancy in the constants for small and large scantlings is doubtless due to the fact that wood, owing to the existence of knots and the manner of its growth, is not isotropic. With respect to deflection, that of the 6 in. by 6 in. beam was 0.1 in. for every 6 C wt.

The deflection of a piece of spruce 4 in. by 12 in. and 17 ft. span was (according to another author) 0.13 in. per 1,000 load. The further consideration of this, however, would involve another modulus, that of elasticity.

WILLIAM DUBOON.

#### KITCHEN BOILER EXPLOSIONS AND SAFETY VALVES.

SIR,—I noticed some few weeks ago that in reporting one of these explosions you strongly advocated the use of safety-valves as preventives. I think it would be useful to your readers if you and some of your practical subscribers would give considered opinions on the matter at greater length. My remarks are confined, of course, to close boilers, each forming part of what is called "low pressure" hot-water circulation, otherwise hot-water circulation with an open relief pipe or open tank at the highest point.

I presume that the best is a "dead-weight" safety valve, and that it should be fixed in a position where it may be free from the corroding action of fire or smoke, and not liable to contact with cooking utensils, or other accidental interference; if so, it should not be fixed on the boiler itself, but as near to it as possible. A fixing to project from the front of the chimney-breast over the mantel-shelf, or from the side of one of the projecting jambs is, therefore, indicated as suitable. I also conceive that it is not good to fix on the flow or return pipes, as these so frequently have their internal diameters reduced by the lime firing from hard waters, so that a separate short non-circulating pipe should be taken from the boiler direct to the safety-valve.

Now, having got our safety-valve, let us see what are the objections to it. If it be not looked to, lifted, and cleaned at proper intervals of time, it is likely to set fast and be of no use; but if it is lifted or the weights raised for this purpose, or by reason of meddling curiosity by a servant ignorant of its action, the servant will be instantly scalded. On the other hand, if it be covered and locked up, the probability is that no one will attend to it.

But what is the use of the safety-valve at all? The most common cause of these explosions is the irruption of water into a highly-heated empty boiler, the consequence of which is that the boiler, suddenly cooling, contracts unequally and ruptures,



at the same time that an enormous volume of steam is evolved, which the open circulation pipes and the safety-valve cannot, either separately or combined, allow to escape quickly enough to prevent its expansive force from bursting the pieces of the boiler in every direction.

The commonest case is, that the supply of water is stopped by the freezing of the return, or supply, pipe; the boiler then becomes emptied either by drawing off the water or by evaporation by means of the fire, or both. The boiler gets red hot, the supply-pipe thaws, and the water suddenly rushes in; then the explosion, which no safety-valve will prevent.

Another case is that the water companies in some districts frequently shut off the supply at night, and if it be turned on again when the boiler is empty and red-hot, then, of course, a similar explosion.

Yet another case. When houses become untenanted, the water companies cut off the supply altogether. In one such case, when the house was let again, a plumber ("expert," no registered plumbers then) was employed to do some work in the house, and to meet the company's men, who were to restore the connexion of house supply-pipe with the company's main. The plumber, arriving early, made himself comfortable by lighting a fire in the kitchen range. Bricklayers had been before him, and finding no other water for their work in the house, drew off what there was in the boiler, and so emptied it. Mr. Plumber then makes it red hot; the water company's men next connect the pipe, and turn on the water whilst the plumber is in the kitchen, boiler explodes, and he pays with his life the penalty of either his ignorance or his thoughtlessness.

I take it that a safety-valve is good to put on, not to prevent an explosion, but only so that if an explosion does occur, it can be pointed out to the corner as evidence that every precaution had been taken. But the risk of scalding from intermeddling with it is sufficient, I think, to outweigh any possible advantage.

Note also that safety-valves do not prevent explosion of engine steam-boilers, when they are allowed to get hot from absence of water, and then are suddenly filled with that fluid.

Fusible plugs, thin copper discs, and safety draw-off cocks are all equally ineffectual against the kind of explosion above described, and they sometimes awkwardly act at improper times, and flood the house with hot water.

The precautions to be taken to prevent explosions are (1) never to have a draw-off tap in the boiler; the lowest draw-off should be on one of the circulation pipes at a height above the level of the top of the boiler. When the draw-off tap is thus fixed, the boiler cannot be readily emptied, and whilst there is water in the boiler, it cannot get red hot. [This does not, of course, prevent the fixing of a special emptying pipe, with screwed nipple or cap for use only when the apparatus is under repair, or is being altered.] (2) Immediately it is discovered that there is a stoppage of cold or hot water supply in the house, draw the fire, and discontinue to draw water from any of the hot-water cocks. (3) Before resuming the fire in the boiler range, see that the cold-water supply is restored, and that the boiler and pipes and tanks of the hot-water system are full of water.

ROBERT WISTON.

**The Assistant Architect, Metropolitan Board of Works.**—At the meeting of the Metropolitan Board of Works on the 25th ult., the Works and General Purposes Committee presented a report as to increases in salaries in the Architect's Department, their first recommendation being that the salary of Mr. John Hebb, the Assistant Architect, be increased from 600*l.* to 700*l.* a year. Mr. Edwards, the deputy chairman of the Board, moved the adoption of the recommendations of the Committee, whereupon Mr. T. W. Williams moved that the recommendation re Mr. Hebb be referred back for further consideration, as it had been somewhat sprung upon the Board. Mr. Shepherd seconded this amendment. Mr. Lindsay observed that, in agreeing to the increase to Mr. Hebb, he had been animated with a feeling that Mr. Hebb had some claim on the Board (hear, hear). Mr. J. Jones thought the matter should go back. These were not the times to give well-paid officers an increase of salary (laughter). Mr. Jolly said he hoped the Committee's recommendation would be agreed to, and Mr. Selway said he thought it only fair that Mr. Hebb should be recognised in the manner proposed by the Committee. The amendment was negatived by twenty to eleven, and the Committee's recommendations were agreed to. At the same meeting of the Board it was resolved that Mr. Hebb and Mr. F. W. Goddard be paid 105*l.* each for additional duties discharged by them between the date of the death of Mr. Vulliamy, the late Superintending Architect, and the appointment of his successor, Mr. Blashill.

#### PROVINCIAL NEWS.

**Plymouth.**—At a recent meeting of the Plymouth Town Council, it was resolved to complete the southern block of the new market buildings before proceeding with any part of the northern block, so that the proposed widening of Market-place and East-street may be carried out, and thus obviate the necessity for making a carriage-way through the market from Market-place to Cornwall-street. At the same meeting of the Council it was resolved to call in Mr. Baldwin Latham to advise the Council on the sewerage scheme for the Western District, and on the other drainage requirements of the town.

**Ramsgate.**—It is proposed to make a new "Jubilee" road to connect the two cliffs in Ramsgate, and the President of the Board of Trade (Lord Stanley), together with Mr. H. G. Calcraft (Permanent Secretary), and Mr. C. Cecil Trevor (Assistant Secretary, Harbour Department), and other gentlemen, visited Ramsgate a few days ago in reference to the proposed improvement in the approaches to the Cliffs and Sands, which, it is asserted, will interfere largely with the harbour property if carried out. The Mayor (Alderman W. F. Pygott) and Councillor Pearce (Chairman of the Sands and Cliff Approaches Committee), on behalf of the Town Council, and Capt. Jones (Harbour Master), Mr. G. Keyto (Harbour Engineer), Mr. W. A. Hubbard (Town Clerk), and Mr. W. C. Barley (Borough Surveyor), were also in attendance. The interview was of a purely private character.

**Southport.**—On the 24th ult. Major-General Hutchinson attended at Southport for the purpose of inspecting, on behalf of the Board of Trade, the new tramways constructed by the Birkdale and Southport Tramways Company, extending their system to Birkdale South, in substitution of the present omnibus service. The whole of the works have been carried out in accordance with the plans, &c., prepared by and under the superintendence of the company's engineer, Mr. C. A. Atkinson, of Liverpool, by Mr. William Winward, contractor, of Wigan. The tramway has been constructed in a substantial manner with concrete foundations, cast-iron sleepers, steel rails and fastenings, best Haslingden paving grouted in asphalt, the paving sets being specially dressed upon the ground, and the roadway for the whole length of the tramways widened and repaved. The district served by this extension is rapidly increasing in population, building operations being very brisk at present, according to the *Liverpool Daily Post*.

#### CHURCH-BUILDING NEWS.

**Bamber Bridge (near Preston).**—St. Saviour's Church, Bamber Bridge, near Preston, has lately been consecrated by the Bishop of Manchester, after enlargement. The church was built in 1837. Plans were made in 1876 for an extension by Mr. Myres, but the project was postponed until 1881, when the matter was again taken up, and in May, 1886, the tender submitted by Mr. Charles Walker, contractor, of Preston, was accepted, amounting to 2,621*l.*, but the total outlay, including fittings and all contracts, amounts to close upon 3,000*l.* The additions comprise a spacious chancel, with circular spire, lighted by nine windows; north and south transepts; a spacious organ-chamber on the north side; and a vestry on the south. The chancel is fitted up with roomy choir-stalls in selected pitch-pine, and the floors are laid with Minton & Co.'s encaustic tiles. The roof is circular and open-timbered. The old nave roof has been boarded diagonally. The nave and transepts have been fitted up with new pitch-pine open benches, having easy sloping backs. A new baptistry has been formed under the present tower and spire at the west end. The church is well lighted and ventilated, and the present accommodation is for 791 persons. The whole of the works have been carried out under the supervision of Mr. T. Harrison Myres, A.R.I.B.A. (Messrs. Myres, Veevers, & Myres), Preston, Mr. John Yates, of Bamber Bridge, acting as clerk of works.

**Croydon.**—It is proposed to renovate the interior of Christ Church, Broad Green, Croydon, and to carry out a general scheme of decoration from designs by Mr. C. A. Monday, A.R.I.B.A.

**Gnaton (Devon).**—The *Western Morning News*

reports that under the title of St. Mary's, Gnaton, a chapel adjoining Gnaton Hall, the residence of Mr. Michael Williams, was opened on the 24th ult. by the Bishop of the diocese. It is really a private chapel attached to the mansion, but wishing to make it as useful as possible to his neighbours, who, like himself, are some two miles from the parish church of Newton Ferrers, Mr. Williams has kindly made a separate public approach to it, and opened its services to all who wish to attend them. Mr. Geo. Fellowes Prynce is the architect of the chapel, which is erected on the north side of the hall. The roof is covered with red Broseley tiles, and surmounted by a bell turret. The walls are of a local stone of a warm bluish tint from Mr. Williams's own quarries, the dressings being, in the exterior, of Box Ground, and in the interior of Corsham Down stone. The contractors for the building were Messrs. Laphorn & Goad, of Plymouth; the carved wood-work was done by Messrs. Wippell & Co., of Exeter; the brass and iron work came from Messrs. Singer & Co., of Frome; the stained-glass windows are by Messrs. Clayton & Bell, of London; the marble work is by Messrs. J. & E. Goad, of the Phoenix Works, Plymouth (who, in regard to the Kitley marble dado, which runs all round the interior of the chapel, were joined by Mr. Gully, of Yealton); and the decoration of the roof was carried out by Messrs. Kingcome, of Yealton.

**Hoghton.**—Through the liberality of Sir Charles de Hoghton, Bart., who has rebuilt the tower from designs by Mr. Birtwistle, architect, of Blackburn, the ancient parish church of Hoghton has been presented with a new clock, specially made by Mr. J. W. Benson, of Ludgate-hill. It has gun-metal wheels, steel pinions, and Graham's dead-beat escapement, shows time on two copper dials, 5 ft. 6 in. diameter, strikes the hours on a tenor bell of 13 cwt., and chimes the celebrated Cambridge quarters on four smaller bells.

#### The Student's Column.

#### FIELD WORK AND INSTRUMENTS.—XIV.

##### Surveying Instruments.

##### IX.—THE THEODOLITE (continued).

**T**he transit instrument, the horizontal axis forms the centre line of the trunnions attached to the telescope, as shown in fig. 4. The trunnions are shouldered down at their outer ends, and are connected at their inner ends to the telescope by means of a collar-piece fixed round the outer tube at or near its centre. The axis is supported and movable upon V-shaped sockets or angular bearings, technically termed *Ys*, in which it is held by movable clips, consisting of thin flat brass plates, attached to one branch of the *V* by a fixed screw, and secured to the other branch by a small milled-head screw, as shown in figs. 39 and 40. In Colonel Everest's theodolite (figs. 41 to 44) the telescope is permanently fixed to its horizontal axis as in a transit instrument (figs. 39 and 40). The supporting frames are made low for sake of compactness, but the telescope can be reversed end for end by unfastening the clip pieces and lifting the horizontal axis out of its bearings. There are two opposite sectors graduated in degrees from zero to 50°, as shown in fig. 41, instead of a complete vertical circle, as in figs. 39 and 40. These sectors traverse with the telescope, as indicated by the dotted lines in fig. 41, and are placed so as to allow the telescope to traverse within an angle of about 45° above or below a horizontal line, as in a plain or *Y* theodolite (fig. 35). The long spirit level which was seen in figs. 3 and 34 to be attached to the telescope in both the plain and the transit types of instruments, is in an Everest instrument attached to the index bar. The index bar carries a vernier at each end, by means of which subdivisions of a degree in measuring vertical angles can be recorded. Instead of the two spirit levels marked *Q* and *T* in figs. 22 and 38, there is only one spirit level, marked *Q*, in fig. 42, which is fixed parallel to the horizontal axis of the telescope, as shown in fig. 44, the spirit level marked *T* in figs. 41 and 42 being substituted for the spirit level *T* in figs. 22 and 38.

In comparing the detail of these instruments the reader is recommended to study their illustration with the aid of a magnifying glass, as

|                                                                                                                                            |       |
|--------------------------------------------------------------------------------------------------------------------------------------------|-------|
| By J. G. & A. PREVOST.                                                                                                                     |       |
| North Row—46 and 48, Eglinton-road, freehold ...                                                                                           | £815  |
| Leytonstone-road—14, Argyle-road, 91 years, ground-rent 5 <i>l.</i> 18 <i>s.</i> .....                                                     | 300   |
| Leyton-road, Tyndal-road—A plot of freehold land                                                                                           | 45    |
| Bethnal Green—Freehold ground-rents of 17 <i>l.</i> a year .....                                                                           | 363   |
| Limehouse—104 and 106, Maroon-street, 17 years, ground-rent 5 <i>l.</i> , and 4, Thomas-street, 55 years, ground-rent 2 <i>l.</i> .....    | 200   |
| MARCH 25.                                                                                                                                  |       |
| By BAKER & SONS.                                                                                                                           |       |
| Staines—Dunroff Cottage, with grounds, copyhold                                                                                            | 980   |
| Cricklewood—The Old Schoolhouse, freehold .....                                                                                            | 393   |
| By C. & H. WRIGHT.                                                                                                                         |       |
| Mitcham—1, 2, and 3, Willow-walk, freehold .....                                                                                           | 1,650 |
| A plot of freehold land .....                                                                                                              | 160   |
| 4 and 5, Willow-walk, freehold .....                                                                                                       | 190   |
| Gray's-in-a-road—Improved ground-rent of 34 <i>l.</i> 12 <i>s.</i> , and 9, Harrison-street, ground-rent 3 <i>l.</i> , term 15 years ..... | 500   |
| 7, Seaford-street, 14 years, ground-rent 15 <i>l.</i> 10 <i>s.</i>                                                                         | 175   |
| Brixton—An improved ground-rent of 2 <i>l.</i> , term 14 years .....                                                                       | 180   |
| By R. REID.                                                                                                                                |       |
| Haymarket—16, Great Windmill-street, freehold                                                                                              | 5,440 |
| Faddington—19, Howley-place, 53 years, ground-rent 15 <i>l.</i> .....                                                                      | 350   |
| Ealing, Castle Bar-road—Knolly House, 71 years, ground-rent 10 <i>l.</i> 13 <i>s.</i> 6 <i>d.</i> .....                                    | 730   |

## MEETINGS.

|                                                                                                                                                                     |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| SATURDAY, APRIL 2.                                                                                                                                                  |  |
| Architectural Association.—Visit to Lambeth Palace. 2.30 p.m.                                                                                                       |  |
| St. Paul's Ecclesiastical Society.—Visit to Lambeth Palace, under the guidance of Mr. J. P. Seddon. 3 and 4 p.m.                                                    |  |
| Royal Institution.—Lord Rayleigh on "Sound." 3 p.m.                                                                                                                 |  |
| Association of Public Sanitary Inspectors.—Dr. Alfred Carpenter, J.R., on "Theory and Practice as to Disinfection." 6 p.m.                                          |  |
| MONDAY, APRIL 4.                                                                                                                                                    |  |
| Society of Engineers.—Mr. Edwin Ault on "The Shone Hydro-Pneumatic Sewerage System." 7.30 p.m.                                                                      |  |
| Society of Arts (Gunter Lectures).—Professor W. C. Unwin on "Machines for Testing Materials, especially Iron and Steel." III. 8 p.m.                                |  |
| Clerks of Works' Association.—Annual Meeting. 7 p.m.                                                                                                                |  |
| Victoria Institute.—8 p.m.                                                                                                                                          |  |
| Leeds and Yorkshire Architectural Society.—Annual meeting.                                                                                                          |  |
| TUESDAY, APRIL 5.                                                                                                                                                   |  |
| Institution of Civil Engineers.—Mr. E. A. Clowes on "Printing Machinery." 8 p.m.                                                                                    |  |
| Birmingham Architectural Association.—Mr. H. H. McConnell will read a paper entitled "Notes on a Tour in Germany." 7.30 p.m.                                        |  |
| WEDNESDAY, APRIL 6.                                                                                                                                                 |  |
| Carpenters' Hall, London Wall (Free Lectures to Building Artisans).—Professor A. H. Church, M.A., on "Wood, its Chemistry, its Decay, and its Preservation." 8 p.m. |  |
| Parkes Museum of Hygiene.—Mr. J. Bailey Denton, M.Inst.C.E., on "Metropolitan Sewage Disposal." 5 p.m.                                                              |  |
| British Archaeological Association.—(1) Dr. Hoopell on "Discoveries at Vinovia." (2) Mr. C. Lysons on "The White Ladies of Brewod." 8 p.m.                          |  |
| SATURDAY, APRIL 9.                                                                                                                                                  |  |
| Edinburgh Architectural Association.—Visit to Duntarvie Castle and Niddry Castle.                                                                                   |  |

## Miscellanea.

**School Hygiene.**—A correspondent sends us his own experience of the sanitary condition of private schools, which is, no doubt, shared by others who have directed attention to this subject. He sent his son to a private day-school, where the drainage and ventilation were defective, and an attack of gastric fever resulted in his removal to another school, where, again, the house was not free from unwholesome smells. A complaint to the schoolmaster was met with the request that the boy should be withdrawn. A third school was found, but this had the important disadvantage of being so constructed that the pupils were required to work in shadow while they faced the full glare of windows. Our correspondent pleads for some proper control over these institutions; the matter is, indeed, very much in his own hands and those of other parents. If schoolmasters found that the guardians of children required satisfactory evidence of the hygienic condition of the schools to which they propose to send their children, there is but little doubt the necessary improvements would be effected. It is not probable the Legislature would consider that school-houses should be dealt with differently from dwelling-houses; nor, indeed, if sanitary authorities were endowed with special powers for these institutions, can it be expected they would be adequately exercised. It is, therefore, desirable that efforts should be made to induce parents to recognise the importance to their children of health conditions, and we might suggest that schoolmasters would be consulting their own interests in meeting the reasonable requirements of those who entrust their children to their care.—*Lancet.*

**The American Exhibition Buildings at Earl's Court, Kensington.**—The works on the buildings of the American Exhibition of the Arts, Industries, Manufactures, and Products of the United States, which are being erected on a large area of land, nearly twenty-three acres in extent, between the Earl's Court and West Brompton stations of the Metropolitan District Railway, are being very actively proceeded with, upwards of one thousand artisans and labourers being at present engaged on the works. For the varied purposes of the Exhibition, several buildings, distinct from each other, are in course of erection. The main building is situated at the extreme western boundary of the site, running northwards in the direction of Earl's Court from its principal frontage at West Brompton, near the West Brompton station, and approached from Lillie Bridge-road, close to the locomotive works of the District Railway. This building is 1,230 ft. long and 120 ft. wide, covering an area of upwards of 125,000 ft. Its elevation in the Lillie Bridge-road is faced with Portland cement. The chief business offices in connexion with the exhibition are on the east and west sides of the frontage. Immediately to the west are separate buildings, one forming a dining-room, 250 ft. long and 90 ft. wide, and the other an art gallery, 160 ft. by 80 ft. The whole of these three buildings are fast approaching completion. The height of the main building to the apex of its angular roof, which is being covered in with corrugated iron and glass (the sides also being in corrugated iron), is upwards of 60 ft. The flooring is considerably advanced towards completion, and it is expected that this main section of the exhibition buildings will be ready for the reception of exhibits in about a fortnight. Amongst the numerous other structures which are in progress are several pavilions and sheds at different points on the ground, and the attractions of the exhibition will likewise include a theatre on the north-west side of the ground. On the north-east side, between four and five acres have been appropriated as an open air encampment, which is intended to be utilised as a hunting-ground, where scenes illustrative of the "wild West" and prairie life will be given. On the south side of the encampment an immense grand stand has been erected. The ground in front of the stand will be formed into a racecourse over a third of a mile in length. This encampment fills a triangular space, having on one side the West London Railway from West Brompton to Addison-road, and on the other sides of the triangle the District line from Earl's Court to Hammersmith, and the District branch from Earl's Court to West Brompton. The encampment, as well as the exhibition grounds generally, will be approached from Earl's Court station, in addition to the Lillie Bridge-road approach, by four bridges at different points on the District line. It may be added that a considerable portion of the space is being formed into colonnades, divided, in American fashion, into "First-street," and so on in succession up to "Tenth-street." The works and buildings have been designed by Mr. O'Driscoll, who is acting as engineer to the Exhibition Commissioners, and are being carried out by the Commissioners' own workmen.

**Crane's Ventilating Warming Coils.**—We have had an opportunity of seeing some of these coils in action, at the Tottenham-road Board Schools, Kingsland. They appear to do their work of supplying the rooms with warmed fresh air most efficiently, and even on a cold day (such as the one when our visit was made) rooms containing a large number of children are comfortably warm, but free from "stiffness." Each coil consists of a series of upright columns, connected with top and bottom boxes, through which the water or steam circulates. Inside of each column is a 2 in. pipe with both ends open. An opening through the wall, next the heater, with air grating, is made to the under side to admit fresh air, which is caused to rise by the heat of the pipes through the inner tube, and being warmed on its way passes out of the top grating and thus enters the room. The room is thus supplied with clean warmed air. The apparatus is made by Mr. Robert Crane, of Stockwell Park-road. The coils are not unsightly, and need no casings or grilles.

**The Zolus Waterspray Ventilating Company** have removed to 124, High Holborn.

**Mitis Iron.**—The following particulars respecting the so-called mitis iron, the patent process for which was recently sold by M. Nordenfolt to an English Company, may be of interest. It was discovered by a Swedish engineer, Herr Witenström, and has for a year been subjected to various trials at Messrs. Faustman & Ostberg's Engineering Works, at Karlsvik, near Stockholm. Mitis iron castings the name being derived from the Latin word *mitis* "weak," "soft," is produced by the direct smelting of soft forged bar-iron, and possesses all the qualities of the latter. According to experiments carried out at the testing establishments of the *Järnkontor* (Iron Board), it has shown an absolute tensile strength of 1.5rd kilograms per square millimetre (fourteen tons per square inch), with a final elongation of 15 per cent. A variety of articles have been most successfully manufactured from this kind of iron at Karlsvik, as, for instance, carriage springs, tools of all kinds, agricultural implements, and even soles for boots, which are to be coated with india-rubber, ordered by an English firm for a South American army. The cost of articles manufactured from this kind of iron is about 50 per cent. higher than that of such made from ordinary cast-iron, but they are much cheaper than hand-forged goods, and in comparison with the former articles of mitis iron show far greater strength and toughness, and with the latter a better finish. Generally very little filing of the edges of mitis cast goods is required, and at Eskilstuna, the Sheffield of Sweden, mitis iron has even been used successfully as raw material in the manufacture of finer steel goods. The new method will doubtless be largely introduced into the Swedish works in preference to the old methods of reduction, and is also sure to affect the hand-forged iron and steel industry of that country.

**Paris Railway Exhibition, 1887.**—As has already been mentioned in our columns, the fiftieth anniversary of the introduction of railways into France will be celebrated by the Grand International Railway Jubilee Exhibition, to be held in Paris this year, under the patronage of the Ministry. We are informed that every description of railway plant will be represented, including the most recent improvements, which will illustrate, by comparison with obsolete material, the railway progress made in different countries. The grounds upon which the Exhibition will be held form part of the Bois de Vincennes, and will contain many attractive features, among which may be noticed representation of the Ports of Havre, New York, and Rio Janeiro, to be erected on the Lao Daumesnil, which is within the grounds. The latter are three miles and a half in circumference, and will be girt by a line illustrating the railway systems of different countries, a special feature being the stations and villages typical of each nationality, which will be placed along a line.

**An Iron House.**—A house built of iron has been sent from Hamburg to the Cameroons. It is stated to be very warm in the summer, and, therefore, cannot be said to be very suitable for hot climates; but, on the other hand, such iron houses are easily taken to pieces and put up where required, hence their advantage. Everything is done to reduce the heat, the walls of the upper stories being double, and the intervening space filled with a material bad for conducting heat, whilst the walls are coated with clay inside. The roof is covered with moid outside, which again in the hot season is covered with straw. A verandah runs, in Swiss style, all round the building, and the stairs to the upper stories are outside the house. The cost is very low, being only 40 marks per square metre of inhabited area.

**The Sanitary Registration of Buildings Bill.**—The Surveyors' Institution, the Association of Municipal and Sanitary Engineers and Surveyors, and the London Sanitary Protection Association, have appointed representatives to attend the Conference of Architectural Engineering, and Medical Institutions on the Sanitary Registration of Buildings Bill, 1887.

**Drying Bricks.**—We hear that Mr. James Brown, of Cannon-street, whose face and ornamental bricks are well known to many architects and builders, is about to put up a new brick drier, on the system of the Universal Cool Air Drying Company (Limited), whose process as applied to the drying of timber was described in our pages in October last.

A Useful Desk-book.—"The Architect and Contractor's Compendium, Specialist's Directory and Diary" (London: James Sears & Sons, Crane-court, Fleet-street) has lately been issued, under the editorship of Mr. John E. Sears, A.R.I.B.A. It is a very useful and handy publication for architects, builders, clerks of works, and foremen. It contains, besides an office diary, a synopsis of Building Acts and By-laws, legal and general information, and tables and memoranda. Without vouching for the accuracy of all this matter, we may say that, so far as we have been able to put it to the test, we have found it to be trustworthy. One important feature of the work is a directory of building materials, manufactures, and specialities, classified and indexed. This will be not the least useful part of the work, which is clearly printed and indexed. We hear that the second issue is now in preparation for publication in October next.

Hydraulic Lifts for the Colonies.—Messrs. R. Waygood & Co. are now making the hydraulic lifting plant for Messrs. W. Gardner & Co.'s Sydney premises. The plant will consist of one of Waygood's patent hydraulic balanced passenger lifts, three goods lifts, two 10-cwt. hoists, accumulator, pumps, and two Otto gas engines for working the latter. The same firm of engineers has just completed fixing a hydraulic passenger lift for the Victoria Coffee Palace Company, Melbourne, and are now erecting one of their hydraulic balanced passenger-lifts in Brisbane, Queensland.

The Excavations at Delphi.—The Daily News correspondent at Athens telegraphs:—The Chamber has ratified the convention with France respecting the excavations at Delphi. The terms of the convention are most liberal to Greece. All the objects excavated remain in the country. The French Government reserves for a definite period the sole right of publishing the inscriptions, photographs, &c. The modern village of Campi being built on the site to be excavated, the French Government agrees to compensate the inhabitants for the land or houses required.

METALS (continued). Table with columns for metal type, weight, and price per unit. Includes Yellow Metal, Lead, Pig, Spanish, English, common brands, Sheet, English, Spelter, Silesian, special, Ordinary brands, Tin, Straits, Australian, and English ingots.

OILS. Table with columns for oil type, weight, and price per unit. Includes Lined, Coconut, Cochin, Ceylon, Palm, Lagos, Rapeseed, English pale, brown, Cottonseed, refined, Tallow and Oleine, Lubricating, U.S., refined, Turpentine, American, in casks, Tar, Stockholm, and Archangel.

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Table with columns: Nature of Work, By whom required, Premium, Designs to be delivered, Page. Example: Jubilee Clock Tower, Margate.

CONTRACTS.

Table with columns: Nature of Work, or Materials, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes Broken Granite, Broken Granite, Repair to Parapet Walls, Erection of Billiard-Room, Ladies' Swimming Bath, Alterations and Additions to Town Hall, Erection of Board Schools, Making-up and Paving Road, Sewage Works, &c., Re-building "New Market" House, Drainage Works, Cast-Iron Water Mains, Erection of Baths, Bournemouth, Repairs to Hospital Steward's House, Road Materials, Roads and Sewers, &c., Wrought-Iron Kitchens, Tar Paving, Restoration of Church, Clifford, Removal of Dust, Removal of Street Refuse by Barges, Polesworth Waterworks, Construction of Aqueduct, Detached Villa, Ashford, Concert Hall, &c., Bethnal Green.

PRICES CURRENT OF MATERIALS.

Table with columns: Material type, weight, and price per unit. Includes Timber (Greenheart, E.I., Segonia, U.S., Canada, Birch, Elm, Fir, Dantale, Oak, Canada, Pine, Canada red, Pine, Canada red, Yellow, Lath, Dantale, St. Petersburg, Waincoat, Riga, Odessa, crown, Dean, Finland, 2nd and 3rd, Riga, St. Petersburg, 1st yellow, White, Swedish, White Sea, Canada, Pine, 1st, 2nd, 3rd, Spruce, 1st, New Brunswick, &c., Battens, all kinds, Flooring, Boards, sq. 1 in. prepared, Second, Other qualities, Cedar, Birch's-eye, Honduras, &c., Australian, Mahogany, Cuba, St. Domingo, cargo average, Mahogany, Mexican, cargo av., Tobasco, Honduras, Maple, Bird's-eye, Rose, Rio, Bahia, Box, Turkey, St. Domingo, Porto Rico, Valbut, Italian, Metals (Box-Bar, Welsh, in London, in Wales, in St. Domingo, London, Sheets, single, in London, Hoops, Nail-roads, British, cake and ingot, Best selected, Sheets, strong, Chili, bars).

PUBLIC APPOINTMENTS.

Table with columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes Building Inspectors, Clerk of Works, Inspector of Nuisances.

TENDERS.

Table with columns: Tender name, amount, and other details. Includes BRIXTON (erecting new parochial rooms), CHELSEA (enlargement of the Sherbrooke-road School), CHELSEA (alterations to shop front at 16, King's-road, Chelsea), CHELSEA (erecting of Chelsea Conservative Club).

Table with columns: Tender name, amount, and other details. Includes CHILWORTH (erecting of a new vicarage at Chilworth, Ham), HORNCASTLE (formation of roads and sewers, Woodhall Spa), HURSTPIERPPOINT (erection of business premises, Mr. George Jupp), REW (construction of a new road and sewers on the New Gardens Station Estate).

**LEIGHTON BUZZARD**.—For stabling, &c., to Golden Bell Inn, Leighton Buzzard, for the Trustees of Duncombe's Charity. Mr. Frederick Gotto, architect, Leighton Buzzard.—

|                                     |      |    |    |
|-------------------------------------|------|----|----|
| Frederick Adams, Leighton Buzzard   | £128 | 0  | 0  |
| Thomas Underwood, Leighton Buzzard  | 116  | 6  | 10 |
| George Andrew, Leighton Buzzard     | 110  | 0  | 0  |
| T. P. Webb, Leighton Buzzard        | 111  | 0  | 0  |
| Albert Dawson, Leighton Buzzard     | 108  | 10 | 0  |
| Anca Miles, Heath                   | 105  | 0  | 0  |
| Henry Edwards, Leighton Buzzard     | 104  | 17 | 6  |
| David Cook & Sons, Leighton Buzzard | 58   | 10 | 0  |
| Wm. Muddleton, Leighton Buzzard     | 95   | 0  | 0  |
| James Futt & Sons, Leighton Buzzard | 91   | 7  | 6  |

**LONDON**.—For additional new business premises, Whitechapel-road, for Messrs Thomas Smith & Son, varnish and colour manufacturers. Mr. Zephaniah King, architect. Quantities by Mr. James Schofield.—

|                     |        |   |   |
|---------------------|--------|---|---|
| John T. Chappell    | £5,679 | 0 | 0 |
| Alfred Bush         | 6,551  | 0 | 0 |
| Dove Bros.          | 6,357  | 0 | 0 |
| Colls & Son         | 6,170  | 0 | 0 |
| E. Lawrence & Sons  | 5,975  | 0 | 0 |
| James Morter & Son  | 5,933  | 0 | 0 |
| Holloway Bros.      | 5,802  | 0 | 0 |
| Rider & Son         | 5,958  | 0 | 0 |
| Ashby & Horner      | 5,910  | 0 | 0 |
| Higgs & Hill        | 5,910  | 0 | 0 |
| Christopher Forrest | 5,875  | 0 | 0 |

**LONDON**.—For gas fittings at the Green Man public house, Euston-road, for Mr. J. T. Smith.—

|               |      |    |   |
|---------------|------|----|---|
| Strond & Co.  | £235 | 0  | 0 |
| Burky & Besch | 240  | 0  | 0 |
| Biggs & Co.   | 205  | 0  | 0 |
| W. Winn       | 189  | 15 | 0 |

**LONDON**.—For rebuilding No. 27, Great Castle-street, for Mr. J. A. Michell. Mr. W. J. Miller, architect, Margaret-street.—

|                       |        |   |   |
|-----------------------|--------|---|---|
| Fairchild             | £1,799 | 0 | 0 |
| Greenwood             | 1,781  | 0 | 0 |
| Patman & Fotheringham | 1,767  | 0 | 0 |
| Simpson & Son         | 1,709  | 0 | 0 |
| Oldrey & Co.          | 1,687  | 0 | 0 |
| Manning               | 1,685  | 0 | 0 |
| Ryder & Hunt          | 1,685  | 0 | 0 |
| W. Downs              | 1,639  | 0 | 0 |

**LONDON**.—For rebuilding No. 66, Hatton-garden, for Messrs. Francati & Santamarina. Mr. John W. Simpson, architect, New Inn, Strand. Quantities by Messrs. Evans & Deacon.—

| Name.             | £     | s. | d. | £   | s. | d. | £   | s. | d. | Weeks |
|-------------------|-------|----|----|-----|----|----|-----|----|----|-------|
| Foster & Dickson  | 3,483 | 0  | 0  | 220 | 10 | 0  | 82  | 0  | 0  | 13    |
| Hill Bros.        | 3,180 | 0  | 0  | 184 | 17 | 3  | 86  | 3  | 4  | 13    |
| C. Dearing & Son  | 3,114 | 10 | 0  | 189 | 12 | 6  | 91  | 2  | 6  | 21    |
| Jno. Grover & Son | 3,07  | 0  | 0  | 181 | 0  | 0  | 65  | 0  | 0  | 20    |
| J. H. Johnson     | 3,056 | 0  | 0  | 168 | 0  | 0  | 112 | 0  | 0  | 18    |
| Jno. T. Chappell  | 2,914 | 0  | 0  | 170 | 0  | 0  | 98  | 0  | 0  | 12    |
| Mark Manley       | 2,883 | 0  | 0  | 193 | 0  | 0  | 78  | 0  | 0  | 20    |
| Kilby & Gayford   | 2,870 | 0  | 0  | 170 | 0  | 0  | 89  | 0  | 0  | —     |
| F. H. F. Higgs    | 2,788 | 0  | 0  | 166 | 0  | 0  | 101 | 10 | 0  | 12    |

\* Alterations to present building.  
† Extra for glazed bricks and tongued flooring.  
‡ Withdrawn.

**LONDON**.—For decorating, &c., 104, 106, and 108, Oxford-street, for Messrs. Whastow & Bennett.  
A. E. Grimes (accepted) ..... £372 10 0

**LONDON**.—For decorating chancel, nave, and nave roof of St. James' Church, Kennington Park, for the Vicar and Churchwardens.  
Marchant, Lady Somerset road\* ..... £105 10 0  
\* Accepted.

**ONGAR (Essex)**.—For sinking and building new swimming-bath, 60 ft. by 18 ft., with pavilion over all, and dressing-rooms, at the Grammar School, Ongar, Essex, for Dr. W. C. Clark.—  
J. Marks, Crouch End (accepted) ..... £270 7 6

**PIREBRIGHT (Sussex)**.—For alterations to cottage residence, Pirebright, near Brookwood, Sussex, for Mr. C. J. Halsey, J. P. Messrs. Peak, Lunn, & Peak, architects, Guildford.—

|                                 |      |    |   |
|---------------------------------|------|----|---|
| Martin, Wells, & Co., Aldershot | £805 | 0  | 0 |
| Mitchell Bros., Shafton         | 813  | 0  | 0 |
| Harris, Woking                  | 8    | 17 | 0 |
| Kingenred, Oxford               | 791  | 10 | 0 |
| Leslie & Knight                 | 781  | 0  | 0 |
| Bottrill, Reading               | 718  | 0  | 0 |

**ST. LEONARDS-ON-SEA**.—For rebuilding premises, London-road, for Mr. N. J. Vaughan. Mr. Philip Henry Tree, architect, St. Leonards. Quantities by architect:—

|                                  |        |   |   |
|----------------------------------|--------|---|---|
| Charles Hughes                   | £2,369 | 0 | 0 |
| P. Jenkins                       | 2,060  | 0 | 0 |
| Henry E. Cruttenden              | 2,187  | 0 | 0 |
| Eldridge & Cruttenden (accepted) | 2,124  | 0 | 0 |

[All of St. Leonards-on-Sea.]

**ST. LEONARDS-ON-SEA**.—For rebuilding Wesleyan Chapel, Dawson, Mr. Philip Henry Tree, architect. Quantities by architect as reduced:—

|                                   |        |   |   |
|-----------------------------------|--------|---|---|
| P. Jenkins, St. Leonards          | £1,140 | 0 | 0 |
| David H. Snow, Hastings           | 1,110  | 0 | 0 |
| Henry E. Cruttenden, St. Leonards | 1,020  | 0 | 0 |
| F. Elliott, Houlting              | 913    | 0 | 0 |

**SOUTHSEA**.—For alterations, additions, painting, and decoration, and the erection of new clerks' rooms, &c., at the Victoria Wesleyan Chapel, Chester-road, Southsea. Mr. A. E. J. Gny, architect, Southsea. Quantities by Mr. James W. Broad, Portsea:—

|                                                                     |      |    |   |
|---------------------------------------------------------------------|------|----|---|
| B. Poyer                                                            | £683 | 18 | 0 |
| D. W. Lewis                                                         | 953  | 0  | 0 |
| H. Jones                                                            | 891  | 0  | 0 |
| T. P. Hall                                                          | 899  | 0  | 0 |
| W. Learmouth                                                        | 867  | 0  | 0 |
| J. H. Corke                                                         | 853  | 0  | 0 |
| F. Ellis                                                            | 859  | 0  | 0 |
| C. Dye                                                              | 840  | 0  | 0 |
| J. Crockerell                                                       | 825  | 0  | 0 |
| G. Pittis                                                           | 795  | 0  | 0 |
| Messrs. Seammell & Dowdell, Wingfield-street, Landport, Portsmouth* | 757  | 0  | 0 |
| R. Stokes                                                           | 733  | 0  | 0 |

\* Accepted.

**SUSSEX**.—For new stables at Gravetye Manor, Sussex, for Mr. W. Robinson. Mr. W. Simmons, architect, Long Acres:—

|                        |        |   |   |
|------------------------|--------|---|---|
| M. Gentry, London      | £2,485 | 0 | 0 |
| John Bottrill, Reading | 2,295  | 0 | 0 |
| Longley, Crawley       | 2,188  | 0 | 0 |

**TOOTING**.—For rebuilding the Plough Inn, Tooting, for Mr. J. E. Smith. Messrs. Wylson & Long, architects, King William-street, Strand:—

|                       |        |   |   |
|-----------------------|--------|---|---|
| Ward & Lambie         | £1,875 | 0 | 0 |
| Walker                | 1,519  | 0 | 0 |
| Oldrey & Co.          | 1,705  | 0 | 0 |
| Patman & Fotheringham | 1,727  | 0 | 0 |

\* \* NEXT WEEK.—As we go to Press a day earlier next week, all lists of Tenders for insertion in the *Builder* for April 9th must reach us not later than 12 noon on WEDNESDAY next, April 6th.

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

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# The Builder.

VOL. LII, No. 2303.

SATURDAY, APRIL 9, 1887.

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### The Musée Carnavalet, Paris.



N the middle of the Quartier du Marais, near the Place des Vosges, so picturesque with its red brick houses, there rises, No. 23, Rue Sévigné, a house as silent as a convent, whose melancholy walls still present, under the dull patine which Time has impressed on the stone, decorative details of great purity of style. At the angle of the building a slab of white marble bears the following inscription:—

"Marie de Rabutin-Chantal,  
Marquise de Sévigné,  
habita cet hôtel  
de 1674 à 1696."

These simple words suffice to transform the aspect of the edifice: they awaken a crowd of associations with the history of a great and brilliant epoch. It was, in fact, in this house that Madame de Sévigné spent the closing years of her life. "Nous voilà arrêtés à Carnavalet," she wrote to her daughter; "le ciel soit loué, nous ne pouvions mieux faire."

She could, in fact, hardly at that time have found a better abode than that hotel of which Pierre Lescot had given the plan to Bullant, and which Jean Goujon decorated with some of his best sculptures. A decorator, one Maître Pouce, whose name history has transmitted to us, had executed the carving on the façades, and the first proprietor of the house, Jacques de Ligneris, had engaged, for the interior decoration, the same Italian painters who had come to Fontainebleau with Rosso.

The Hôtel Carnavalet is one of the numerous specimens of Renaissance architecture the elegant lines and delicate ornament of which succeeding generations seem to have found pleasure in cutting up and spoiling. In this case it is not the present generation, at all events, which is to blame for such depredations, and the municipal administration of Paris has shown an enlightened and discreet spirit in dealing with the necessary enlargement of any of the old buildings in which historic collections are preserved. The blame in this instance must be credited back to a certain Claude Boislevé, a rich financier, whose fortune was shipwrecked in the great disaster in which the *Surintendant* Fouquet was concerned. The valuable documents recently discovered by the learned Librarian of the City of Paris, M. Jules Cousin, enable us to recover the chronological succession of the proprietors of Carnavalet,—of which Madame

de Sévigné was only a tenant,—and to ascertain that it was Boislevé, with the tasteless ways of a *nouveau riche*, who ordained the clumsy restoration of the work of Pierre Lescot. The sole excuse for him is that he did employ François Mansard, who employed as assistant a heavy-headed Flemish artist, one Van Obstal, whose evil deeds have lived after him. This is the cause why, while the ancient façade of the Hôtel is remarkable for its grace of composition and detail, the wings afterwards built present only heavy masses of building devoid of character. Fortunately, while enlarging the building, which he beautified with the inevitable "Mansard" roofs, the architect employed by M. Boislevé respected the old sixteenth century gateway of Du Cerceau, ornamented by Jean Goujon with some remarkable bas-reliefs, which time has dealt gently with.

Above the entrance is a figure of "Abundance" standing on a mask such as are used in carnival time (a reference to the title, "Carnavalet"). In the tympanum, two genii bearing palms form supporters to an escutcheon which formerly bore the Ligneris arms. In panels on each side two lions *passant* are sculptured on a ground of military symbols. One of them, which holds his paw on a globe, is well known as the "Lion à l'Écu," and is regarded as a kind of model of decorative sculpture of this class.

The elevation we give, reproduced from an old engraving (see next page), shows the general design and proportion of the principal façade; the other exterior façade, which looks towards the Rue Francis-Bourgeois, offers but little of interest, in spite of the bas-relief with which Van Obstal has decorated it, and which symbolises, with mythological extravagance and in very bad taste, the marriage of Louis XIV.

The principal entrance leads, by a passage with a vaulted ceiling, to the *cour d'honneur*, a rectangular space whose four faces present each a different decoration. The one next to the Rue Sévigné reproduces very nearly the exterior design. It is ornamented with two large seated figures of Fame, holding palms, and grouped with a keystone figure in relief which stands for Authority. There is a frieze ornamented with delicately-carved foliage. Above the roof there was a figure of Flora, which was so dilapidated as to threaten a fall, and which is now in a corner of the courtyard awaiting indispensable repair or "restoration."

The façade on the left, crowned by a balustrade, is divided into six bays. On the first-floor level are four figures in bas-relief, symbolising the elements. In the sixth bay, two genii, holding torches, are reclined on the cornice of the doorway. The opposite façade

reproduces the same disposition of parts. The figures on the first-floor level personify Juno, Hebe, Diana, and Flora. Van Obstal has made clumsy affairs of these subjects, which, above all others, ought to have been graceful. This heavy and commonplace sculpture serves as a good foil, however, to the façade parallel to the Rue Sévigné, which is the most interesting from an artistic point of view; the figures, which symbolise the four Seasons, being all the authentic work of Jean Goujon.

Behind the main pile of building extends a large rectangular space, which is to be transformed into a "square," and on or amid which stand various remains of old Paris; on one side the Pavillon de Choiseul,—a remnant of an hôtel of the seventeenth century, destroyed when the Rue de Quatre Septembre was made through the site; a little further on the façade of the old Bureau des Marchands-Drapiers, formerly situated in the Rue des Déchargeurs, and which has been very successfully rebuilt here under the care of M. Roguet, after the drawings of Jacques Bruant, "Architecte des Bâtimens du Roi," who died in 1664. We give an illustration in this number of the upper portion of the building, showing the modern sculpture of M. Gautier, and the carved decoration by M. Villenot.\*

Opposite the Pavillon de Choiseul has been erected, under the superintendence of M. Bonvard, a gallery of communication in which is to be framed one of the most curious remains of the "île de la cité," the arch of Nazareth, constructed under Henri II., to form a communication between the Galerie des Archives and the Chambre des Comptes. Greatly injured by the fires of the Commune, and pulled down some years ago to make room for the new Cour d'Assises, this small monument is now preserved under a shed until the approaching completion of the Musée Carnavalet. The sculpture on it is excellent, especially four figures with palms, of which Jean Goujon need not have been ashamed.

If we now enter the Hôtel, we find, on turning to the right of the vaulted passage out of the Rue de Sévigné, several rooms devoted to the exhibition of pre-historic implements of the Flint Age. The greater part of the specimens came from Levallois, Perret, and Meudon. In another room, devoted to the Gallo-Roman epoch, we may see some of the stones of the first enclosure wall of the ancient Lutetia, found in the sandy deposits on the left bank of the Seine. Some are pierced for poles; others exhibit rudely-cut letters or figures. The succession of rooms in the direction at right angles to the Rue de Sévigné contain a great number of objects of the Roman and

\* See prototype illustration in the present number.



Façade of the Hotel Carnavalet.—From an old engraving.

Merovingian epochs; a double staircase, situated in the last chamber in this quarter, leads to a gallery containing various fragments of the Christian basilica which preceded Notre Dame, and to another containing a collection of sarcophagi of the fourth and fifth centuries. In an angle of the basement we find disposed, with a certain kind of scenic effect not quite in good taste, a number of casts of skeletons discovered in 1870 in the "Arènes de Lutèce."

We come now to a room which still shows remains of its original decoration. The beams of the ceiling bear the monogram of Carnavalet with the S interwoven with it, which, in the symbolic language of that day signified "grandesse," "tendresse," and "fermesse" (*fidélité*). This room contains a fine chimney-piece ornamented with caryatides, baskets of flowers, and palms, the cornice decorated with an escutcheon bearing the arms of Carnavalet.

In the next room, the interest is centred in a curious collection of potteries, vases, bronzes, and other objects found in the Gallo-Roman Cemetery of the Nicole. Among these there is to be seen, under a glass case, a perfect impression or cast of the figure of a child, which was found in the cement lining of a sarcophagus discovered in 1872. This little inhabitant of Lutetia, dead about 1800 years ago, seems as if sleeping, with all the details of its small features preserved, by a fortuitous event, intact to our day.

On leaving the ground-floor galleries, a stone staircase gives access to the first floor, where is situated the collection of engravings, and the fine municipal library founded in 1871, thanks to M. Jules Cousin, who, in those bad days, and just after the burning of the Hôtel de Ville, generously presented his own library of books to the city. Rich as the library is today, one cannot forget the treasures that were lost sixteen years ago, of which the most precious jewel was the incomparable missal of Juvenal des Ursins, destroyed by the iconoclasts of the Commune.

Following this are the Galleries of the

Municipal Museum, among which may be remarked a small room, of which the ceiling is richly decorated with foliage and garlands painted and gilt, and with mythological subjects in cameo. In a neighbouring room a pedestal, in rather bad taste, covered with tricoloured plush, supports a model of the Bastille, made out of stone which formed part of that fortress. Among a number of objects connected with that turbulent epoch may be observed a copy (very rare) of the official announcement of the death of Louis XVI., the sword of Latour d'Auvergne, and a portrait of Marie Antoinette, taken at the Conciergerie. Unfortunately these and other things, to which a serious interest is attached, are nearly lost in a crowd of trifles of little interest, and placed there merely to make a show.

The buildings which surround the Pavillon de Choiseul are specially devoted to the revolutionary museum left by M. Liesville, who had by time and patience amassed a numerous collection of faience, insignia, decorations, jewels, and medals, the great merit of which is that they are authentic, while a great proportion of similar collections elsewhere are mere modern imitations. The Pavillon de Choiseul itself forms a gallery filled with wood carving in the Louis Quinze style, which came from the old Hôtel des Stuarts, Rue St. Hyacinthe Saint Michel. Among other things in this room is a fauteuil which belonged to Voltaire, another which was the property of Béranger, and various other pieces of furniture belonging to these two illustrious Parisians.

The interior of the Pavillon des Drapiers contains, on the first story, a large square chamber adorned with Doric pilasters with gilt flutings. The ceiling, restored some years ago by M. Maillot, was the work of Lebrun. It represents Mercury presenting Hebe to Jupiter. In a vaulted recess a fine terra-cotta bust of Madame de Sévigné, by Chatrouse, is carried on a gilt console.

The decoration of the neighbouring gallery

comes from the ancient Hôtel of the famous Marquis de Dangeau, who wrote the history of the Court of Louis XIV. Although the wainscot, with its Corinthian pilasters with fluted and gilt shafts, is in had taste, and the allegorical ceiling paintings have almost entirely disappeared, the general effect of the room is still fine.

We have unavoidably neglected, from considerations of space, the mention of many things in the museum worth attention, in the course of a description more directed to the buildings themselves than to their present contents. As will be gathered, there are, besides the municipal collection, a certain number of architectural curiosities which are in themselves worth the attention of the visitors and strangers who, on two days of the week (Sunday and Tuesday), can enter the City Museum free; and, apart from the historical side of the matter, the building may well be a subject of much interest to artists, as one of the remnants of that fine period of French Renaissance of which Jean Goujon was the prominent ornament. None of his work is better than that at Carnavalet; none has more of grace and artistic vigour. And the interest of the buildings at present is not confined to the old house of Kernevenoy (the Breton name which has been softened into Carnavalet), but extends to the modern portion, with its restoration or reconstruction of various architectural monuments of old Paris, full of interest, both from the historic and the architectural point of view.

**Edinburgh Municipal Buildings Competition.**—The names of the authors of the design illustrated in our last should have been given as Messrs. "Morris & Hunter," not "Morris & Hunt."

**Early Church Architecture.**—On the 29th ult., Mr. S. Slingsby Stallwood, of Reading, delivered an interesting lecture at Wokingham on "Early Church Architecture," which is reported in last week's *Reading Mercury*.

ON THE THEORY OF THE ABANDONMENT OF ANCIENT LIGHTS.

BY GEO. H. POWELL, BARRISTER-AT-LAW.

**D**URING the course of the last year there has once more been brought before the Court of Appeal an important case,\* involving the question of the exact meaning of the legal term "abandonment." The following remarks, which have no pretension of representing a scientific inquiry into the subject, aim merely at working out, if possible, in a simple and practicable form, some definite principle which could be applied to the decision of such cases as that above alluded to.

Now, whenever a prescriptive right to light has been acquired in respect of a certain window, the position of which in the original wall is subsequently altered (by the aperture being either raised or lowered), or the plane of which is altered by an alteration in the site and plane of the wall, the first material question is, of course, "to what 'quantum' of light was the owner of the window,—the plaintiff, let us say,—originally entitled?"

Now the prescriptive right,—according to the natural interpretation of the statute,—is a right to all the light which has access to the window in question, i.e., to the "general light of the sky,"† so far as "intercepted," to use the common expression, by the window. It is usual to speak of this as a "cone" of light,—by which expression is meant presumably the whole volume of light poured (so to speak) through the aperture of the window from all quarters of the area of sky visible from any part of such aperture. What amount of illumination this "cone" would represent in the case of any given window would clearly depend not only on the nature, height, and extent of the obstacles which obscure or tend to obscure it, but upon the exact nature of the aperture, the amount and quality of the glass (where glass is employed), &c.

But for practical purposes (legal and not scientific) we need hardly consider the matter in so much detail. Starting only with the necessary assumption that all parts of the sky are equally luminous, we proceed to consider what pencils of light from any part of the whole area of the sky fall, at any angle, upon the plane of the particular aperture. Whether the aperture be well or ill glazed, or not glazed at all, does not affect this question, so long as some appreciable quantity of light passes through it.

The statute says nothing about glass; and though the use of this material necessarily involves a waste\*\* of a certain quantity of light which would pass through an unglazed aperture, yet it could hardly be maintained that the volume of light which reaches the plane of the aperture (glazed or open) is not in any case "used and enjoyed" in a legal (and practical) sense, so long as the diminution, from any cause, of the light without the aperture would always produce a proportionate diminution of the light within.

The extent of the intercepted area of sky seems therefore the only material thing to be considered.

For a simple example, let us take the case of a square horizontal skylight, set in the centre of a square courtyard surrounded by four walls of equal height, facing (let us suppose) north, south, east, and west respectively.

The base of the inverted pyramid shown in fig. 1 A will accurately represent\* the required area, being bounded on the north by a straight line,  $b'a'$ , parallel to and in the same plane with (1) the south side of the aperture  $abcd$ , viz.,  $ab$ , and (2) the line  $gh$  representing the obscuring horizon on the north side; similarly on the east side by the line  $a'd'$ , which is parallel to and in the same plane with (1) the line  $hk$  (the obscuring horizon on the east side), and (2) the line  $ad$ , the west side of the aperture  $abcd$ . And similarly with the other sides, so that if we imagine the base of the pyramid to be a visible superficies, and further imagine one of the four sides surrounding the square courtyard removed in order to give us a view of it, the rectangular area of sky represented by the said base would appear, when viewed in perspective from below, in the form of the figure  $a'b'c'd'$ , in fig. 1 A. It can easily be seen that the figure would be exactly pyramidal only when the dimensions of the aperture and surrounding walls were as assumed above.

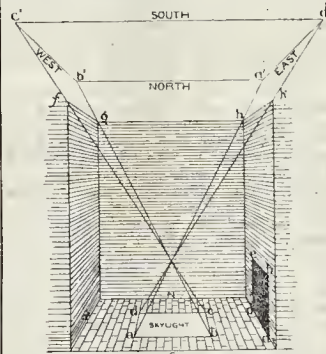


Fig. 1 A.

But if we wish to consider the whole volume of light reaching the aperture  $abcd$  from any part of the aforesaid area of sky, in so far as it is below the level of the obscuring horizons  $fg, gh, hk$ , and  $kf$ , this will be represented not by any part of the pyramid in fig. 1 A, but by the six-sided figure having for opposite sides the squares  $abcd$  and  $ghhk$ , shown (in perspective) in fig. 1 B, and formed by drawing straight lines from the points  $abcd$  to the points  $ghhk$  respectively. It will be seen that the apex of the pyramid in fig. 1 A would fall within this figure, also that supposing the straight lines  $af, dg, ch$ , and  $b'h$ , were produced to any distance, the side  $fgghk$  would always fall within the base of the pyramid. Thus the upper side of the figure shown in fig. 1 A (were the figure produced to any length) would never represent the area of sky intercepted by the aperture  $abcd$ . But, as has been said, fig. 1 A shows this area of sky, represented by the base ( $a'b'c'd'$ ) of the pyramid; whereas fig. 1 B shows the "channel,"† so to speak, through which all direct light must travel, below the level of the obscuring horizon, to reach the aperture  $abcd$ . It is important to observe this, merely because the sides of this figure  $afgd, dghc, chkb$ , and  $b'kfa$ , represent the planes beyond which the buildings on the west, north-east, and south sides of the aperture respectively cannot be advanced without obstructing the passage of the light at present intercepted by it.

The base of the pyramid (fig. 1 A) representing, as has been said, the area of sky from some part or other of which all the light that reaches the aperture  $abcd$  must come, the directions of the various pencils of light must clearly cross one another at various points

within the figure representing the volume of light below the level of the obscuring horizon shown in fig. 1 B. The apex of the inverted pyramid (fig. 1 A), a point some distance above the surface  $abcd$ , will be the point where the pencils of light from the extremities (north, south, east, and west) of the intercepted area of the sky  $a'b'c'd'$  intersect one another.

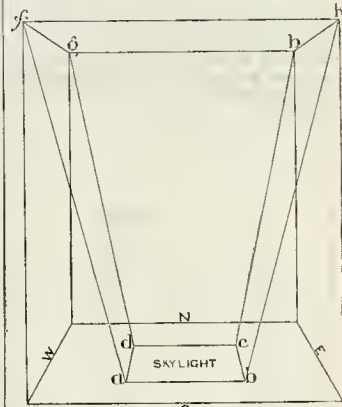


Fig. 1 B.

It will be seen, moreover, that the pencils of light from the extreme N.E., N.W., S.E., and S.W. points respectively of the area  $a'b'c'd'$  will be intercepted at the extreme S.W., S.E., N.W., and N.E. points of the aperture  $abcd$  respectively, and may be represented, as in fig. 1 A, by the lines  $a'a$ ,  $b'b$ ,  $d'd$ , and  $c'c$  respectively. The case of a horizontal skylight in the position above described is only here referred to because it affords, perhaps, the simplest illustration of the principles involved. Moreover, it can be easily seen from this illustration (as represented in the sketch) what would be the effect of moving the position of the aperture  $abcd$  (for example) in a direction due east. It is clear that the area of sky would be extended on the west and proportionally diminished on the east side, while its breadth from north to south would remain unaltered. Suppose the aperture to be moved in the E. direction till its side  $cb$  falls on the base of the wall  $hk$ ; then suppose its movement continued upwards in a plane at right angles to the horizontal (in which it was originally), and for the skylight we now have a window, of the same size and shape, in the wall on the east side. What is the effect of this change of plane upon the sky area intercepted? In the first place, that area has been reduced on the east side, since the side  $ad$  (now the lower side of the window  $abcd$ ) has moved a considerable distance eastward, and, therefore, the line  $a'd'$  (which, as explained above, must always be in the same plane with and parallel to the lines  $hk$  and  $ad$ ) must have moved westward, and would now ( $ad$ , as has been said, being in the plane of the wall) be in the plane of the wall produced. In the second place the sky area will have been extended in a westward direction, since, in proportion as the line  $cb$  advances in one direction the line  $c'b'$  will have advanced in the other. Meanwhile the breadth of the sky-area from north to south will have been enlarged. In the simple case first considered the intercepted "sky-area" would be represented by the base of an inverted pyramid. In the case of a window the intercepted area would be represented by the base of an irregular figure to some extent resembling a pyramid and having as many triangular sides as there were different planes in the obscuring horizons. But the extent of the said area in any given direction could clearly be estimated on the principles applied above.

For instance, let  $ab$  in fig. 2 represent a window in a vertical plane placed in a wall facing south (viewed in section), and  $g$  the

\* Represented by the part shaded dark in fig. 1 A.

\* Scott v. Pape, reported in 31 Ch. D., 566.  
 † 2 and 3 Wm. IV., c. 71 (1832), s. 3.  
 ‡ Homersham Cox on "Ancient Lights."  
 § See judgments and arguments in the case cited above, and in Ancient Light cases, *passim*.  
 ¶ It will be observed that "direct" light alone is here considered, for the following reasons—(1) That it may (it is submitted) be assumed, with sufficient nicety for practical purposes, that the amount of reflected light would vary, *ceteris paribus*, as the amount of direct light; and (2) there seems no ground for supposing that a right could be acquired to "reflected" as distinct from "direct" rays or pencils, or that the mere alteration by the owner of the servient tenement of the reflecting properties of its surface, could form the subject of an action at law.  
 ¶ Which is assumed, in the following argument, to which, however, the point is immaterial, to be the same plane as that of the surface of the wall in which it is set.  
 ¶ For the scientific expression of this, and the trigonometrical measurements of the illumination and obscuration of a glazed window, see the "Optics" of "Ancient Lights" in Mr. Homersham Cox's work on the subject.

\* For, whatever be supposed to be the surface of the area or arc of sky from which the light is (*ex hypo.*) derived in the first instance, every part of that area must be included in the *figures* represented at any given altitude by the plane figure  $a'b'c'd'$ , as viewed from any point within  $abcd$ .  
 † When regarded as a solid figure, it represents the volume (see above), the whole body of light reaching the aperture.

obscuring horizon on the south side. The sectional area of sky intercepted from *a b* will clearly be bounded on the north side at the point *c* in the plane of the wall produced, and on the south side at the point *d* in the line *a g d*; and consequently the line *c d* may be taken to represent the sectional area intercepted from north to south, by the window *a b*. Supposing there were other obscuring horizons on the east and west, S.E., S.W., or any other quarter, to be considered, figures could be drawn similar to the above (fig. 2), showing the sectional area that would be intercepted in a plane at right angles, or in a plane at any angle (according to the position of the obscuring horizon) to the plane of *c d*.

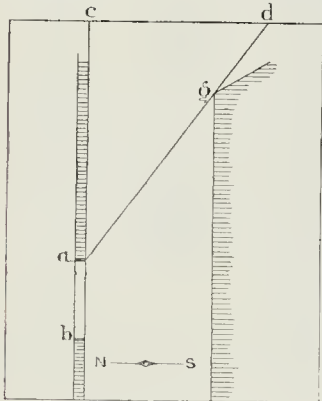


Fig. 2.

Having reminded the reader of the above principles, we pass on (still considering, for the sake of simplicity, the sectional area intercepted by the window in one plane only) to inquire what the law provides in the case when either the position of the window in the wall, or the plane of the wall itself, is altered. To what extent are the supposed plaintiff's rights affected or impaired (for, of course, they cannot be increased) by such alterations? Let us suppose the plaintiff has acquired a prescriptive right to the access of light to the window *a b* (fig. 3), the obscuring horizon of the servient tenement being represented by the point *g*. Then let the plaintiff's wall be advanced from the position *X* to the position *Y*. Now in considering exactly what is meant by "abandonment," we may begin by observing that the mere advance of the plaintiff's wall from the plane *X* to the plane *Y* will necessarily deprive him of the enjoyment of a considerable quantity of light which he before enjoyed, viz., of all the direct light coming from the sectional area of sky, *k l*. But inasmuch as this deprivation is entirely due to the plaintiff's own act (and could not in the nature of things affect the rights of the defendant, the owner of the servient tenement), we may dismiss it from consideration. The only "abandonment" which it is necessary to discuss may be defined as the relinquishing by the plaintiff of some right which restricted the defendant in the enjoyment of his property. In fact, if we say that whatever acquired right the plaintiff intentionally ceases to enjoy, constitutes a corresponding restoration of or addition to the rights of the defendant, this statement will only require to be modified by the legal maxim, "De minimis non curat lex."

Now, for the legal answer to the question propounded above, we need refer no further back than to the afore-mentioned case of *Scott v. Pape*,\* in which the most important decisions on the subject are reviewed. The legal right is there stated to be retained in respect of a new window, "which includes in its area a substantial part of that of the original window," i.e., which if the new wall

were laid upon the old wall so that their bases coincided, would substantially coincide with the old window. Dozens of judicial expositions of this principle might be cited, were it not well known to be supported by all authority. So long as there is a preservation of a material part of the old aperture so long there is no abandonment of the right, and if there is no preservation of any material part of the old aperture, the right is understood to be abandoned, and therefore lost. This is a perfectly plain and simple principle, and in accordance with it the plaintiff in the aforesaid case of *Scott v. Pape*\* (decided in February, 1886) did not venture to ask for relief (in the form of an injunction) with respect to those of his new windows (his building having been advanced towards the servient tenement), which could not be proved to "correspond" with ancient lights in the original building.

But the various declarations of the law on the subject seem to suggest, in conjunction with the above, another and a different theory, which has only been imperfectly developed. We find it authoritatively stated† that if the plaintiff continues to use, through his new apertures, "the same or substantially the same cone of light" which he enjoyed before, then there is no legal abandonment.‡

In another place§ the prescription stated is defined as the right "to have arrive for the use of your house" the pencils of light "which during the twenty years passed through the original aperture," to have "the space within" lighted in the same manner "in which it was lighted through the old windows. At the same time "structural identity" is not, we are told, "the test." The measure of the enjoyment is not the aperture itself, but "the size and dimensions of an aperture in that position" (scil. that of the original window). To apply these principles of law to the case supposed (see fig. 3), the sectional area of the sky, intercepted by the original window *a b*, will be represented by the line *k-a'*. It is clear that there will be pencils of light from the extremity *a'* of this area passing along the line *a-a'* through the aperture *a b* to *a*, some object within.

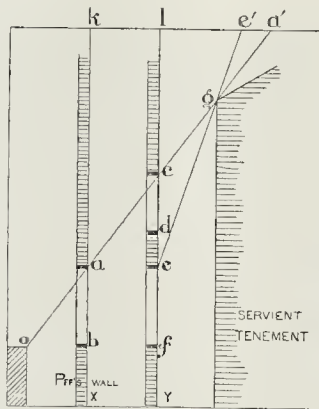


Fig. 3.

Now, if in the new wall, a window, *e f* (in exactly the same position, relatively, as *a b*), be substituted for the original window, there will be, according to the first principle stated above, no abandonment at all; for the window, *e f*, not only substantially, but exactly, coincides with the original window, *a b*. But it is clear that no pencils of light from the point *a'*, or,

\* See p. 556 of the Report in 31 Ch. Div.  
† E.g., per Cotton, L.J., 31 Ch. Div., p. 570; and see the cases cited.

‡ Of the meaning of this language we have spoken above. It has been already submitted that the material points to consider are not so much the form in which the light is thrown into the building, lessened or not by refraction, but (1) the "volume" of light (below the level of the obscuring horizon) which illuminates the plane of the aperture (glazed or otherwise); and (2) the area of sky from which the pencils of light constituting that volume are derived.

§ See remarks of Bowen, L.J., 31 Ch. Div., pp. 572-4.  
¶ *Id.*, per North, J., whose decision was affirmed by the superior Court.

indeed, from any point of the sky area between *c'* and *a'* can possibly "arrive" at *e f*, and that the "space within" is therefore not (in any ordinary sense of the words) lighted "in the same manner" as before. In fact, no direct light arriving from any point of the sky area between the points *c' a'* can possibly reach any window placed below the point *c*. But if the access of light which was enjoyed before is now no longer enjoyed, surely it has been in fact and in law abandoned? Conversely, it is obvious that if the plaintiff, having acquired the supposed rights in respect of the window *a b*, wishes to continue in the enjoyment of these rights in so far as is compatible with the alteration in the plane of his wall, far from placing his new window in the position (*e f*) of the old one, he must raise it to the position *c d* (the point *d* being supposed to be in a straight line with the points *g* and *b*). If he puts his new window in any position lower than this, he will, in fact (if not in law), be ceasing, to a greater or less extent, to enjoy the access of light, to the enjoyment of which he has acquired a right. Is it possible, then, to follow such clear enunciations of the law as are quoted above with regard to "pencils of light," "cones of light," &c. (the only sensible interpretation of which points to the above conclusion), and, at the same time, carry to its logical results the principle which seems to attach such a magical importance to identity of position,—in fact, to a fictitious "correspondence" between the old and new windows? Suppose, for example (in fig. 3), the window *c d* were the original window, intercepting the area of sky, *l a'*, and the plane of the wall were moved from *Y* to *X* (i.e., retired from the servient tenement). If for the original window, *c d*, a new window, *a b*, were substituted, then according to all authority, the rights acquired in respect of *c d* would be "abandoned," notwithstanding that, as a matter of fact, the same pencils (to a considerable extent) pass through *c d* as passed through *a b*, and this could not be the case with a window in the position *e f*. Why then is the latter said to be lighted "in the same manner" as *a b*? Again, supposing *e f* to be the "original" window intercepting the area of sky *l e'*, and the wall (*Y*) to be pulled down and rebuilt in the same plane, the only alteration in the building being a substitution of a window *c f* for the original window *c e*, according to the principles of law at present applied, the plaintiff has "abandoned" the right he had (see hypothesis) acquired in respect of the window *c e*. Yet all the area of sky intercepted by the aperture *c f*, and a good deal more,\* is still intercepted by the aperture *c d*.

CUSTOMARY CHARGES.



HERE is unquestionably a common idea existing among professional men that what may be termed "customary charges" are binding on those with whom they do business. This idea is perhaps more strongly rooted in the minds of architects than of any other body of men. It arises from the fact that the usual remuneration for an architect's services, viz., 5 per cent. commission on the total cost of the works executed from his designs, forms the subject of the first of the schedule of rules issued under the sanction of the Institute. In the same way, quantity surveyors usually have a regular charge, and land surveyors and house agents have scales of remuneration which are almost universally the same among all members of the particular profession. There can be no question that a customary scale of charges, if it be a reasonable one, has many advantages, for it may be taken

\* But this, the enjoyment *pro tem.* of more than he had a prescriptive right to, has (since the decision of Tapping v. Jones, reported 11 Ho. of Lords Cases, p. 260) no prejudicial effect on his existing rights. Probably it would never have occurred to any but a legal mind to maintain the contrary, which was equivalent to arguing that the owner of a right of way should lose that right if he trespassed in his neighbour's field; but, if possible, more absurd, since the plaintiff's action (in the case of lights) could hardly, by any stretch of language, be described as a trespass.

† To be continued.



to be a fair average profit for the person who receives it, and a fairly reasonable payment to be made by the customer, based on a considerable mass of experience. On the other hand, there is always this danger, viz., that the person who habitually charges a sum common to most of his professional brethren regards it as one which he has a kind of legal right to be paid, and consequently he takes, in many cases, no special precautions to have this sum agreed upon before the work is begun. The consequence is that in some cases the customer disputes the amount, and the professional person—architect, surveyor, or what not,—finds to his surprise that his account is docked by a British jury, who, whatever may be their professional feelings out of the box, are usually actuated by a kind of corporate pleasure in cutting down the charges of professional persons. More cases of this description occur than many people are aware of. They very often do not, indeed, come into court at all; sometimes they are settled by the acceptance of a smaller sum than that originally charged for the sake of peace; sometimes they are referred to arbitration, and so do not find their way into the public prints. Not very long ago, for example, the surveyor to a water-works company who had done work in surveying for the purposes of a Parliamentary Committee had his account largely docked by an official referee. We allude to this case not in anyway for the purpose of commenting upon it, but merely as an instance of the manner in which from time to time these professional charges are cut down. The fact is that no charge of a customary character, even one so generally recognised and accepted as the five per cent. charge of architects, is legal unless it is a reasonable charge. The tendency of all persons outside a particular profession is to minimise the value of professional services. They are apt to overlook the value which must be paid for experience, for professional education, and to suppose that because an architect takes a comparatively small time over a plan, or a lawyer over the composition of an opinion, they are to be paid for the work without taking other matters than the mere expenditure of time into consideration, just as if a professional man were a day labourer, who occupied a certain number of hours in digging a certain plot of ground. There is no question that the charges of land surveyors are to the outside world frequently startling, but the public are apt, in connexion with them, to overlook the many things which are requisite in regard to the formation of a surveyor's opinion. On the other hand, there probably exists an opposite tendency in the minds of professional men to overvalue the indirect elements for which they make a charge. When all these different tendencies and conflicting views have to be taken into consideration by one or more individuals, whose minds may also have some individual leanings of their own, the difficulty in a disputed case of arriving at what may be regarded as a reasonable sum, can scarcely be overrated. But it cannot too often be pointed out that the proper course for every professional person to follow is, as a rule, to let his charges be known beforehand, and obtain, at any rate, a verbal assent to them. If this were done, many unfortunate disputes would be avoided. So far as architects are concerned, this is, in regard to matters falling within the first of the Rules of the Institute, the simplest thing in the world. Nothing is easier than to show a client a copy of the rules or to inform him that it includes the scale to be charged, and to obtain from him an assent to this. Whether the customary charge be in the particular case reasonable or unreasonable then becomes immaterial, for there is an express contract by the client to pay at this particular rate. But unless a professional man can, as a solicitor is empowered to do, charge a fee settled by an Act of Parliament, he must sooner or later find himself in difficulties when he relies on obtaining in every case and from every client payment of a customary charge. A customary charge, convenient as it may be, cannot from its very nature, in all cases, be a fair one, and its very

convenience and general use thus makes it in some instances a trap. There are, it is obvious, other objections to a customary charge, as that individual labour receives no greater remuneration than work done by means of a subordinate. Persons may differ as to which disadvantages are of the least weight, but there can be no doubt in regard to the point to which we have chiefly confined ourselves, viz., that a customary is not necessarily a reasonable and a legal charge.

## NOTES.

**T**HE Railway Bill passed through Committee in the House of Lords on the 1st inst., and several discussions took place upon the traffic clauses, Lords Bramwell, Grimthorpe, and Brabourne again displaying great energy on behalf of their "clients." A motion to restrain the companies from making charges for station terminals was withdrawn, as it was opposed by the noble lords just named with an ardour which is interesting and significant to contemplate, and did not receive much support from the rest of the House. Only one amendment to clause 24 was adopted, providing that the maximum rates and charges under the revised classifications shall be, on the whole, equivalent to those which the companies have already been authorised by Parliament to receive. The apparently apathetic way in which the House thus agreed to the important provisions of this clause may be attributable to Lord Salisbury's remark that they were not by this Bill giving final sanction to any decisions of the Board of Trade. When the latter arrived at decisions involving any change Parliament would be asked to say whether they were reasonable or not. A division was taken on sub-section 2 of the "undue preference" clause, which, it will be remembered, allows the Commissioners to take into consideration whether reduced charges are necessary for the purpose of securing traffic. The railway companies, whose adherents numbered 49 against 11, assert that their action in giving special facilities to imported traffic is out of consideration for,—or, at least, results in benefit to,—the community at large; so the clause is retained, ostensibly in the interests of the consumer. The "conciliation" clause was struck out altogether, it being argued that the reason this system had answered in America was because they had no other court to go to; and the 29th clause, relating to the publication of tolls and charges, is also omitted. It is significant that these amendments were all recommended by the manager of the Great Western Railway (Mr. Grierson), in a long letter to the *Times* on the same day; and Lord Stanley appears to admit, by the manner in which he has abandoned some of the provisions of his measure, that they were only inserted on account of having appeared in last year's Bill. Further alterations, and possibly some additions, may be looked for when the measure is before the House of Commons.

**W**E have received a circular emanating from some commercial gentlemen in North Wales, calling attention to the desirability of altering the law in regard to limited liability companies. The object is to prevent directors giving orders in excess of the means of the company, whereby on the winding-up of a company creditors become losers. The means suggested to prevent this mischief are (a) to make directors personally responsible for expenditure beyond the resources of the company, (b) that there should be a compulsory reserve not to be used except when a company is wound up. The amount suggested is 10s. uncalled for every pound of capital called up. There is a good deal to be said in favour of this proposal. It would be very desirable to make directors more careful, and to prevent companies spending their last shilling; on the other hand, those who give credit to companies of doubtful credit have only themselves to thank if in consequence they lose money. It is possible to obtain information and guarantees. Much of the loss complained of arises, in fact, from reckless competition, and those who give

credit without taking security, or without inquiry, must bear the blame if they go unpaid on the winding-up of a company.

**T**HE value of land in New York does not appear to be so high as in the City of London, if one may judge from a recent sale of two plots in Broadway, which, as all the world knows, is one of the principal thoroughfares in that city. Nos. 135 and 137, Broadway, two contiguous plots, one of which was a corner plot, were put up for sale by auction. The inside plot was purchased by the Niagara Insurance Company, and realised 142 dobs, or about 29l. 10s. per square foot, which is much less than the value of land in Cornhill and its neighbourhood, where it has reached as much as 40l. per foot. The corner plot, with a frontage of only 15 ft. on Broadway, realised upwards of 73,000l., but the rate per foot superficial is not stated.

**I**N all likelihood the Bank of England governing body will appeal from the decision in a case heard last week in the Queen's Bench, by Mr. Justice Day and Mr. Justice Wills, in the matter of the Mayor and other officers of the Staple of England. In reversal of a verdict obtained at the trial before Mr. Baron Pollock, the Court adjudged, though, as Mr. Justice Day said, with some reluctance, that the Bank should recoup to the Corporation a certain, their sole remaining fund of 4,250l. Consols, which had been misappropriated by their clerk. The plaintiffs represent a now effete Guild-merchant. Under protection of King Edward III. the Woolstaplers were established (1353) in the New Palace ward of St. Margaret, Westminster, parish. Yet Stow says that "this church [St. Margaret's, as rebuilt by Eadward the Confessor] continued till the days of Edward I., at which time the merchants of the staple and parishioners of Westminster built it all of new, the chancel, excepted, which was built by the Abbots of Westminster." Having for a long while exercised main control over the once staple product of our country, the Corporation gradually sank into insignificance on the increasing importation of fleeces from beyond the seas; nor can the charter which they obtained from Charles II., together with a mace and silver common seal, be regarded as more than a passing *succis Vestime*. Tradition goes that Richard II. removed them to fresh quarters in Holborn, which having been converted, *temp.* Henry V., into an Inn of Chancery, yet retain the style of Staple Inn. A woolpack, by the way, formed the cognisance of that lately-dissolved society. Still, the Staplers did not sever connexion with their earlier home, for in 36 Henry VIII. they established on their Westminster property an almshouse, known as St. Stephen's Hospital. Demolished *circa* 1745, that hospital was rebuilt in the neighbouring St. Anne's-lane. At that time, too, were pulled down a watergate and strong round tower, being the Long Staple,—site of the present Bridge-street,—for the western approach and abutment to Labeleye's (old) Westminster Bridge. An assessment of "Orlando Gibbons, ij<sup>d</sup>," in the Woolstaple is entered, in 1628, upon the overseers' books for the parish of St. Margaret. With the name of Staple Inn may be compared that of Steel, or Stapel, Hof, corruptly termed the Steelyard, as appertaining to the Hanse and Almaine, or Easterlinge, merchants, who originally settled by All Hallows, in Upper Thames-street, in 1250. Yet in a law of Æthelred the Easterlingas, coming with their ships to Billingsgate, are cited as "the Emperor's men," and receive royal protection accordingly.

**T**HE competition designs for the new façade at Milan are to be sent in on the 15th. There seems to be an anxiety (not unnatural), on the part of some German competitors to ensure the presence of some German and English representatives on the jury. The appointed members of the jury are mostly Italians, and the competitors, among themselves, are to vote for four other members. A German correspondent begs us to put before English competitors the consideration that

if English competitors vote only for Englishmen as judges, and German competitors only for Germans, neither will get votes enough to be elected, and the specially elected will consist entirely of Italians, and, at the most, one Frenchman. He therefore suggests that English and German competitors should arrange to vote for two Englishmen and two Germans, to be agreed on among themselves, so as to secure the election of German and English representatives on the jury. Our German correspondent proposes, as the German members to be voted for, Herr Hase, Privy Councillor and Baurath, of Hanover, and Herr von Statz, Baurath, of Cologne; and writes, "please recommend the names of two English gentlemen for whom the German competitors may unite their votes." Whether the German and English competitors generally will accept this suggestion we cannot say, but as we certainly agree that it is desirable that English and German architects should be represented on the jury of this international competition, we have recommended the names of Mr. Pearson and Mr. Waterhouse as the other two judges for whom the German and English competitors should unite their votes.

ON the motion of Mr. D. Plunket on Tuesday night, it was agreed "That a Select Committee be appointed to reconsider the plans and proposals for an Admiralty and War Office; and that it be an instruction to the Committee to report whether some or all of the existing buildings of the Admiralty may not, with advantage, be retained." The following were appointed the Select Committee:—Sir William Harcourt, Lord George Hamilton, Mr. Henry H. Fowler, Mr. Jackson, Mr. Selater-Booth, Mr. Shaw-Lefevre, Colonel Malcolm, Mr. Howell, Mr. Isaacs, Mr. Dillwyn, Mr. Edward Hardesty, Mr. William Bright, Mr. Seager Hunt, Sir William Crossman, Mr. Patrick Joseph Power, Mr. Byrne, and Mr. David Plunket. The Committee includes an architect (Mr. Isaacs), but we are not aware that any of the other members appointed are publicly known for any interest in or knowledge of architecture. The question whether some of the existing buildings of the Admiralty may with advantage be retained is of course put in purely for the economists, architecture being generally regarded in the Legislative assembly as merely a matter of pounds, shillings, and pence, not of beauty or of national honour and glory. The point which ought to be impressed on the Committee is that the design which Mr. Shaw-Lefevre has endeavoured to put upon the country is one which, from an artistic point of view, is exceedingly devoid of genius or interest, the execution of which in its present form would cause general disappointment to the few Englishmen who care about architecture.

THE collection of works by Mr. Watts, which was on view at Christie's at the close of last week, drew a considerable number of visitors, who were, it must be said, enticed there under rather false pretences, the preliminary notice which was got into the *Times* specifying, among the works to be seen, "Love and Death," "Love and Life," and two or three others of the painter's greatest works, without giving any suggestion that these were not the large paintings, but only small replicas or studies. The collection (the property of the late Mr. Rickards, of Manchester) was, however, a fine one as far as it went, including some of Mr. Watts's best portraits, and a number of imaginative paintings, studies of ideal characters, portraits of children under various ideal titles, &c. Among these, one called "Pretty Lucy Bond," which had never been exhibited, is a very charming child study, rather after the feeling of some of Sir J. Millais's child studies, though, of course, sufficiently different in technique. Another was the exquisite half-length of a blue-eyed child with a shell, entitled "On the Seashore," one of the most beautiful child pictures ever painted by any artist, ancient or modern. Among the things that exhibit Mr. Watts's power of con-

veying intellectual interest or deep pathos through the medium of very slightly-executed studies, two were to be remarked, the "Sir Perceval," a small sketch of a knight in armour walking through a forest, and "The Bridge of Sighs," a mere indication of a drowned figure and the cold water flowing past the bank, but of deeper interest than many a lesser artist's most finished works. "The Return of the Dove to the Ark," which has been "cracked up" rather immoderately in the communications furnished to the daily papers, appeared to us now, as it did when painted many years ago, a failure, owing to the totally impossible treatment of the water, in long parallel ridges as if the waves were drawn with a ruler. Among the portraits was the earlier (and not the best) of Herr Joachim, of whom the artist painted a finer and more dignified portrait at a later period, and that of Mr. Russell Gurney, one of the best and most characteristic of all Mr. Watts's portraits. The collection, including more than fifty works, formed a beautiful exhibition of what may be called the poetry of colour, even considered apart from subject, of which Mr. Watts is such a master.\*

THE loan exhibition of the works of Bonington, Cattermole, Holland, Nash, De Wint, and William Hunt, which was held for three days last week at the rooms of the Society of Painters in Water Colours, served to remind us of the peculiar faculty of Jas. Holland in painting architecture. His Venetian pictures are remarkable for the brilliant effect of light in them, and for the solidity and clearness with which the architecture is delineated. De Wint's architecture, on the other hand, is in many cases very bad; it is a mere wash with no stone or brick texture, and an utter ignoring of detail. His view of the west front of Lincoln Cathedral is a travesty. On the other hand, the "Old Houses, Lincoln," lent by Mr. Huish, is a superb bit of the kind, going to the very root, as it were, of the picturesque properties of old buildings of this kind. Here there was no architectural detail, properly so called, to paint; only the varied surfaces of old bricks, stone, and timber, and their various stages of decay and lapse from the perpendicular. The drawing illustrates better than most the peculiar union of breadth with the greatest delicacy in gradation and contrast of tone which characterises De Wint's execution when at his best. Cattermole's works, despite their brilliancy, when collected together have an air of great sameness, and a want of distinctive character in the countenances and figures, for which his brilliant execution and perception of colour cannot altogether atone. In the large work called "Montrose," for instance, which is obviously intended as an illustration of that scene in "The Legend of Montrose" where Montrose, disguised as Lord Menteith's attendant, is suddenly made known to the assembled Highlanders, the countenances are those of so many dummies or "supers"; the arrangement of the picture is effective in a stage sense, but that is all. Nash's large interior of Westminster Abbey is an illustration of the change in ideas of pictorial treatment of architecture; the effect is fine and true in general, but it will not bear looking into; there is neither the texture of stone, nor the true detail of the carving, &c. Nowadays we have become accustomed to demand so much more from the artistic illustrator of architecture than the last generation demanded. Holland comes nearer the modern mark in this class of work than either De Wint or Nash. There were some capital flower studies of Holland's also in the collection. As to the examples of William Hunt, they were marvellous as examples of splendid realistic painting of flowers and still life of various kinds, combining the most brilliant execution with the most delicate perception of form and colour. In this class of art one can hardly suppose that Hunt can ever be superseded; he carried it to perfection.

\* Since the above remarks were written, we have had occasion to observe the remarkable prices brought by many of these small works at the sale which followed; a gratifying practical proof that, in spite of the realistic and sensational tastes so prevalent, there is a public, "as it were," that knows the value of intellectual work like that of Mr. Watts.

IN answer to a question from Sir A. Borthwick on Monday, Sir W. Hart Dyke said that the Committee appointed in July last to consider the question of the action of light on water-colours was deferring its report until a series of experiments by scientific experts on the action of light on various pigments and their mixtures had been completed. We hope it is to be inferred from this answer that we are likely to get some definite information as to facts when the report of the Committee does come out, since a Parliamentary Committee has been appointed on such an inquiry. The subject seems, to say truth, rather out of the proper line of the Legislature.

WE greatly regret to learn from an article in the *Indian Engineer*, that the series of "Professional Papers on Indian Engineering," for many years periodically issued from Roorkee College, have put in their last appearance, and will be seen no more. The publication, which seems to have been carried on at a pecuniary loss for some time back, was a very well got-up one, often containing papers of unusual and special interest, to the consideration of which we have from time to time devoted some space. We are very sorry to have seen the last of them.

THE "Society of British Artists" has been drawn yet further into the meshes of Whistlerism this year; the number of works hung is still further reduced; the draping of the gallery is as effective as ever; and artists who have not before been known as "impressionists" are vying with each other in their efforts to catch the style of the presiding genius. Mr. Whistler's own contributions are not happy this year. His portrait of a lady, under the title "Arrangement in Violet and Pink" (157), is not pleasant in colour, and the face of the sitter is made to look as if it were in want of a thorough scrubbing with soap and water. The "Nocturnes" hung on either side of this have the same kind of merit as many others by the same artist; they are good as effects; even this cannot be said of "Harmony in Grey,—Chelsea in Ice" (165), which appears to be an effort to try how much people will swallow. Among the known and professed followers of Mr. Whistler, Mr. Jacobus Hood has an ugly but characteristic portrait of a lawn-tennis player, "Game and Set" (103), in flannels, and relieved against a white wall, according to the now favourite trick of composing paintings entirely of various whites. M. Roussel's "Portrait of Mortimer Menpes, Esq." (121), looks as if it were a good likeness, but a more ridiculous piece of affectation than the treatment of the whole it would be impossible to imagine; the sitter is in evening dress relieved against a pink wall, with a red fan hung on the floor beside him. The efforts of M. Ludovici, jun., to be ridiculous in the prevailing mode are even more noteworthy, and in such a thing as "Youth" (18) he seems to reach the acme of vulgarity possible in painting. Among the things which it is any pleasure to look at (and they are a small proportion of the whole) are "The Approach to London" (116), up the Thames that is to say, by Mr. Wyllie; the fine interior of Nuremberg Cathedral (126), by Mr. Wyke Bayliss; and a large painting of a coast scene in a gale, with a ship outside, "Helpless" (146), by Mr. T. C. Gotch and Mr. Ayerst Ingram: we presume the sea is due to the latter artist, and the figures to the former; the sea carries off the honours of the day; there is a fine wild effect of wind and boiling sea in the picture. The exhibition is certainly more interesting in a sense than the exhibitions at this gallery used to be for a long time; but there seems to have been a rush from the extreme of dulness to the extreme of affectation.

THE exhibition of "The new English Art Club," now open at the Dudley Gallery, includes a good many names not familiar to us, but we fail to discover any predominant principle which is to distinguish this collection of artists, or give a *raison d'être* for their special exhibition, except a tendency to paint

unfinished pictures: and some works which look at first sight very original are found on consideration to owe this impression a good deal to the fact of their being splashily painted and with no attempt at showing detail. The "Landscape" by Mr. Walton (36), and "Study of a Cloud," by Mr. W. L. Wyllie (85), both exhibit a vertical column of cloud piled up in a grand mass, but the cloud is laid on with a trowel, so to speak, and seems more solid than the ground over which it hangs; and this coarse, rough work gives a sort of special *cachet* to the painting, which is what is wanted. Mr. Sargent has a life-size portrait of a lady (55) which has plenty of character, and the background is very effectively sketched; but it would be every bit as good if the arms were more like flesh and less like dough. Mr. Roussel's life-size of a "Reading Girl" (3) hangs at the opposite end of the room, showing a "young person" reading before her fire *in parvis naturalibus*, her clothes being thrown over the chair back. The figure is well drawn and expressive enough, though ugly (but ugliness is beauty in the New Art Club), and the rather washy style of execution and unreal and dingy flesh colouring are perhaps of service in giving a slightly ideal appearance to what would otherwise be a too realistic work. That is one of the advantages of not finishing a picture; the conception may be the most prosaic, but a sort of poetry is imparted to it by leaving out detail. Mr. A. Harrison's big picture "In Arcady" (78), has not this assistance even: it shows a scene in a wood with flashing sunlight through the leaves, very vividly represented, in which two or three vulgar blowsy milkmaids have stripped themselves for the fun of the thing. Technically the picture is very clever; in other respects, more especially in connexion with the idea and associations of "Arcady," it is a piece of blatant vulgarity. "Stone Pickers" (32), by Mr. G. Clausen, one of the "dauntless three," shows feeling and character, but is not of a power to make all Royal Academicians tremble for their laurels; and two or three of the best landscapes in the room are the inferior works of well-known painters, such as Mr. Aumonier and Mr. Parsons. By far the best picture in the room, if feeling and pathos as well as technique are to count for anything, is "The Battle of Life" (32) by the secretary, Mr. T. B. Kennington: the interior of the home of a working man who cannot get work; each figure is carefully studied; the result is a picture painful certainly, and which few would hear to keep in their room, but marked by true and unaffected pathos, the more notable from the many affectations by which it is surrounded.

WE referred some little time back (see p. 378, *ante*) to an extraordinary statement made by the *Journal of Education*, to the effect that the delay in opening the Royal Holloway College was partially due to the absence of drains. We showed that this statement was unfounded, and we now learn that the *Journal of Education* has apologised to Mr. Crossland, the architect of the building, for its serious misstatement. The fact is that the drainage arrangements are stated by Sir Robert Rawlinson to be "in all respects complete and satisfactory." So much for the *Journal of Education's* would-be smart quip that drains are "a detail that architects have a way of overlooking."

DR. TANNER inquired of the First Commissioner of Works, on Tuesday, whether his attention had been called to the danger to pedestrians which the improvements at Hyde Park Corner had brought about. We pointed out long ago the certain inconvenience which the blundering in laying out the site would cause, independently of its utter ineffectiveness. Now, after it is done, people are beginning to find out the mistake; but that is the way we do in London.

IN addition to the new theatre that is about to be built in the Strand, and to which we adverted in our columns of the 2nd inst., sites have been taken in London for three more. Of these, the first lies in Oxford-street, between

Hanway-street and the Oxford Music-hall, being where the Star Brewery used to stand. Some of our readers may remember the two ravens that used to mount guard at the yard-gate. The second site is in Shaftesbury-avenue, whereon Mr. Hollingshead intends to erect a large playhouse having three frontages, the principal one to face towards the Avenue. The third proposed new theatre is a suburban one, and is to be located at Brixton, in Canterbury-road, just behind the London and County Bank, and opposite to the Police-station, near the end of Stockwell-road. Mr. C. J. Phipps, F.S.A., is designated as the architect of this theatre.

THE first London Exhibition of the "Société d'Aquarellistes Français," opened this week in the Goupil Galleries, is an artistic event of some interest. If we take it to fairly represent French water-colour art, it may be said at once that in landscape, at all events, the branch of art so specially suited to the capabilities of water-colour, the French can come nowhere near to the leading English water-colour artists of the day, the best landscapes in this collection being such as would be passed over as of little account at the Society of Painters in Water Colours. The exhibition is a peculiar one as compared with our own; the works of each artist are grouped together; the numerous and brilliantly-painted military groups of *Détaille* give a special character to it. Further on we have a set of sporting pictures by M. Bêthune and M. Olivier de Penne; a painting of "setters" by the latter (41) is remarkable for truth and spirit of action in the animals. Framed designs for fans abound. The strong point of the exhibition consists in the brilliant execution of figures in pure water-colour; the point in which our own water-colour exhibitions, in spite of Sir James Linton and Mrs. Allingham, are on the whole the least conspicuous. In addition to the work of *Détaille*, may be mentioned in this respect "Les Loisirs d'un Réserviste" (6), by M. Loustaunau, and the brilliant and charming little series of illustrations to "L'Ahbé Constantine," by Madame Lemaire. This gifted artist's flower and fruit pieces are also beautiful, and she appears to show equal mastery in both classes of subject. MM. Maurice Leloir & Paul Pujol contribute some good architectural subjects. The exhibition should be seen, both for the sake of the admirable work in certain lines which it contains, and for the characteristic contrast it affords with English exhibitions of the same class of work. It may be added that the works of the "impressionist" exhibitors, in the smaller room, may afford the English visitor the consolation of knowing that in this respect there are even greater humbugs on the other side of the Channel than on this side.

#### ST. OLAVE'S CHURCH, OLD JEWRY.

THE Wednesday Divinity Lecture which was delivered on the 23rd of March was the last religious function to be celebrated within the walls of St. Olave, Old Jewry. The parish is to be united with certain others, and the church is marked for speedy demolition. Scarcely has the last brick been removed of St. Matthew's, Friday-street, Cheapside, before another work of the same architect, Wren, has to share a like untoward fate. Its effacement forms part of a scheme that has just been accomplished for the union of the parish of St. Olave with the parishes of St. Martin Pomeroi, St. Mary Colechurch, St. Mildred, Poultry, St. Christopher-le-Stocks, St. Margaret Lothbury, and St. Bartholomew-by-the-Exchange; and for the appointment of the Rev. Prebendary Ingram, rector of St. Margaret, as the first rector of the united seven parishes.

Most of the names we mention carry us back to very early times. St. Martin Pomeroi, or Pomary, by the Orchard, one of the smallest parishes in London, was joined to St. Olave after the Great Fire; no trace of it remains except the graveyard between that church and Ironmonger-lane. So similarly with St. Mary Colechurch, also in the Ward of Chepe, which was united with St. Mildred, Poultry. Named after its founder, and situated in Old Jewry, at the southern end of Coneyhoop-lane, where now is Frederick's-place, this church is only remem-

bered, perhaps, in connexion with its chaplain or clerk, Peter, who died just four years before the completion, in 1209, of his stone bridge<sup>\*</sup> across the Thames, and was buried in the chapel of St. Thomas thereon. Yet Stow reminds us "that Henry IV. granted license to William Marshal and others to found a brotherhood of St. Katharine therein, because Thomas à Becket [who was born in a house on the site of the Mercers' Chapel hard by] and St. Edmund the Archbishop were baptised there." The churchyard, to the south-west of Old Jewry, is now built over. St. Mildred's, Poultry, as rebuilt by Wren, was standing until about fifteen years ago behind the houses in the Poultry that lay between St. Mildred's-court (prius Scalding-alley) and Chapel-place, and close to the site of the Poultry Compter, the only prison, by the way, in London that had a separate ward for the durance of Jews. The site of St. Christopher-by-the-Stocks-market, otherwise known as St. Christough, in Threadneedle-street, was taken for the south-western portion of the Bank of England at the enlargement of the Bank in 1788. There its graveyard is still preserved as "the Garden"; whereby, under the statute 9 Anne (1709-10), was established "the General and Chief Penny Post-office." Hutton, in his "New View," gives a succinct account of the church of 1462, and says that "the Walls were not burnt down by the terrible flames of Septemb. 1666; but the church was very much damnify'd, the Pillars and Arches, the Pews, Lead, and Six Bells being destroyed. . . . All the old Part which the Fire left is of the Gothick order; but the Pillars within, &c., are of the Tuscan." Its three-storied tower, with angle pinnacles, are shown in T. Malton's aquatint of October 1st, 1781. The present Sun Fire Office, Threadneedle-street,† denotes the position of St. Bartholomew-by-the-Exchange, which was founded by Nicholas Yeo (Sheriff in 1438) and Thomas Pyke. Having been restored by Wren, it was demolished in 1840 at the building of Sir William Tite's Royal Exchange. The general design, including the four singular doorways or window-frames with which Wren terminated the old tower, is reproduced in Cockerell's Church at the corner of Moor-lane and Tenter-street.

The tale of Wren's City churches that have been destroyed is lengthening apace: the first to go was St. Christopher, followed, after an interval of about fifty years, by St. Michael, Crooked-lane, for the approach to new London Bridge. Then followed St. Bartholomew-by-the-Exchange, and its opposite neighbour, St. Bennet Fink, conspicuous for its domed ceiling, borne upon eight columns of Corinthian order. Next we lost the beautiful spires of St. Michael, Queenhithe, and St. Bennet, Gracechurch-street; the pinnacled tower of All Hallows, Bread-street, which surely a reverence for Milton's memory might have spared; the perfect Ionic façade of the eastern front of St. Dionis Backchurch; and then St. Antholin's, so rich in its associations of religious life during the sixteenth and seventeenth centuries; the wanton destruction of whose exquisite stone steeple leaves us small hope for Wren's already threatened masterpieces of St. Margaret Patens and St. Mildred, Bread-street. Truly enough, his Church of St. Olave, Old Jewry, has no ambitious design; yet its tower, rising from the ground in four stages, and surmounted with angle obelisks capped with balls, is very pleasing. The vane staff, capped with a gilded ship, is appropriated for a multiplicity of telegraph wires, that must now find support elsewhere. The daily press is pleased to deny to this fabric any architectural attractions whatever. He who writes this is dead to any appreciation for the well-devised eastern elevation, immediately over against Old Jewry-chambers, with its large and nobly-planned window. This church, formerly known as St. Olave Upwell, is of ancient foundation, being scheduled in the survey of Ralph de Diceto, dean 1181-1204, as one of those collated to the Dean and Chapter of St. Paul's. A north aisle was added in 1450 by Thomas Morestead, who was churchover to the kings Henry IV., V., and VI. He was buried in that aisle, and Weever has preserved his epitaph:—

"Thomas Worsted gist icē,  
Dieu de s'aine est mortel.  
Amen."

\* Peter is said to have constructed a wooden bridge a few yards eastwards of the later one in 1163.  
† The original Sun Office was also taken for the Bank of England.

Of other worthies interred here may be mentioned Robert Large, mercer (1140), a magnificent benefactor to certain civic charities, and the master of Caxton; Sir Humphrey Weld, Lord Mayor in 1608, whose widow's foundation of the Wednesday Lectures was enlarged by Sir John Frederick; and Giles Dewes, servant to Kings Henry VII. and Henry VIII., and, according to Strype's *Stow*, "clerk of their libraries, and schoolmaster for the French tongue to Prince Arthur, and to the Lady Mary." Also Sir Nathaniel Herne (son-in-law to Sir John Frederick), for whom, as for Sir Robert Clayton, "the fanatic Lord Mayor of Dryden's "Religio Laici,"—Wren built two of the fine mansions for which Old Jewry was once renowned. Clayton's house was pulled down about twenty-five years since, having for while served as the home of Professor Porson when librarian to the London Institution. Here too are the tomb and monumental tablet of Alderman John Boydell, died 12th of December, 1804, the celebrated engraver and printseller. To his liberal patronage of the arts, combined with his collection of what is known as the Shakspeare Gallery, may fairly be ascribed a notable impetus to our later school of historical painting. Boydell had removed from the Unicorn at the Queen street corner, Cheapside, to a shop formerly 90, Cheapside, by the corner of Ironmonger-lane. The remains of the dead will be removed to Ilford cemetery, under care of the Commissioners of Sewers.

Destroyed by the Great Fire, St. Olave's was rebuilt in 1673-6 at a cost of 5,580*l.* 4*s.* 10*d.* Hatton gives us the following dimensions of Wren's fabric:—"Le. of the church, 78 foot; br. 84; altitude, about 36; and that of the Tower to the vertex of the Pinnacles about 88 foot; wherein are only 2 bells."\* This is one of the four London churches which were dedicated to the memory of the Norwegian Olaf, son of Harald Ghrinaka, king and Christian martyr, who fell in battle against the rebel Thore Hund, at Stikkestad, on August 31, 1030, the cry of "Fram, Fram, Kristnen Krossmen Koenigmen" resounding from his dying lips. It had one Unfred for priest, temp. Henry II. At the Dissolution the living devolved upon the Crown, having been previously granted, by a lease, to Builey Priory, county Suffolk. Old Jewry commemorates an early settlement here of the Jews before their expulsion from England in 1290 under Edward I. Their synagogue in this street passed into the hands of some friars,—the *Frates de Sacco*,—and ultimately was adapted as a "manse-house" for several lord mayors in succession. On the northern side of Meeting House-yard, a *cul-de-sac* out of Old Jewry, is a gate opening out to a range of steps. The steps lead downwards, and to a much greater depth than one would expect to find, upon an inclined approach to some premises in the rear of Coleman-street. The descent is too sudden and too steep to be explained in the ordinary way; and there is no record of any watercourse or the like thereto which might account for so rapid and deep a depression in the ground level.

#### THE ACTON DRAINAGE SCHEME.

##### EXPERIMENTS IN SEWAGE TREATMENT.

At the laying of the memorial stone in connexion with this work, by Mr. Wm. Robnck, C.E., Chairman of the Local Board, on Tuesday week last, some interesting experiments were made in a new system of treating the crude sewage. Before referring to these, however, it may be interesting to note the somewhat peculiar circumstances under which Acton was compelled to construct the new drainage scheme, now nearly completed, according to the designs and plans of the Acton engineer, Mr. C. Nicholson Lalley, at a cost of nearly 100,000*l.* Unlike the other districts along the Thames Valley, Acton was not driven to the necessity of running its crude sewage directly into the Thames. The Stamford Brook, an ancient waterway, had been the sewage outlet for Acton from time immemorial; but the Metropolitan Board, in order to utilise its carrying power, incorporated it into their drainage system. The Metropolitan Board three years ago, curiously enough, obtained an injunction against the Acton Local Board, restraining them from putting the sewage of houses built after the date of that order into

the Stamford Brook. Although the sewage of all those houses built antecedent to the injunction was still permitted to enter the brook, Acton was compelled to construct a comprehensive drainage scheme, in order to provide for the requirements of the many new houses being built wide apart all over the parish. In some instances, therefore, an expensive long length of sewer is laid for the drainage of one or two new houses. The Acton Board tried earnestly and repeatedly to come to some arrangement with the Metropolitan Board by which the Local Board would divert at once to the river the large quantity of surface storm water from the Harrow uplands which flowed into the Stamford Brook, and increased unnecessarily the cost of pumping at Barking. This the Local Board undertook to do on condition that it was allowed to use its ancient sewage outlet for sewage only. But the Metropolitan Board were obdurate, and preferred to go on pumping millions of gallons of storm-water of which it could easily have got rid. The Acton scheme is carried out upon what is known as the separate system, and consists of a high and low level. The sewage from the high level finds its way to the outfall at the works by a 3 ft. by 2 ft. egg-shaped sewer, and from the low level by a 2 ft. 6 in. circular sewer. The sewage from the latter is lifted to a height of 36 ft., when the high and low level sewage is mixed with chemicals. It then gravitates into the precipitation tanks, each capable of containing 140,000 gallons. There is also an effluent water tank for storing the effluent during high tide in the river Thames when there is a back flow in the effluent sewer. The storage-tank is capable of containing the same quantity of liquid as one of the other tanks. The effluent sewer, which discharges the clarified sewage into the river at Mall Eyot, Chiswick, is 24 in. in diameter, which enables the tank to be emptied rarely for use in thirty-five minutes. In addition to the tanks, some suitable buildings with neat elevations have been erected for the chemical treatment of the sewage. These buildings stand in two blocks; the engine, boiler, and coal-house to the east, and the chemical buildings in one range stand directly in front of the precipitation tanks. At the rear is constructed a sludge-well, into which the sludge from the precipitation tanks gravitates, from which it is pumped into the pressing-room, and pressed by Drake & Mainhead's patent presses, then ground in the grinding room, and after being dried is put into hags as a manure. The works are situated at the lowest portion of the Board's district, between Acton and Belford Park, on a triangular plot of land, comprising in all five acres and a half. Near the entrance of the works is an attendant's lodge in the "Queen Anne" style, and the ground is being laid out round the buildings and precipitation tanks. The cost of the scheme is about 80,000*l.*, and it is confidently hoped that its operation will improve the health-condition and stimulate the prosperity of the district. The Board has not fixed upon any particular mode of chemical treatment, some negotiations for that purpose with the ABC Company having, from some cause or other, fallen through. The Board are desirous, however, of adopting the most effective and economical method that can be found; and through the chairman, an invitation was given to Dr. A. Angell, of the County Laboratory, Southampton, and Mr. Candy, Director of the International Water and Sewage Purifying Company, to demonstrate the capabilities of their system of treatment, and the Acton tanks were put at their disposal. These experiments were of more than ordinary interest, as this was the first occasion on which the company had conducted experiments in dealing with sewage at any public sewage works. One of the precipitation tanks was filled with crude sewage from the Stamford Brook now connected with the metropolitan system, as the main sewers of the new scheme will not be in operation till June next. The sewage was charged with the chemical salts of the company, the principal feature of which compounds is the absence of lime, which is largely used in most other precipitation sewage works throughout the country.

These "sewage salts" consist for the most part of sulphate of magnesia, sulphate of alumina, and a small quantity of sulphate of iron; in addition to which the company use a powder called magnetic ferrons carbon. One of the difficult questions connected with the

chemical treatment of sewage has undoubtedly been how to retain in the sludge the ammonia and sulphuric acid, which are, to a greater or less extent, lost in the "lime process." It was contended for the company that it has solved the problem by the substitution of ferrous or iron compounds for lime, by means of which the manurial value of the sludge is greatly enhanced, and that instead of the sludge lying in offensive accumulations at the pumping stations it will be very extensively used by farmers. It was stated by Dr. Angell and Mr. Candy, in the course of their experiments, that these materials can be used as economically as any other kind of chemicals. The treated sewage in the experimental tank was allowed to remain quiescent for nearly two hours, though it was asserted that precipitation could be completed in an hour, and then run off into the open channel at the mouth of the effluent sewer. As seen against the white glazed bricks of the bottom of the channel, the effluent, it must be admitted, had not that white appearance which is desired in official quarters, but bore a red tinge, though without any opaqueness. It was explained that this tinge was entirely due to the presence in the precipitants of the iron, which it was pointed out, was not only harmless, but rather a purifier of the water of any river with which it might commingle. The presence of iron was demonstrated by the application to a paulil of the liquid of a testing agent, which gave the resulting green colour to the effluent. Some members of the Board expressed a preference, however, for the white effluent; as people generally, and perhaps inspectors, might not always understand that the red colour was due to such an innocent element as iron. It was pointed out that eight grains of the iron compound had been used per gallon of sewage, but a less quantity would suffice, and would reduce to a large extent the red tinge. A small quantity of the red effluent was afterwards put through a miniature filter bed, composed of a central layer of the company's magnetic spongy carbon, with layers of sand on each side, and in a minute or so the iron-coloured effluent came away limpid and clear like filtered water, and without smell.

The contract for main sewers has been executed by Messrs. Nowell & Robson, and by Mr. George Osenton, of Eritch, Kent, whilst the outfall buildings, pumping station, and precipitation tanks have been constructed by Messrs. John Mowlem & Co., of Westminster.

#### GLASGOW INTERNATIONAL EXHIBITION.

Progress is being made against the opening of the Exhibition next year, a design by Messrs. Campbell Douglas & Sellars, architects, Glasgow, having been approved and adopted. The leading idea makes few pretensions to novelty, consisting as it does of a great central avenue or nave lying east and west and intersected midway by a transept of equal dimensions as to width and altitude; the show-courts, fine-art galleries, and dining-rooms filling up the rest of the oblong. The grand hall at the east entrance is on a line with the nave, and, indeed, practically forms a portion of the unbroken promenade when not shut off for those reception and general ceremonial functions for which it is specially designed.

At the intersection of the nave and transept rises the dominating feature of the elevation, a dome 80 ft. in diameter at the base, and rather over 100 ft. in height. The housing of the Fine Arts section is provided for at the south-west angle of the edifice, where, for fireproof purposes, the prevailing timber of the general structure becomes brick for both outer and inner walls, with corrugated iron for roof covering. Distinct from the main building, which measures 880 ft. by 360 ft., to the west of it, and on a 6 ft. lower basement level, stands the less ornate machinery annex, 300 ft. long by 250 ft. broad. The general site flanks the left bank of the River Kelvin, over against the southern façade of Glasgow University, which extensive cluster of stone and lime, including the famous Bute Hall, occupies the bold crest of Gilmorehill, a few hundred yards back from the stream. Opposite the Exhibition and upon the Park ground between the college and the right bank of the river it is proposed to erect a full-sized presentment, in improvised and temporary materials, of course, of the old "Bishop's Palace" of Glasgow, which from early in the fourteenth

\* A New View of London, 1758. Vol. ii., fo. 449.



House, "Oakleigh," Pembury, Tunbridge Wells.—Mr. George Lethbridge, Architect.

century to the close of last century (latterly in a state of hopeless ruin) stood on the line of the High-street in the immediate vicinity of the stately cathedral which has so happily survived it. This reproduction is, in dimensions and architectural details, to follow as closely as the lost original as a somewhat imperfect knowledge of former actual conditions will permit; and it is intended that the larger apartments of the revived palace shall be set aside for that portion of the Exhibition which for its interest depends on the concerns of archaeology and antiquarian rarity. As the old palace was of considerable extent, and possessed some claims to magnificence, even the material likeness now contemplated will prove no light effort in a byway of the builder's art; but if accomplished to reasonable satisfaction, the added attraction will undoubtedly be important. It is remembered with interest in this particular connexion that the rural castle or country quarters of the old bishops of Glasgow stood on the banks of the Kelvin, at only a trifling distance away; and further, that the same building was not so very long since demolished to help in making way for the spreading tereaments of ship-building Partick. The Exhibition site is within the bounds of the city's west-end park, occupying that portion in ordinary times

set apart for football and like pastimes. On three sides it is bordered by streets, and on the fourth or north by the left bank of the winding Kelvin, which, after flowing through the park, and threading the less desirable purlieus of Partick, falls into the Clyde about a mile away. The grand entrance is on the north, facing the western suburb of Hillhead, and in direct line with Bank-street and University-avenue, the approaches across the park from that quarter being served by two bridges, side by side, which debouch right in front of the entrance doors. In style the design is somewhat Oriental in character, and the central dome is relieved and enstained by attendant towers, minarets, and spires at various angles and intersections. The corner of park ground chosen is not perhaps the most desirable, being uneven of surface and offering but poor margin for the adornment of arboriculture; but the finest part of the permanent park is quite at hand, and will sufficiently serve for purposes of outdoor variety to visitors. The Kelvin, unfortunately, is not so pellucid as it was in the days when the old hishops rusticated on its banks; but possibly in view of next year's exhibition the very natural solicitude of the authorities may result in some temporary alleviation, if nothing more, as regards its rather questionable look and odour.

HOUSE, "OAKLEIGH," PEMBURY, TUNBRIDGE WELLS.

THE above illustration shows a new front to this house, the additions consisting of porch and entrance-hall, with bed and dressing rooms, &c., over. The materials used are, for the exterior, Peterhead granite for columns and pilasters, and Portland stone for the other portions of the work. The porch is finished in various coloured marbles, with mosaic ceiling and floor. The entrance-hall has a high dado of mahogany, dull polished, and the upper parts of the wall are furnished with Tynecastle tapestry, with a ceiling of the same material. The floor of the hall is of black and white marble. All the windows are fitted with double sashes, and all the walls are built hollow. The architect is Mr. George Lethbridge.

**Prof. H. G. Seeley's Geological Field Glass.**—It is intended to form a class, including beginners and advanced students, this summer, in the same way as last year, for the study of geology near London, to be conducted on Saturday afternoons, by Prof. H. G. Seeley, F.R.S., King's College.

## COMPETITIONS.

*Glasgow Exhibition Buildings.*—At a meeting of the Executive Council for the Glasgow International Exhibition, 1888, held on the 30th ult. in the Corporation Galleries, Sauchishall-street, the principal business was to adjudicate on the designs for the building. In answer to advertisements, twelve plans had been submitted by competing architects. For the three best designs, premiums of 150, 100, and 50 guineas were offered, and the author of the first one was to have the right to carry through the work of erection at a rate of 2½ per cent. upon the cost of the building, restricted to 30,000*l.* It was remitted to a sub-committee to examine the designs and report as to their order of merit. According to their recommendation it was understood, says the *Scotsman*, that the first prize design was "Industry, Science, and Art"; second, "Bishop's Palace"; and third, "Thought and Experience." After discussion the Council agreed that the three plans recommended by the Building Committee should be voted on by ballot, Drs. Macgregor and Robertson to be tellers. The result was as follows:—For "Bishop's Palace," 38; for "Industry, Science, and Art," 23; and for "Thought and Experience," 2. On the letters being opened it was found that Messrs. Campbell Douglas & Sellers, St. Vincent-street, along with Mr. J. Barr, C.E., were the authors of "Bishop's Palace"; Messrs. J. Burnet, Son, & Campbell, St. Vincent-street, with Mr. Charles Lindsay, C.E., the designers of "Industry, Science, and Art"; and Messrs. P. Smith and H. E. Clifford, St. Vincent-street, of "Thought and Experience."

*New Government Offices at Christiania.*—By Royal Resolution of March 16, designs have been invited for a new Government building at Christiania. The total cost is fixed at 75,000*l.*, the State providing the site. The designs are to be submitted within six months from the above-mentioned date. Five premiums will be offered, of 55*l.* each, and a further sum of 110*l.* awarded for the design chosen.

## Illustrations.

THE BUREAU DES MARCHANDS.  
DRAPRIERS, PARIS.

THIS is an old building rebuilt, and with modern sculpture and carving in the centre portion. For further reference to it, see the article on the "Musée Carnavalet" in the present number.

DETAIL OF PRINCIPAL ENTRANCE,  
CITY HALL, ALBANY.

This is a fine example of the kind of detail, based on Byzantine types, which has been worked out in America by the genius of the late Mr. Richardson. It is reproduced from a photograph.

VESTIBULE OF THE CASINO THEATRE,  
NEW YORK.

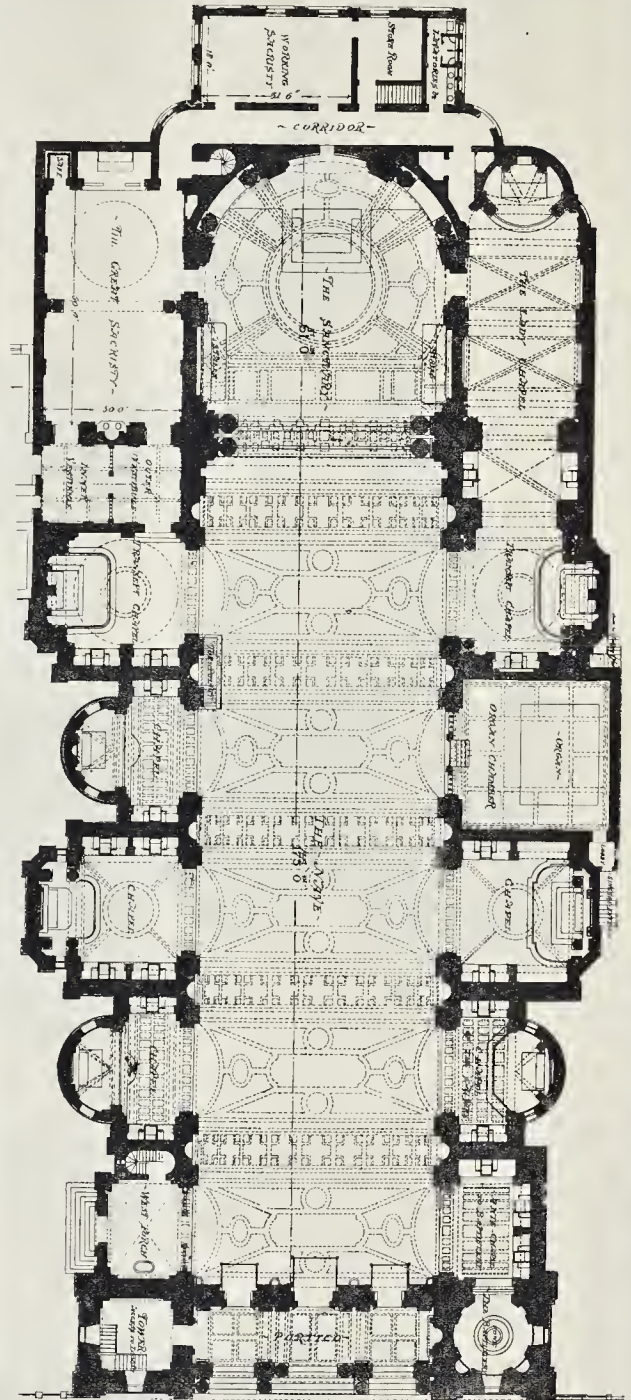
THIS, which is not a new building, but one of comparatively recent date, we give as an example of the manner in which Eastern types of decoration and detail are being adopted more or less in American architecture. In this case there is more of mere reproducing, however, than in the doorway referred to above. It does not fall to many architects to have the genius of Richardson for shaping new forms out of old.

DESIGN SUBMITTED FOR THE LONDON  
ORATORY.

THE design an interior and exterior of which we now publish was that sent in competition by Messrs. Goldie & Child.

The style was, as required by the conditions laid down, that of the Italian Renaissance. The materials proposed to be used were brick for the structure generally; in the interior, slabs of rich marble for the pilasters, panels, &c.; columns and balustrades of the same materials, as also the exposed portions of the floors. The caps were to be of bronze, and the walls and ornaments were to be finished in some fine cement,—designed, as was the vault, to allow of the introduction of a great amount of rich decoration.

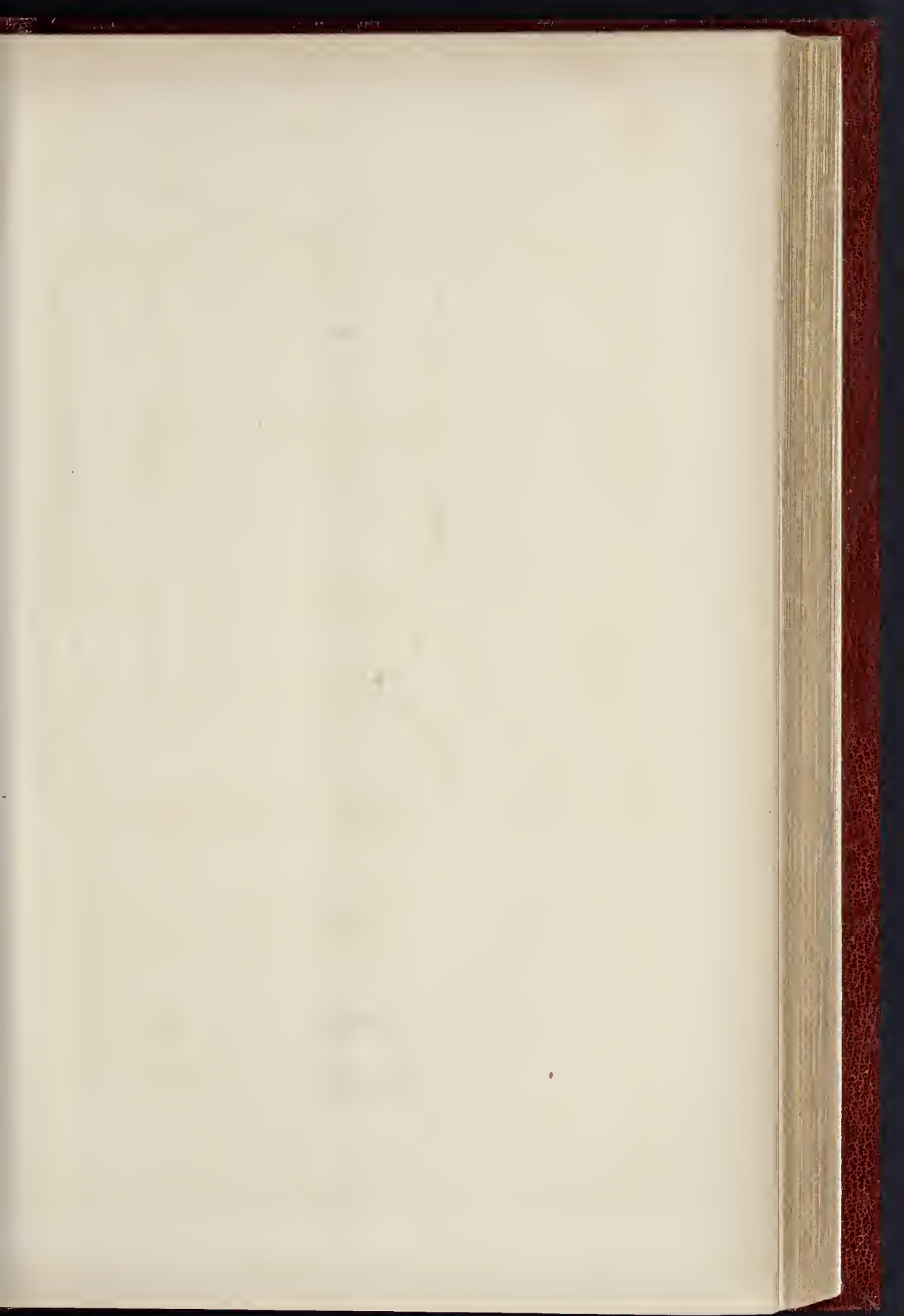
The exterior generally was to be faced with marble, with Portland stone dressings. The upper part, the campaniles, and the whole of the west front, however, were to be entirely of the latter material.



Messrs. Goldie & Child's Competition Design for the London Oratory, Brompton.—Plan.

It was owing to the vast outlay which would be necessarily involved by the great scale prescribed for the fabric, that stone was not proposed for the entirety of the exterior of the building, and it was for the same reason that a dome, much as it was to be desired, was not introduced into the design.

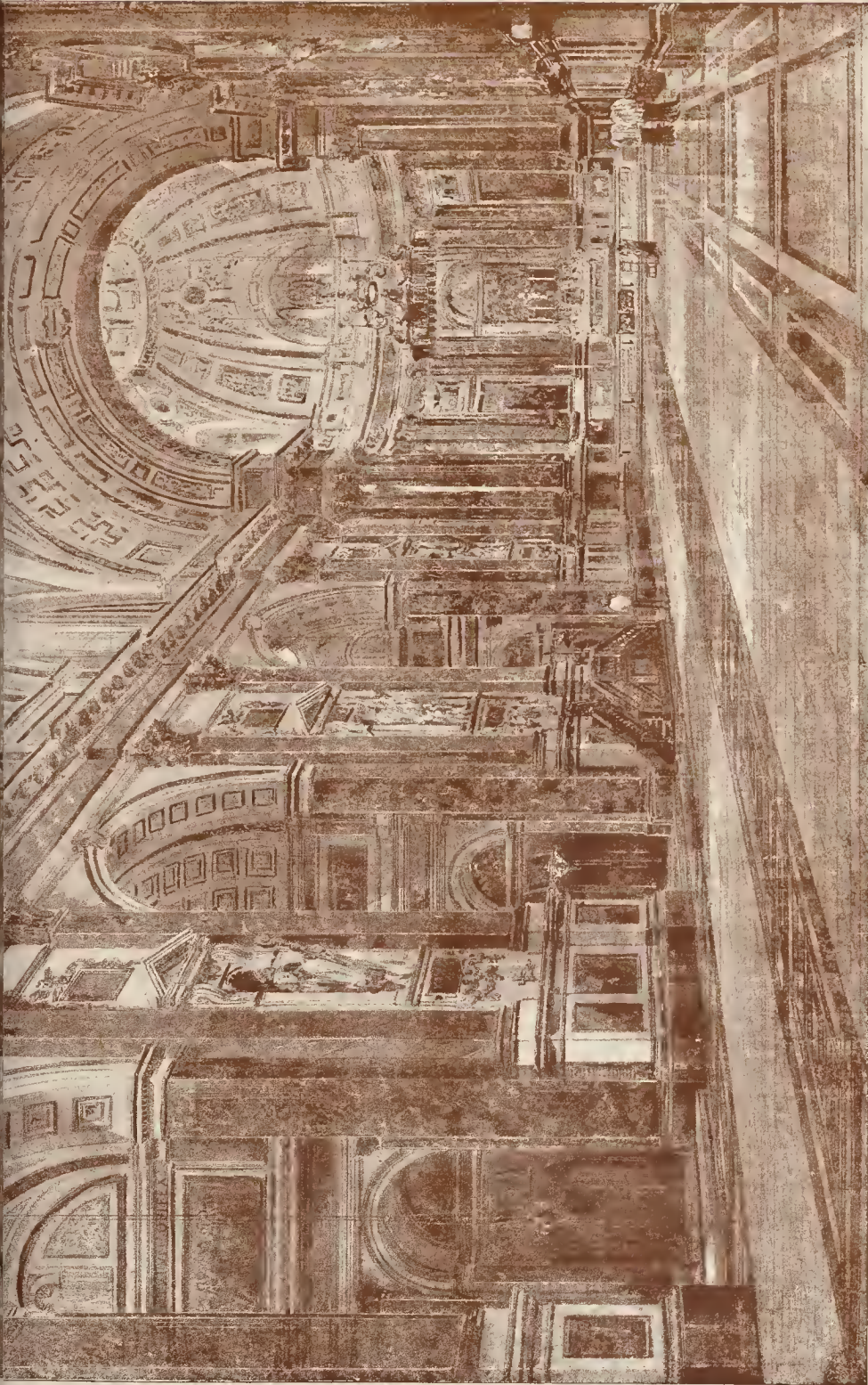
Although unsuccessful in the competition, the design will be admitted to be one well worthy to be better known, and its publication at the present moment will, we hope, be accepted as a slight tribute on our part to the memory of the late Mr. Goldie, an architect who has left much excellent work behind him.



THE BUILDER, APRIL 9, 1887.





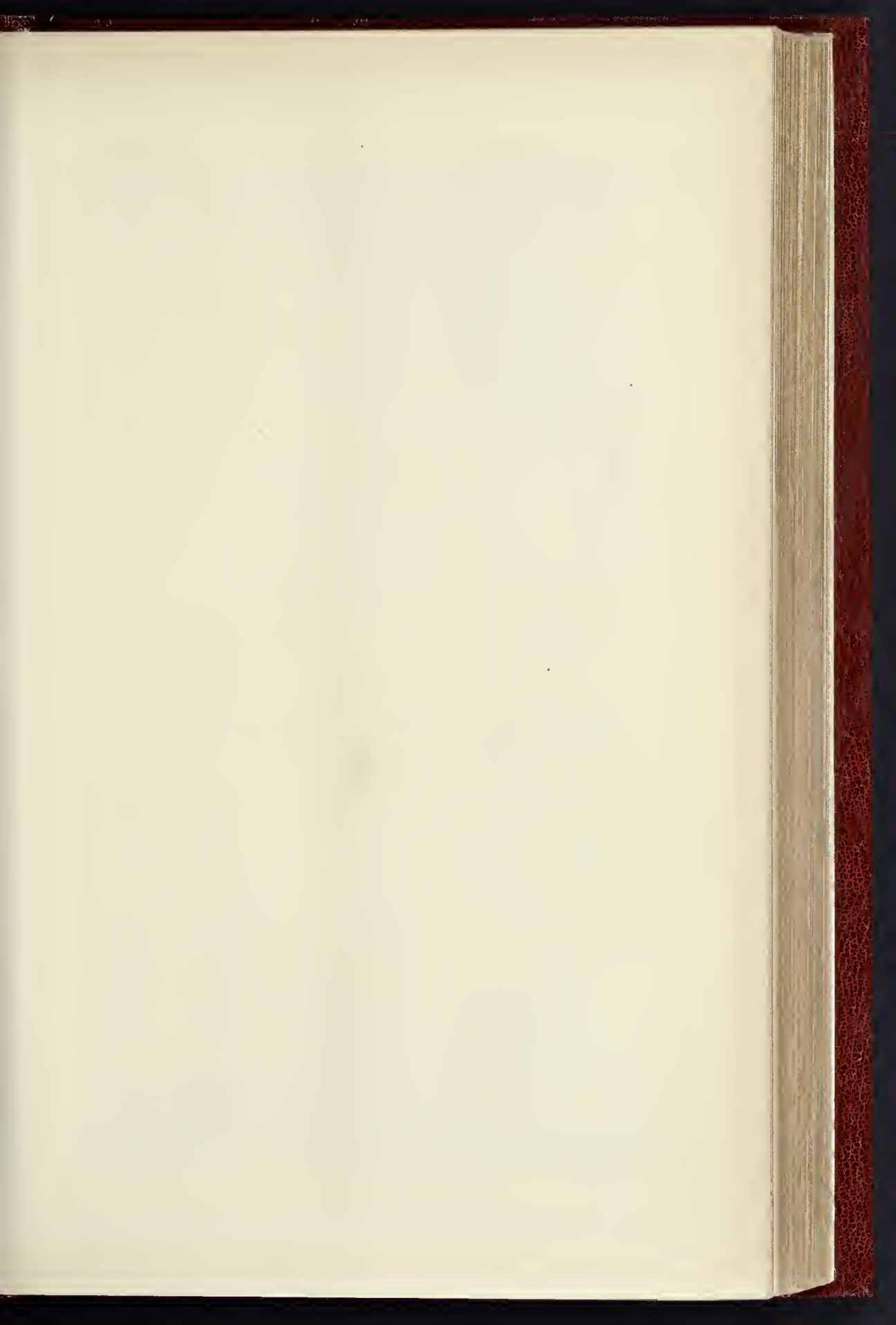


Drawn by H. W. Brewer

THE PHOTO SURVIVAL CO. LTD. LONDON

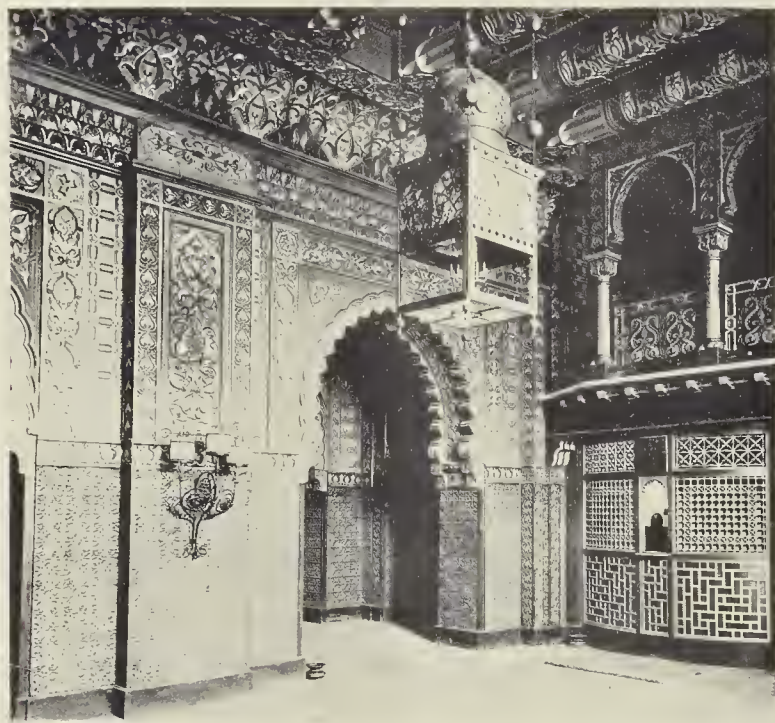
Messrs. GOLDIE AND CHILD'S COMPETITION DESIGN FOR THE LONDON ORATORY, BROMPTON  
INTERIOR VIEW.







DETAIL OF PRINCIPAL ENTRANCE, CITY HALL, ALBANY. THE LATE H. H. RICHARDSON, ARCHITECT.



The Phototype Co., 308, Strand, London.

VESTIBULE OF THE CASINO THEATRE, NEW YORK. MESSRS. KIMBALL & WISEDELL, ARCHITECTS.

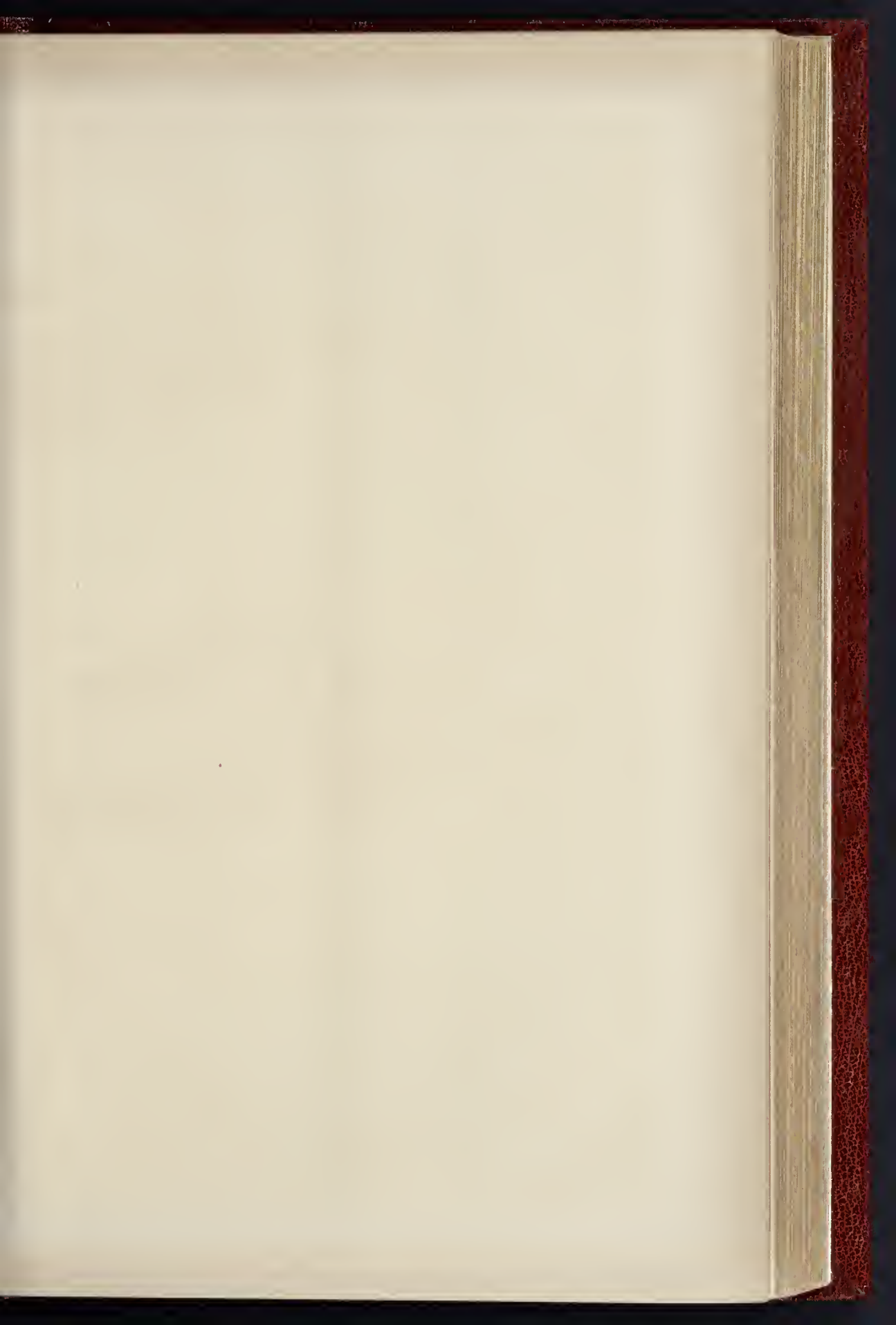


The Phototype Co., 503, Strand, London.

THE OLD "BUREAU DES MARCHANDS-DRAPIERS," PARIS.—UPPER PORTION.

THE MODERN SCULPTURE BY M. GAUTIER, AND THE ORNAMENTAL DETAIL BY M. VILLEMENOT.

THE UNIVERSITY OF CHICAGO



THE BUILDER, APRIL 9, 1887

THE BUILDER, APRIL 9, 1887



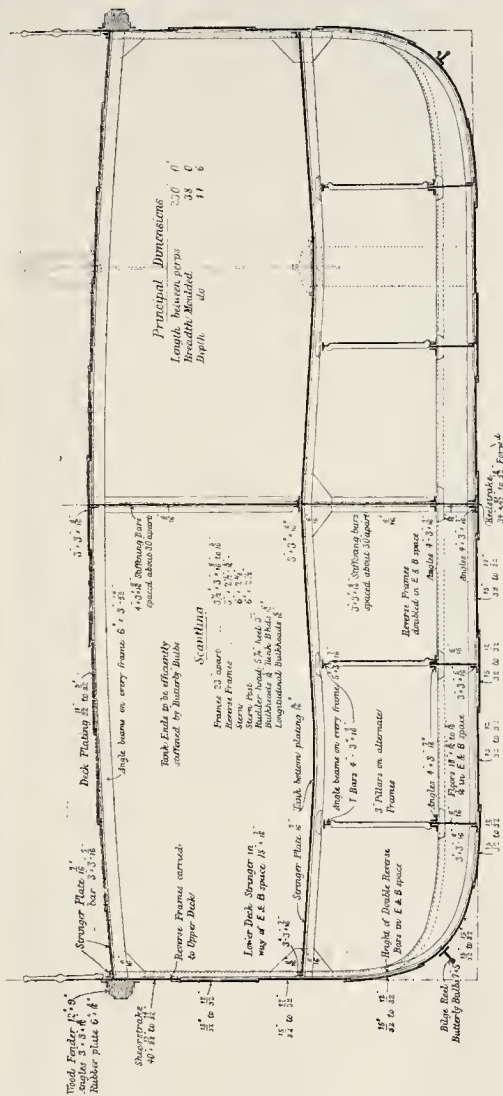




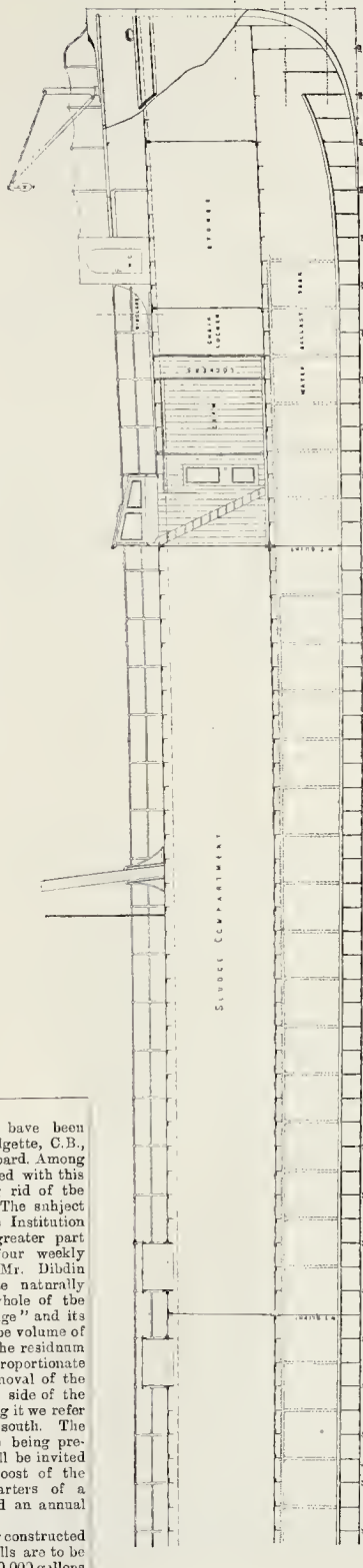
INK PHOTO. SHRAAGLE & CO LONDON

MESSRS. GOLDIE AND CHILD'S COMPETITION DESIGN FOR THE LONDON ORATORY, BROMPTON  
EXTERIOR VIEW.

THE HISTORY OF THE UNITED STATES



Midship Section of Sludge-Ship for the Metropolitan Board of Works.



Longitudinal Section of Part of Sludge-Ship for the Metropolitan Board of Works.

SLUDGE-SHIPS FOR THE LONDON SEWAGE.

THE public are generally aware that extensive works are being constructed by the Metropolitan Board of Works for the purpose of treating the sewage of London by a chemical process, with a view to prevent the pollution of the Thames. At present the sewage is discharged into the river at two points, one a little to the west of Barking Creek, and the other at Crossness Point, somewhat further down the stream on the opposite shore. The Barking outfall is an outlet for all the metropolitan sewage north of the Thames, while the Crossness outfall in like manner discharges the southern sewage. Works for the precipitation of the sewage and the removal of the sludge are to be established at both the outfalls. The contract for the northern works has recently been taken by Messrs. J. Mowlem & Co., and commencement has been made with the preliminary operations. The contract price is 406,000*l.*, and the works are to be finished in eighteen months. The chemical process has been devised by Mr. W. J. Dibdin, F.C.S., F.I.C., the chemist to the Metropolitan Board, the method having the approval of Dr. Dupré and other eminent chemists. The works, which are very extensive,

and altogether of a novel type, have been designed by Sir Joseph W. Bazalgette, C.E., the Engineer to the Metropolitan Board. Among other remarkable features connected with this undertaking, the plan for getting rid of the sludge takes a prominent place. The subject has engaged the attention of the Institution of Civil Engineers during the greater part of a discussion extending over four weekly meetings, a paper prepared by Mr. Dibdin serving as the text. The debate naturally digressed into a review of the whole of the sewage scheme, but "sewage sludge" and its disposal was the avowed topic. The volume of the London sewage is vast, and the residuum from the precipitated process is of proportionate magnitude. The plan for the removal of the sludge will be the same for each side of the river, and consequently in describing it we refer to the entire volume, north and south. The plans for the Crossness works are being prepared, and the requisite tenders will be invited at no distant date. The entire cost of the scheme is reckoned at three-quarters of a million for the capital outlay, and an annual charge of 118,000*l.*

The precipitation works now being constructed at the Barking and Crossness outfalls are to be adapted for the treatment of 156,000,000 gallons

of sewage per day as the average for a future population of 5,200,000. A grain of solid matter per gallon corresponds to ten tons in the daily total. It is reckoned that 3,000 tons of "settled sludge" will have to be disposed of daily when the works on both sides of the river are in full operation. After debating various expedients, the Metropolitan Board have arrived at the conclusion that the best mode of dealing with the sludge is to have it conveyed beyond the Nore in ships and cast into the sea. For this purpose they invited designs and tenders for suitable vessels, and numerous proposals were received, among others from the Barrow Shipbuilding Company.

The design sent in by this Company was submitted to Sir Frederick Bramwell, in conjunction with Sir Joseph Bazalgette, and received approval. The Company's tender was accepted and one ship was ordered. Future arrangements are, of course, uncertain, but it is expected that as many as six or seven ships of some kind or other will be required, so as to provide for the due removal of the sludge under all circumstances of weather, wear and tear, and other contingencies. The contract with the Barrow Shipbuilding Company for the one ship now in hand was sealed a short time back, and the vessel was to be delivered at Crossness in six months from that period. This will bring the delivery into the month of July, and Crossness is named, inasmuch as the precipitation process is already in partial operation there in connexion with experimental works, and a considerable quantity of sludge has been produced. The contract price for the ship is 15,750*l.* On the whole, something like 100,000*l.* will have to be expended on the sludge fleet. The ship now being built will have a load displacement of 1870 tons and will carry 1,000 tons of sludge. The length between perpendiculars will be 230 ft., the moulded breadth 38 ft., and the moulded depth 14 ft. 6 in. When loaded the draught forward will be 9 ft. 9 in., and aft 10 ft. 1 in. The form of the ship is characterised by considerable breadth in proportion to her depth. She may be described as long and broad, but very shallow. Her light draught forward will be 2 ft. 4½ in., and aft 7 ft. ½ in. When coaled, and trimmed with water ballast, the vessel will float on an even keel with a draught of 5 ft. 9½ in. The material employed in the construction of the ship will be principally steel, of a quality to stand Lloyd's tests. The stem and the sternpost will be of iron, and the main deck of steel. The engines and boilers will be placed abaft the sludge-hold, and propulsion will be given by twin screws, the available speed to be not less than ten knots per hour. The engines are to be of the triple expansion type, in two sets. Steam is to be generated in two multitubular marine boilers of mild steel, with iron tubes, each boiler being 11 ft. in diameter, by 10 ft. 3 in. in length. There will be two of Fox's patent corrugated furnaces to each boiler. Powerful pumps are to be provided for filling the sludge compartments, and supplying the ballast tank forward with water. The consumption of coal will be 11 cwt. per hour, and the hunkers are adapted to hold at least 30 tons. The vessel will have no sails, but simply a mast for signalling purposes. The scantlings are to be in accordance with Board of Trade rules, and a certificate is to be obtained from the Board. The vessel will carry one boat.

The sludge will be transmitted from the precipitation works to the ship along iron pipes laid under the platform of a jetty and pier carried out into the river, the ship lying alongside the pier for the purpose. The cargo will occupy four large water-tight compartments, ranged two abreast, in the hull of the ship. The total length thus occupied will be 60 ft. long. The lowest part of the floor of these compartments is left about 9 in. above the light-trimmed water-line, and slopes down from two sides to the centre, where the outlet valves are placed. Of these valves there will be two, 18 in. in diameter, in each compartment. That portion of the ship which lies below the sludge compartments is simply so much unoccupied space, giving sufficient buoyancy to the vessel to bear up the sludge to the requisite height, so that the water-line shall always be at such a level in respect to the sludge as to permit of a free discharge. As the sludge escapes so the vessel will rise and the due relation of the levels be maintained. The exit of the sludge will follow the raising of the valve, effected by means of a rod leading up to

the deck, where it will be worked by a screw arrangement, so as to lift or depress the valve to which the rod is attached. Passing through the valve the sludge will pass down a fixed cylinder into the sea. The hopper arrangement by which dredged materials are cast into the sea on some parts of the coast would be unsuitable in this case, the specific gravity of the sludge being little more than that of water. In the present plan the sludge will escape from the bottom of the ship several feet below the surface of the sea. From the time when the sewage enters the precipitating tanks at Barking or Crossness until the residuum is discharged into the German Ocean, the sludge will never be seen. Having reached a specified distance of at least ten miles beyond the Nore the ship will commence to discharge its refuse freight. If occasion required the whole could be allowed to escape in ten minutes. But a more deliberate mode of proceeding is to be expected, so as to prevent any palpable pollution of the sea. As the quantity of settled sludge produced at the two outfalls when the works are in full operation will average 3,000 tons per day, three ships will be required for the day's work. It is reckoned by Mr. Dibdin that this quantity of sludge will be spread over a course of some thirty miles. The organic matter in the discharged material will be about 150 tons, and it is calculated that the track of the ships will not be polluted to any greater extent than about 16 grains of organic matter per gallon of sea water. Oxidation, the feeding of fish, and the action of the tide, are expected so to deal with this organic matter as to prevent any nuisance accruing to the contiguous line of coast. As to the volume of the sludge it was stated by Sir John Cooke in the recent discussion at the Institution of Civil Engineers, that the quantity of material dredged and sent to sea by the Tyne Commissioners during a period of years, averaged about four times as much per annum as the weight of sludge to be disposed of annually by the Metropolitan Board.

Two diagrams are appended, to illustrate our text. The longitudinal section shows a portion of the length of the ship, commencing at a point a little abaft the midship line, and proceeding forwards. Two water-tight bulkheads are shown, forming the two extremities of one of the forward sludge compartments, and also enclosing a portion of the cellular space below. The engines and boilers are at the rear of the tanks, with accommodation for the captain and officers further aft. The remainder of the hands on board are provided for in the forepart of the ship, ahead of the sludge compartments. The water ballast tank near the bow is required to bring the vessel's head down when the sludge has been discharged, thereby counterbalancing the weight of the engines aft. The midship section, which forms one of the diagrams, is taken through the sludge compartments, showing in section the longitudinal divisions of the cellular space beneath, and the position of one of the discharge valves.

#### DISINFECTATION IN THEORY AND PRACTICE.

ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

On Saturday last, at the monthly meeting of the Association of Public Sanitary Inspectors, held at the Westminster Town Hall, Dr. Alfred Carpenter, J.P., read an interesting paper entitled "Theory and Practice in Disinfection," in complying with a generally-expressed wish for an elaboration of some advice given by him to the members of the Association a few months ago. Commencing with an exhortation to the members to let reason and science guide them in their acts instead of the method, once nearly universal, of following empirical rules (which the Doctor emphatically called "following instinct"), the lecturer indicated the necessity of a systematic inspection, which ought to be regular in its irregularity. The various causes of infection were enumerated, the formidable list closing with the fouling of sources of water, and then the action of individuals or communities, and then the remedial measures to be adopted were discussed. So simple an action as pouring a solution of chloride of lime into a sewer should have a basis of reason in the mind of the inspector, and should not be done by mere rule and in blind obedience to stereotyped orders. Merely to get rid of nasty smells was not a sufficient reason for applying a disinfectant. The very nonsensical-

ness of a nasty smell generally prevented its doing harm. The object should be to check putrefaction,—to prevent the production of the gases which were causes of smell. The great difficulty of correct disinfection was to destroy the germs or eggs of bacteria as well as living bacteria. He had seen ova covered by carbolic acid and actually preserved by being so covered, with the result that when released from their dormant state by the peeling-off of the acid, they caused a fresh outbreak of disease. Germs such as those contained in the breath of a smallpox patient in the feverish stage would strike root if at once conveyed to the mucous membrane of a susceptible person, but they could not bear the action of light and air, nor the action of ozone, and they would lose their vitality if floated in air for the space of 100 yards. Hence the philosophy of isolation coupled with rapid ventilation, and the danger of the conveyance of smallpox cases through crowded districts. He recommended a particular kind of respirator to be used in such cases, the object to be attained being the retention of the germs in a disinfecting medium, which might be either antiseptic gauze soaked in a solution of carbolic acid, or a thin layer of cotton wool. All matter in which dormant spores might be resting hidden must be destroyed, but even then the process of disinfection would be incomplete unless the disease protoplasm were oxidised. The three necessary conditions of complete disinfection were, therefore,—first, ventilation, to secure complete oxidation; second, destruction of the bacterial life; and third, destruction of the resting spore. Chloride of lime and carbolic acid having somehow failed, and ventilation having proved insufficient, many sanitarians resorted to burning the offending matters, but that appeared to the lecturer wicked waste. Nature provided a better security, viz., vegetation itself. He thought the benefit of lime-whiting arose less from the action of the lime upon organic matter in contact with it than from its absolutely removing the poison from the air of the chamber treated. Aerial disinfection by ventilation and sunlight, and by sulphurous acid fumes, was advantageous for the destruction of insect life, but alone such disinfectants were never enough for infected rooms. Scraping the walls (the scrapings being burnt in a furnace), washing the walls with lime-whiting, and the floors of infected rooms with corrosive sublimate, must follow. The latter was dangerous to use, and expensive, but rapid and thorough in its action. A solution of one part in 5,000 of water would in a quarter of an hour destroy either dormant germ or living thing,—a fact that had been proved by actual experiment. In declaring his conviction that steam heat was superior to every other means for disinfection, the lecturer said he was supported by the experiments of Dr. Koch, and he had no doubt that, in the future, disinfection by heat would take that form. To trust to carbolic acid for destroying the progress of infectious disease was to trust to a broken reed. Spores kept weeks in a five per cent. solution of carbolic oil, or preserved in alcohol, had been found capable of vigorous growth when afterwards transplanted to a favourable soil. Therefore, it was a fiction, and not a fact, to suppose that alcohol, or the use of spirituous liquors, was a remedy against impure water. While sewers were little better than elongated cesspools, and remained a disgrace to the constructing engineer,—i.e., so long as they were not self-cleansing,—all excreta from infectious cases should be disinfected before entering the sewers, and for this purpose the application of green copperas (sulphate of iron) was the best. In the insufficient quantities which ordinarily were used, most of the advertised nostrums were moonshine for purposes of disinfection. Unless used in quantities fifty times more profuse than was usual, it was a wicked waste of material, and the same might be said of permanganate of soda and lime and iron, as recommended by the advisers of the Metropolitan Board of Works. Dr. Carpenter, in conclusion, said,—I trust that I have said enough to show the main basis upon which disinfection should be carried out are: Ventilation, aerial disinfection, or disinfection by chlorine or steam; lime-whiting, washing floors and furniture with solution of mercuric chloride (corrosive sublimate); steam heat, for clothing, furniture, &c.; sulphate of iron, or chloride of lime, in adequate quantities, for flushing; and the wonderful agency of

vegetable life. If these means are effectually applied, infective diseases will be completely banished from our midst, and any local authority which now allows of their continuance is doing defective work.

The lecturer was warmly applauded at the conclusion, and after a discussion, in which the chairman (Mr. Jerram) and other speakers took part, a cordial vote of thanks was tendered.

PROFESSOR ROGER SMITH'S LECTURE ON "BRICKS AND BRICKWORK."

SIR.—The Professor quotes in his lecture at Carpenters Hall, as reported p. 519 of last issue of the *Builder*, "A good brick was uniform in size; standard 9 in. by 4½ in. by 2½ in." I wish to point out that with bricks of this size or this proportion you cannot make decently fair work. Try with a common wall one brick thick, Flemish bond: the outer stretchers side by side with a 3 in. joint between would measure 9½ in., whilst the headers being only 9 in. long, cannot reach the face of the work on one or both sides. Then, again, how is "Old English" bond to be worked, if two headers be equal to one stretcher? The header courses must have double the number of perpendicular joints than the stretcher courses require. The proper proportion of breadth to length is that the breadth should be half the length *less half the thickness of a joint*. I prefer a 2-in. joint. The size to be aimed at is 9½ in. by 4½ in. by 2½ in. It will be seen that in this size, or in any size of the same proportion, the bricks will bond perfectly with each other, either in "Flemish" or "Old English." Of course, in stocks, you cannot make bricks all exactly to sixteenths of an inch; but if you adopt this as a proper standard size and aim at making them as nearly that as possible, your bricks will average the proper dimensions. If you want a 3-in. joint, the size should be 10 in. by 4 in. by 2½ in., or 9 in. by 4½ in. by 2½ in.

Whilst writing of bricks, permit me to point out that many admirable facings from the Midlands and other distant parts are too thick to bond with London bricks. Again, others, especially white Suffolk, are too long in proportion to their breadth, being commonly 9½ in. to 9 in.; so that to keep the "perps" with other facings, they have to be shortened, at considerable expense.

In some cases the makers start with a size more or less right, but as the clay at different depths often slightly varies in quality, so that it shrinks more or less in burning, they neglect to follow this variation by the necessary alteration of their moulds, and so the size of brick varies from season to season. A. H.

KITCHEN BOILER EXPLOSIONS, AND SAFETY VALVES.

SIR.—Mr. Wiston, on page 521, in mentioning his "precautions," appears to me to make a mistake; for, while he refers to "tanks" in his third recollection, he says, in his first, that the lowest draw-off tap is to be above the top of the "boiler." Now, if there is a hot-water tank on the hot system, the lowest draw-off should be joined above this tank, so that the said tank cannot be emptied by opening the draw-off taps.

By "tank" here is meant the hot-water receptacle often placed below the ceiling of the kitchen, and not the *cistern* which supplies the boiler with cold water.

Further, another precaution, often omitted, is to see that the hot blow-off pipe has a rise upwards in every part of its course, so that there may not be any obstacle to the easy rise of the steam and heat up the pipe. W. E. BUCHAN.

SIR.—Mr. Robert Wiston has fairly argued this subject. One little point remains to be noted, which has always adopted with perfect success, viz.: to have the dead weight safety-valve on the return pipe—say, just above the kitchen mantel,—and not on the flow pipe. The advantages are, (1) the return pipe never corrodes, as does the flow, neither does the water freeze in this pipe so low as the kitchen mantel. When the water freezes in the pipes, it always occurs somewhere in the upper or coldest part of the house,—assuming the pipes are kept inside. Should the boiler be overflowing with water through other causes, the pipes being free and open, the safety-valve will instantly blow it. I have no interest in saying it, but I have always found J. Tylor & Sons' very effective. No good engineer ever thinks of putting a draw-off cock to a circulating boiler. ROBT. CRANE.

CRANE'S WARMING AND VENTILATING COIL.

SIR.—Observing a notice in your last issue [p. 524] of Crane's warming and ventilating coil, we feel, in justice to ourselves, that it is only right to state that the coil in question is simply a copy of our hydro-caloric warming and ventilating coil, which has been manufactured by us for upwards of 20 years. We enclose our printed particulars, with abbreviated extracts from notices received in the press about seven years ago, the first of which appeared in the *Builder*. J. WEBBS & CO., King's-road, Chelsea, April 4.

PROVINCIAL NEWS.

**Bideford.**—The new Infirmary and Dispensary buildings here were opened on the 31st ult. They have been built by Messrs. W. E. Gent & Son, the contractors for the work, from the designs of Mr. G. Malam Wilson, Bideford. The whole of the hospital departments are on the ground floor. Each of the main wards will accommodate five beds. The premises have been built of local stone and brick, with Portland cement dressings and Aberthaw wrought cast. The contract price for the erection of the building was 1,120l., but, including sundry extras and the purchase of the site, the total cost has been about 2,000l.

**Birmingham.**—On the 31st ult. the memorial stone of the new infirmary which is now in course of construction at the workhouse, Spring Hill, was laid. The building is designed on the pavilion principle, with a continuous corridor connecting the several pavilions with each other. The chief block is placed centrally, so that easy access is not only obtained there from all parts of the infirmary proper, but it is so planned that the laundry and chapel are accessible without any official or inmate getting out in the wet or inclement weather. The design is in harmony with the existing architecture. In the wards about 1,100 cubic feet of space will be provided for each patient, and 80 ft. of floor-space. The whole of the floors, corridors, and gangways will be of fireproof construction,—concrete carried on wrought-iron girders and joists,—and the floors of the wards will be laid with "oak-block" flooring, wrought and polished with beeswax; those on the ground-floor having a layer of bitumen underneath, so as to prevent the slightest damp arising. Mr. W. H. Ward is the architect, and Messrs. Bissett & Sons are the contractors.

**Cardiff.**—The Marquis of Bute has given eighty-eight acres of land at the foot of Penylan-hill as a new park for Roath.—Levin's new Music-hall, in Queen-street, has been opened. It has been erected by Mr. Martin, contractor, Cardiff, at a cost of between 6,000l. and 7,000l., and will seat 800 persons.

**Stockton.**—Stockton New Bridge, which crosses the Tees at a distance of about 20 ft. above the old bridge, was thrown open for traffic on Monday last. The old bridge has five arches, but the new one has only three,—viz., a centre opening of 110 ft. span and two side openings each of 85 ft. span. The crown of the centre arch is 18 ft. above zero of the tide gauge adopted by the Tees Commissioners, being the same height as the crown of the centre arch in the old bridge. The crowns of the side arches are 16 ft. above zero. The old bridge (says the *Leeds Mercury*) was built under the powers of an Act obtained in 1761, the twelfth Parliament of Great Britain, and the work was commenced about the year 1763 and was completed in 1771. The Bridge Board have entered into a contract with Mr. W. C. Atkinson, of Stockton, for the removal of the old bridge, and this will now be proceeded with. The causeway of the new bridge is 60 ft. wide between parapets, this width being divided into a roadway of 49 ft. and two footpaths each of 10 ft. The new structure is of iron and stone. Each arch consists of eight ribs of wrought iron, strongly braced together; upon these are laid transverse iron joists, which in their turn support a flooring of iron "buckled" plates, covering the whole surface of the causeway. Over this plated surface is spread a layer of concrete, forming the foundation for the metalling of the roadway and the York-stone flagging of the footpaths. Over the arches the parapets are of open cast-iron work; over the piers and abutments they consist of massive masonry of granite. All the visible portions of the piers, abutments, and approach walls are of Brumley Fall stone, the masonry of the piers and abutments is of dressed ashlar, and that of the retaining wall, on the Durham approach, is of rough ashlar. Cement concrete has been used in the hearting of both piers' abutments. The subaqueous part of each pier consists of five cast-iron cylinders, filled with hydraulic concrete. The abutment on the Yorkshire side is of masonry and concrete throughout. Here the river bank consists of a deep bed of tenacious clay, which rendered it possible to lay a foundation of concrete at a sufficient depth, and build up the masonry upon it, the water being excluded by means of a timber cofferdam surrounding the abutment.

On the Durham side of the river the case was different; the clay does not extend to so great a depth as on the Yorkshire side, and below it is a bed of running sand, interspersed with boulder stones. Under these circumstances, and considering the depth attained by the channel in an adjacent part of the river, it was considered advisable to have recourse to the same system of foundation as that adopted for the piers, and accordingly cast-iron cylinders were employed. A contract for the execution of the works was taken by Messrs. Whitaker Brothers, of Horsforth, near Leeds, upon an open competition, and the entire work has been carried out by them. The approximate cost of the works, exclusive of Parliamentary and legal expenses and land, is 65,000l., the estimated cost being 40,000l. The engineers of the work were Mr. Harrison Hayter, Vice-President of the Institution of Civil Engineers, and Mr. Charles Neale, M. Inst. C.E. Mr. Sivert Hjerleid, of South Stockton, has acted as clerk of the works.

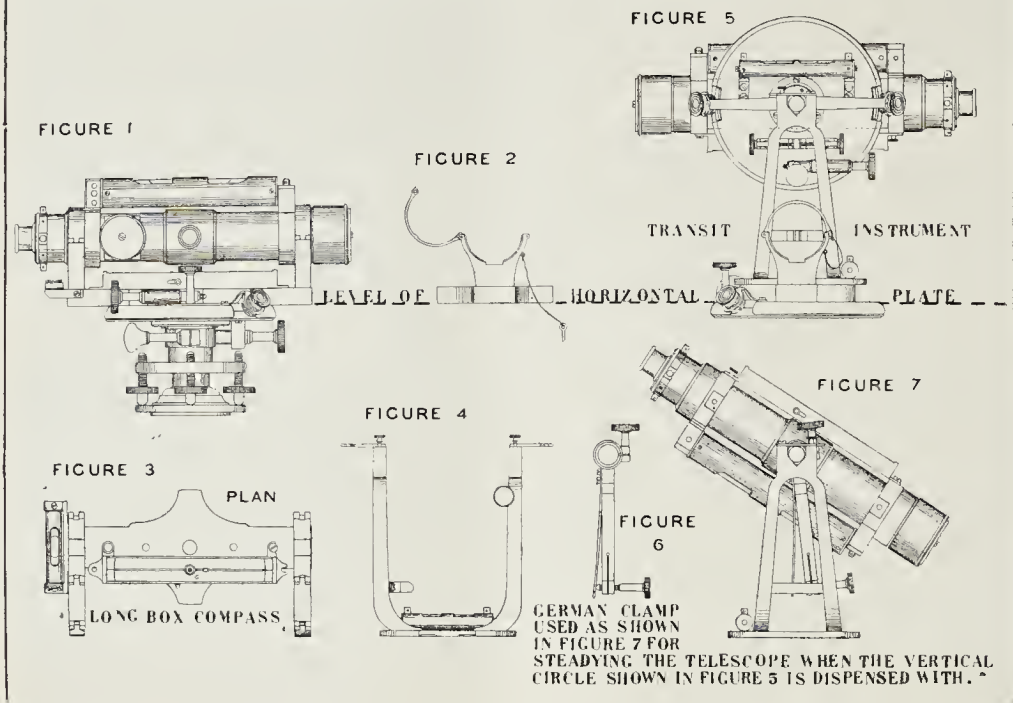
SCOTCH NEWS.

**Alloa.**—On the 2nd inst., the memorial stone of the new town-hall and library at Marshall, Alloa, the gift of Mr. John Thomas Paton of Norwood, was laid with Masonic honours by the Earl of Mar and Kellie. The building, which, as regards style is an adaptation of Gothic, will be 165 ft. in length; the breadth of the front portion facing Marshall is 87 ft., while the breadth of the main portion, which consists entirely of the hall, is 54 ft. The height of the front portion of the buildings from the ground line to the ridge will be 60 ft., while the height of the hall from ground line to ridge will be 40 ft. The centre block of the front portion will project fully 8 ft. beyond the general line of frontage. Springing from the hall floor, there is on either side a handsome staircase leading to galleries and rooms above. On the ground floor and on either side of the entrance there will be ladies' and gentlemen's lavatories, cloak-rooms, porter's room, &c. In this portion of the structure there are two side entrances to the hall. The hall will be fitted with side and end galleries, with orchestra and space for organ, having also a suite of retiring-rooms at the back of the platform, to which entrance may be had at the extreme north end of the building. On the first floor in the front block is situated reading-room, billiard-room, smoking-room, library, and reference library (Mr. Paton having agreed to give 1,000l. to form the nucleus of a library), billiard and reading rooms. On the second floor there will be provision for the Art School, which will include masters' room, elementary room, model-room, &c.; indeed, the whole of the second floor will be more or less devoted to the purposes of the Art School, and all these rooms will be reached by the main staircases, lighted from above by means of a glass roof. At the north end of the building, on the second floor (immediately to the back of the ball), rooms will be provided for the keeper. The building is from designs by Mr. Waterhouse, R.A., London, and will cost between 20,000l. and 30,000l. The contractors for the work are:—Mason work, Messrs. G. & R. Cousin; joiner work, Mr. Thomas Brown, Glasgow; plaster work, Mr. James Grant; slater work, Mr. R. Macfarlane; plumber work, Messrs. Philip & Hutchison; the clerk of works and local representative of the architect is Mr. Monteith.

**Kirkcaldy.**—New premises have just been erected in Kirkcaldy for the British Linen Company's Bank. The building is Italian in style, and consists of three stories. The ground-floor contains a spacious telling-room, also safe-room and agent's room. The writing chambers of Messrs. T. Dow & Sons are situated in an outbuilding in the rear of the bank. On the first and second floors of the building is the agent's dwelling-house. The bank has been built from plans prepared by Messrs. Kinneir & Peddie, architects, Edinburgh.

**Ancient Monuments.**—An order in Council was passed on the 7th of March last, declaring that the following ancient monuments should come under the provisions of the Ancient Monuments Protection Act, viz., Little Kix's Coty Houses in Aylesford, Kent; the chambered tombs at Buckholt, Gloucestershire; the Druids' circle and tombs on Eyam Moor, Derbyshire; the Pictish tower of Carlaway, the Ruthwell Runio Cross; and St. Ninian's Cave in Wigtownshire.—*Athenaeum*.

## ADIE'S COMBINED LEVEL &amp; THEODOLITE



## CHURCH-BUILDING NEWS.

**Lincoln.**—On the 29th ult. the cap-stone of the spire of St. Swithin's Church, Lincoln, erected at the sole cost of Mr. Alfred Shuttleworth, as a memorial to his late father, was put in its place. The whole height of the spire from the ground level is 200 ft., just 100 ft. short of Louth spire (300 ft.), 74 ft. short of that of Grantham (274 ft. before the recent restoration; now something more), and 20 ft. short of the spire of Newark (220 ft.), but 17 ft. higher than the western spires of Lichfield Cathedral (183 ft.). The architect is Mr. James Fowler, of Louth. The stone was laid by Mr. Browning, the foreman under Mr. Baines, of Newark, the contractor for the work.

**Maldon.**—On the 29th ult. St. Mary's Church, Maldon, Essex, was reopened by the Bishop of St. Albans, after having been closed for restoration and enlargement for more than a year. The church, some parts of which date from Norman times, had suffered much by neglect and had been much pulled about during the last hundred years. The works which have been carried out include the construction of an arcade, with clearstory over, upon the site of the old south wall of the nave, and the building of a new north aisle capable of seating upwards of 100 additional persons. This will give accommodation for 390 persons against 254. At the east end of the new aisle an organ chapel and vestry have been constructed, an entirely new roof has been put upon the nave and also on the chancel, and the walls and windows of both nave and chancel have been substantially restored, and the whole fitted with new benches and paving, care being taken to preserve the old memorial slabs, and also the fragments of interest which were found during the progress of the works. The tower, which is surmounted by a fine old oak heacon, still remains to be restored. The whole of the works have been carried out by Mr. Gozzett, builder, of Woodham Walter, under the superintendence, as far as the nave and aisle are concerned, of Mr. Fred. Chancellor, architect, of Chelmsford, and as regards the chancel, under Mr. Ewan Christian, architect to the Ecclesiastical Commissioners. The total cost of the works as far as carried out amounts to £2,400.

## The Student's Column.

FIELD WORK AND INSTRUMENTS.—XV.  
Surveying Instruments.

IX.—THE THEODOLITE (continued).

THE permanent adjustments of the instrument executed by the makers fix the horizontal limb marked P truly level, when the spirit bubbles Q and T, or T', appear in the centre of their run, and the plane of the vertical arc or circle perpendicular to the horizontal limb. The line of collimation must also be at right angles to the trunnion axis of the telescope, and the trunnion axis of the telescope should be parallel to the horizontal limb. The long spirit level attached to the telescope should be parallel to the line of collimation (see figs. 34 to 44). To test the workmanship of the bearing surfaces connected with the vertical axis, set up the instrument as accurately level as possible, clamp the vernier plate to zero, and turn the limb of the instrument round the vertical axis until the telescope is over two opposite parallel plate screws U U, or Z Z. Tighten the collar R, and finally adjust the bubbles Q and T in the centre of their run by the parallel plate screws. Then unclamp the vernier plate, and turn it half round, so that the telescope, after traversing 180° upon the horizontal circle, is again over the same pair of parallel plate screws. The spirit levels Q and T will now be reversed in position with regard to the parallel plate screws, and if the bubble in each level is not in the centre of its run, the adjustment must be half effected by turning the capstan-headed screws of the bubble tubes respectively, which connect it to the instrument, and the remaining half by turning the elevating plate screws parallel to which it is placed. The operation must be repeated until each bubble remains accurately in the centre of its run in both positions of the telescope. Having accomplished this, perform the same operation with the vernier plate clamped to the horizontal limb by unclamping the collar R, and again reversing the telescope by traversing it round 180° over the elevating plate screws. If the bubbles do not still remain in the centre of their run, the instrument must be returned to the makers,

as it shows that the two parts of the axis upon which the limb and the stage revolve have been inaccurately turned. When both the horizontal limb and the vernier plate are in adjustment,—that is, when the bubbles of the two spirit levels Q and T remain in the centre of their run during all positions of the revolution of either the vernier plate or of the whole instrument round the vertical axis, as above determined,—the line of collimation in the telescope should be horizontal when the bubble attached to the telescope is in the centre of its run, with the vertical arc or circle set to zero. The adjustment of this long bubble for reversion is effected in a similar manner to the adjustment of the shorter bubble T, to which it is parallel. The vertical arc is clamped to zero, and the telescope reversed as before.

However carefully the mechanism of the instrument may be executed, the telescope requires to be tested optically when fitted together. The line of collimation is examined and adjusted (1) for measuring horizontal angles, or angles in azimuth; (2) for measuring vertical angles.

Horizontal angles between vertical planes.

(a). Having set up the instrument level, clamp the horizontal vernier plate to zero, and with the collar R unclamped, direct the telescope to a flagstaff, the weather vane on the spire of a church, or to some small well-defined object, at as great a distance from the instrument as the situation will permit. Then tighten the collar R, and by means of the tangent screw S, make the central intersection of the cross hairs bisect the object viewed. Having done this, release the clamp screw C of the upper plate, and traverse the upper plate from zero, so that a point in another well-defined distant object, which should stand about the same level is viewed, clamp the screw C, and by means of its tangent screw, D, make the cross hairs carefully bisect the second point of observation which has been selected. Then carefully record the horizontal angle traversed, taking the mean of the readings furnished by the verniers, so as to ensure accuracy in registering the sub-divisions. Next before unclamping either the screw C or R revolve the telescope vertically, in the case of a transit instrument, so that the telescope is turned over,

## Books.

*Society in the Elizabethan Age.* By HUBERT HALL, of H.M. Record Office. London: Swan Sonnenschein & Co. 1886.

THE value of this contribution towards our knowledge of the social condition of England in the sixteenth century is considerable. In the hands of a Scott the materials which Mr. Hall has collected would have been woven into half a dozen historical romances, and, although the present editor makes no claim to possess any share of the great novelist's genius, the simple stories which the records themselves embody are replete with interest.

Mr. Hall's object is to make his readers acquainted with the principal phases of life in the Elizabethan age, and for this purpose he takes from each class in society one or more representatives, and tells us,—not what they ought to have done, or what they might have done, in their dealings with others, but,—what they actually did, and often what they actually said. As a specimen of the landlord class he selects a Wiltshire squire, William Darrell, of Littlecote, ill-known as "Wild" Darrell, but, in reality, more sinned against than sinning. Not that his life was a blameless one. He lived freely, gave generously, fought obstinately; but the ruin of his estates was as much due to the expenses of litigation as to personal extravagance. Like some others of his age, he sought to repair his broken fortunes through the favour of the Queen, and he therefore re-appears in Mr. Hall's pages under the character of a courtier. The details of his life in town, drawn from contemporary evidences, are curious, and the letters and accounts are especially valuable.

The other sections of society which Mr. Hall's extracts from the Records in his charge chiefly illustrate are the Civic, the Ecclesiastical, the Official, and the Mercantile. There is also a chapter entitled "The Tenant," which will be read at the present time with special interest. Mr. Hall asserts that the Elizabethan age was distinguished by "a violent land fever which raged in town and country." The Crown (enriched by the spoils of the Church) was a ready seller, and from every rank in the community there came eager buyers. But no sooner did these become landholders than,—like the ancient owners,—they endeavoured by every means to wrest from the sub-tenant his vested interest or fixity of tenure in the land. The great object of the copyholder was to secure a freehold in his tenure, and the great object of his lord was to get as much as he could out of his estates by rents, fines, and other payments. But on the whole, Mr. Hall thinks, "the position of the Elizabethan copyholder, villein, or even serf, as some people would delight to call him, was an independent and prosperous if not an honourable one."

We cannot speak too highly of the value which attaches to such side-lights as those Mr. Hall throws on history. We do not always agree with the conclusions at which he arrives, and his accuracy is not unquestionable. For instance, in the text (p. 106) he speaks of William Waryng as "of Pembroke," but in the appendix (p. 170) the Record describes him as "of Pemhrugh or Pemhruge, in the county of Hereford," i.e., Pembridge, Herefordshire. This error (not the only one) is all the more remarkable as in the index Mr. Hall is a great deal too particular in giving "Brugsy, Sir Egidius,"—an archaic form of the surname and a Latinised form of the Christian name of an old friend, Sir Giles Brydges. These, however, are trifles which do not much detract from the real merit of the book.

*Instantaneous Photography for Amateurs.* By C. W. Bath: Charles Seers. 1887.

THIS is a small pamphlet giving information and instruction in a plain and concise manner as to the methods of taking instantaneous photographs. It is of more use for those who would photograph landscape than architecture, of course; architectural photographers have little need of instantaneous photography, their subjects generally retaining the *status quo* sufficiently for any ordinary length of exposure.

**Newcastle-on-Tyne.**—Additions are about to be made to the National Schools at St. Anthony's, near Newcastle-on-Tyne. Mr. Arthur B. Plummer, of Newcastle, is the architect for the work.

## RECENT PATENTS.

## ABSTRACTS OF SPECIFICATIONS.

2,758, Ventilating Louvres. A. E. Bule.

The louvres constructed in accordance with this invention are chiefly for use in the jalousies common to tropical countries. They are controlled by cords and weights, which automatically check or close the louvres when the pressure of wind is brought against them. In other cases, water placed in a metal tube, and evaporated by the action of sun or temperature of the rooms, will actuate the louvres, which are in all cases held open by counterbalancing weights.

5,076, Sliding Sashes. W. S. Lockhart.

This invention consists in an arrangement applicable to railway doors or windows, and allows the window-frame to be actuated from the side, instead of by the cord in the usual way. A weather board is an important feature of the invention. This is brought into play by a tumblers-like action at the side of the groove in which the sash slides.

4,962, Improved Draught and Dust Excluder. T. J. Porter.

This appliance consists of a composition cast or made into a suitable form, somewhat similar to the draught-tubing in general use, but with the important difference that it may be melted and pressed into the joint or crevice of window or door, and when cold it sets rigidly hard, until heat is again applied to remove it if necessary. The plastic material is covered with felt, which renders it warm and pleasant to the touch and slight, and prevents noise when the material is fixed to doors frequently opened and shut.

5,795, Ventilators. C. Gamaway.

The form of ventilator which is the subject of this invention is for the extraction of vitiated gases or foul air. It is simply an arrangement of double tubing through which air circulates or is caused to circulate by means of a fan or blower or other appliance. The tubes are placed vertically, and are made with suitable openings at intervals. On a current of air being forced down the central tube a strong current is set up in the outside tube, which extracts all foul air or bad gases.

5,820, White Lead. J. Warwick.

The improvements which are the subject of this invention are in the direction of performing the necessary operations with the least possible exposure of the workpeople to the injurious effects arising from the ordinary method of manufacture. This is attained by exposing different surfaces of lead very rapidly to the action of acids, and performing all this part of the work in closed vessels or with facilities for drawing off the fumes at such a distance as to be harmless.

6,292, Chimney Top or Ventilator. G. Sharp.

According to this invention two cones are fitted over the chimney-pot in such a manner as that they have free play to swing or oscillate within given limits. The effect of wind, therefore, is to blow one side of the cone nearer the chimney-pot, closing it, while the other side is opened and the egress of smoke or bad air accelerated.

## NEW APPLICATIONS FOR PATENTS.

March 25.—4,458, W. Barker, Brickmaking Die.—4,463, H. Allan, Soil-pipe Connectors for Water-closets, &c.—4,468, J. Morris, Chimney Top or Cowl.—4,478, E. Shaw, Ventilating Apparatus.

March 26.—4,521, T. Murphy, Bridle for Painters' Brushes, &c.—4,539, J. Evans, Axle Pulley for Window Sashes.—4,540, S. Taylor, Glazing Buildings, &c.—4,544, J. Williams, Metallic Window Sashes and Frames.

March 28.—4,593, W. Murray, Stone-dressing Machines.—4,594, E. Sturdy, Fastening Doors.—4,598, S. Elliott, Metal Water Bars for Windows and Doors opening inwards.—4,606, A. Boulton, Paving.—4,611, N. Naudy, Cross-cut Saws.—4,615, R. Haddan, Brick or Block for Building Purpose.—4,622 and 4,623, J. Pirih, Opening and Closing Window Casements, Fanlights, Doors, &c.

March 29.—4,642, Taylor & Davis, Mounting and Attaching Door-knobs to Spindles.—4,683, B. Holmes, Sash or Door Latch.—4,701, H. Lake, Drain Traps.

March 30.—4,753, Burn & Macdonald, Pedestal, Combination, and Valve Closets.—4,763, W. Heath, Bending Lead Pipes or Tubes for Forming Elbows, Traps, &c.—4,772, J. Stavitz, Water Meters.—4,773, A. Boulton, Door Checks.

March 31.—4,818, S. Taylor, Metal-covered Roofs.—5,835, T. Le Poitevin, Brickmaking Machine.

## PROVISIONAL SPECIFICATIONS ACCEPTED.

2,786, S. Wilding, Pressing Floor-boards together.—2,923, J. Kershaw, Machines for Cutting Wood Mouldings.—3,120, E. Taylor, Attaching Door and other Knobs to Spindles.—3,432, T. Gill, Water-closets.—3,740, W. Eddington, Mortar Mills.—3,912, J. Browne, Locks for Doors.—3,961, Young and Co., Ventilating Apparatus.—3,247, W. Evans, Window-sash Fastener.—2,821, W. Turner, Printing on Tiles, &c.—2,957, T. White, Decoration of Tiles, &c.—3,121, T. Cudlipp, Stoves, Ranges, Grates, &c.—3,397, T. Lister, Cramps, &c.—3,918, F. Sage, Show Cases, &c.

reversing the eyepiece and object glass end for end; then unclamp the collar R, and turn the whole body of the instrument round 180° in the direction of the last or second object viewed, leaving the vernier plate clamped as at the last reading. Clamp the collar R, and by means of the tangent screw S, make the cross hairs again bisect this object. Then release the vernier plate by unclamping the screw C, and turn the telescope horizontally round in the direction of the first object without unclamping the lower plate. Clamp the upper plate by the screw C, and carefully bisect the first object viewed by working the tangent screw, D. If the index of the vernier now points exactly to zero upon the lower plate, the line of collimation is correct, and the horizontal angle read between the two lines of sight can be accurately booked; but if the index of the vernier does not return to zero upon the primary scale of divisions, then half the error must be corrected by the horizontal capstan-headed collimation screws, and half by the tangent screw D. Care must be taken to move the opposite side screws in the diaphragm plate, both in the same direction and equal in amount, so that they should be adjusted gradually, in order to turn one as much as the other. The adjustment of the screws is effected by a spindle piece found in the box. (b). In a transit instrument, the adjustment of the line of collimation may be tested with the observation of a single station by first bisecting the object viewed after clamping both screws C and R, then revolve the telescope, so that if the bubble was first above the telescope, it is now below it, and then unclamping the screw C, revolve the vernier plate round 180°, reclamp the screw C, adjust the index by the tangent screw D, and proceed as before. (c.) Another method consists in sighting accurately the centre of a distant object; then without unclamping or in any way disturbing the position of the instrument revolve the telescope with great care and mark a position upon the other side of the instrument, which should be on a continuous line in plan. Then without revolving the telescope or releasing the upper plate, undo the lower clamp R and turn the body of the instrument half round, clamp the lower plate and by means of the tangent screw S make the cross-hairs bisect the first position viewed. Then, again, revolve the telescope vertically without unclamping the instrument, and if the cross hairs now bisect the second point observed on the line produced, the instrument is in adjustment for taking horizontal angles on or upon the same levels, but if not, note the error, and adjust the horizontal screws in the diaphragm plate so that the line of sight may strike half-way between the two points observed upon this side of the line. Repeat the test to prove the accuracy of the adjustment for the measurement of angles in azimuth. In the case of a non-transit instrument, such as a plain or an Everest theodolite, the vernier plate is first clamped to zero as before. The cross wires are set to bisect some well-defined distant object by means of the clamping and adjusting arrangements, R and S. The telescope is lifted gently out of its bearings, and replaced very carefully with the trunnion axis reversed. The screw C is then unclamped, and the vernier plate traversed through 180°. The screw C is again clamped, and the vernier index finally adjusted by the tangent screw, D. If the object viewed be still bisected, it proves that the line of collimation is perpendicular to the trunnion axis, but if not, then the error must be corrected as above explained. Having done this to ascertain if half the error of deviation has been correctly estimated, again traverse or reverse the trunnion axis, and if the line of collimation does not still bisect the object viewed, the operation must be repeated until, by successive approximations, the object is found to be accurately bisected in both positions of the trunnion axis.

**Penarth.**—The Presbyterian Chapel, which has been renovated at a cost of about \$600, was re-opened on Sunday last. The whole of the old building, with the exception of the end and side walls, was taken down, and extended at the front, thus providing sitting accommodation for about 400 worshippers. The work has been carried out from plans and under the superintendence of Mr. John H. Phillips, architect, Cardiff, and the style adopted is a free treatment of Romanesque.

COMPLETE SPECIFICATIONS ACCEPTED.  
*Open to Opposition for Two Months.*  
 6,238, W. Pringle, Apparatus for Cutting, Mitring, and Cramping up Mitres of Mouldings.—  
 7,100, J. Rollason, Wedge for Securing Doors and Windows.—  
 7,115, Stoford and Dykes, Construction of Girders.—  
 7,232, J. Jefferies, Pneumatic Door Checks.—  
 8,910, J. Law, Feeding Mechanism for Saw Frames.—  
 9,324, A. Muir, Mitring Machines.—  
 95,965, G. Dobbs, Moulded Slag Paving Blocks.—  
 844, C. Dixon, Apparatus for Drilling, Rhymering, Girders, &c.—  
 1,908, Kristensen and Jensen, Cement Fastenings.

RECENT SALES OF PROPERTY.  
 ESTATE EXCHANGE REPORT.

| MARCH 28.                                                                                             |        |
|-------------------------------------------------------------------------------------------------------|--------|
| By D. J. CHATELLE.                                                                                    |        |
| Mottingham—The freehold residence, Highfield and grounds .....                                        | £1,570 |
| MARCH 29.                                                                                             |        |
| By BROAD & WILTSHIRE.                                                                                 |        |
| Burton-crescent—No. 11, term 19 years, no ground-rent .....                                           | 501    |
| Strafrod—2, Amily-road, freehold .....                                                                | 300    |
| By R. & F. SWAINE.                                                                                    |        |
| Notting-hill—25, Ladbroke-grove, 51 years, ground-rent 10l. ....                                      | 680    |
| By R. BOYCE.                                                                                          |        |
| Mill-end—19 and 21, Emmot-street, 22 years, ground-rent 4l. 13s. 4d. ....                             | 370    |
| By DEBENHAM, TAWSON, & CO.                                                                            |        |
| Waltham Abbey, Sun-street—Freehold house and shop .....                                               | 510    |
| Quaker's lane—Three freehold cottages .....                                                           | 370    |
| Bedford Park, Marlborough-crescent—Ground-rents of 120l., reversion in 87 years .....                 | 3,660  |
| Flinders-road—Ground-rents of 44l. 4s., reversion in 87 years .....                                   | 1,415  |
| Bath-road—Ground-rents of 34l., reversion in 87 years .....                                           | 800    |
| MARCH 30.                                                                                             |        |
| By J. HEMBALL.                                                                                        |        |
| Fulham—31 to 37 odd, Reporton-road, 91 years, ground-rent 22l. ....                                   | 635    |
| Ball's Pond—21, Canterbury-road, 65 years, ground-rent 3l. 18s. ....                                  | 285    |
| By M. MILLS.                                                                                          |        |
| Clapham Park-road—The Oxford Arms, freehold .....                                                     | 2,630  |
| By W. HALL.                                                                                           |        |
| West Brompton—3 and 5, Seagrave-road, 45 years, ground-rent 8l. ....                                  | 380    |
| East Finchley, Leicester-road—A plot of freehold land .....                                           | 60     |
| By COLLETT & COLLETT.                                                                                 |        |
| St. Marylebone—3, 25, 26, 30, 31, 35, and 39, Nightingale-street, 33 years, ground-rent 62l. 2s. .... | 1,213  |
| MARCH 31.                                                                                             |        |
| By HAMNETT & CO.                                                                                      |        |
| Croydon—1 and 3, The Close, freehold .....                                                            | 3,000  |
| By FAICHERT, VALES, & CO.                                                                             |        |
| Finchley—1 and 2, Aldon-cottages, freehold .....                                                      | 515    |
| 1 and 2, Carlyle-cottages, freehold .....                                                             | 455    |
| By MULLETT, BOOKE, & CO.                                                                              |        |
| Chelsea—3, Trafalgar-square, 22 years, ground-rent 6l. ....                                           | 500    |
| Hyde Park—4, Gloucester-place, 50 years, ground-rent 12l. ....                                        | 1,700  |
| 2, Gloucester-mews, 50 years, ground-rent 2l. ....                                                    | 2,000  |
| Portman-square—20, Montagu-street, and adjoining, 35 years, ground-rent 30l. ....                     | 3,600  |
| By T. B. WESTCOTT.                                                                                    |        |
| Somers Town—11 and 12, Charles-street, 40 years, ground-rent 20l. ....                                | 590    |
| By E. SIMMONS.                                                                                        |        |
| Clapham—3 to 14, White-square, freehold .....                                                         | 1,280  |
| Denmark-hill—10 and 14, Selborne-road, 75 years, ground-rent 11l. ....                                | 650    |
| Wandsworth-road—An improved rental of 190l., term 19 years .....                                      | 1,110  |
| Rotherhithe—54, Plough-road, 61 years, ground-rent 3l. ....                                           | 330    |
| 70, Plough-road, 63 years, ground-rent 9l. ....                                                       | 1,170  |
| 1 to 4, Canute-street, 63 years, ground-rent 9l. ....                                                 | 560    |
| Deptford—13, Shere-road, 58 years, ground-rent 2l. 1s. ....                                           | 270    |
| By H. G. BLISS & SONS.                                                                                |        |
| St. George's, E.—1, 2, and 3, Grace's-alley, freehold .....                                           | 1,490  |
| 24, Cable-street, freehold .....                                                                      | 620    |
| By W. J. GARDNER.                                                                                     |        |
| Finbury Park—68, Blackstock-road, 61 years, ground-rent 6l. ....                                      | 600    |
| By NEWSON & HARDING.                                                                                  |        |
| Hoxton—131, High-street, freehold .....                                                               | 1,010  |
| Hackney-road—Nos. 130 and 132, freehold .....                                                         | 1,630  |
| Bishopgate-street—25 and 29, Brushfield-street, freehold .....                                        | 1,655  |
| Clayton—161, 167, and 169, Clarence-road, freehold .....                                              | 1,015  |
| 12 and 14, Downs-road, freehold .....                                                                 | 1,170  |
| 20, Oakfield-road, 75 years, ground-rent 6l. 5s. ....                                                 | 295    |
| Kingland-road—137 and 132, Tottenham-road, 34 years, ground-rent, 8l. ....                            | 505    |
| Stamford-hill—Nos. 23 and 25, term 55 years, ground-rent 18l. ....                                    | 1,100  |
| Hertford—Freehold rent charge of 2l. a year .....                                                     | 35     |

MEETINGS.

SATURDAY, APRIL 9.  
 Edinburgh Architectural Association.—Visit to Duntarvie Castle and Niddry Castle.

MONDAY, APRIL 11.  
 Society of Antiquaries of Scotland (Edinburgh).—8 p.m.

WEDNESDAY, APRIL 13.  
 Civil and Mechanical Engineers' Society.—Mr. R. E. Middleton on "The Forth Bridge."—7 p.m.  
 York Architectural Association.—Mr. S. H. Adams on "Sanitation."—7:45 p.m.

THURSDAY, APRIL 14.  
 Edinburgh Architectural Association.—Mr. J. Crawb Watt on "The Aesthetics of City Building."—8 p.m.

FRIDAY, APRIL 15.  
 Institution of Civil Engineers (Students' Meeting).—7:30 p.m.

Parkes Museum (Lectures for Sanitary Inspectors).—Dr. Alfred Hill, M.R.C.S., on "General History, Principles, and Methods of Hygiene."—8 p.m.  
 Bradford Historical and Antiquarian Society.—7:30 p.m.

Miscellaneous.

**Rothwell Market House.**—At a public meeting held at Rothwell, Northants, some time since, it was resolved that the most fitting way to commemorate the Jubilee of Her Majesty's accession would be by the completion of the interesting old Market-house for the purpose, primarily, of a reading-room. This building, according to the inscription, "was the work of Thomas Tresham, Knight. He erected it as a tribute to his sweet fatherly and county of Northampton, but chiefly to this town, his near neighbour. Nothing but the common weal did he seek; nothing but the perpetual honour of his friends. He who now puts an ill construction on this act is scarcely worthy of so great a benefit. A° Domini One Thousand Five Hundred and Sev—" Sir Thomas's good intentions towards Rothwell were unfortunately frustrated by the turbulence of the times, and the trials he underwent on account of his religious and political opinions, by which not only did he suffer in fortune and liberty, but his attention was engrossed to such a degree that of all the buildings he undertook (Rothwell Market-house, Rushton Hall, the Triangular Lodge, and Lyveden New Building) only the Triangular Lodge was completed in his lifetime. "Hard to say," says Thomas Fuller, "whether greater his delight or skill in building, though more forward in beginning, than fortunate in finishing his fabricks. Amongst which the Market-house at Rothwell, adorned with the Armes of the Gentry of the County, was highly commendable." The task which was abandoned in Queen Elizabeth's reign it is now proposed to complete in Queen Victoria's. The change of time necessitates a slight departure from the original intention of the founder. The lower story was to have been an open market-house, but there has been no market at Rothwell for many years. It is, therefore, proposed to enclose this story and to let it as an office. By this means a regular annual income will be obtained, which will serve not only to help the building in repair, both of which objects, if left to annual subscriptions, are likely to languish. As to the upper story, it is not clear to what purpose it was intended to be put (it may have been intended for a school), but it is this room which is now to be used as the reading-room. The space in the high-pitched roof will also be utilised. In completing the building it is the intention of the promoters to have the external work done strictly in architectural harmony with the present fabric. The work will be entrusted to Messrs. Gotch & Saunders.

**Society of Engineers.**—At a meeting of this Society, held on Monday evening last, at the Westminster Town-hall, Professor Henry Robinson, President, in the chair, a paper was read on "The Shoues Hydro-pneumatic Sewerage System," by Mr. Edwin Antl. The author introduced his subject by a general consideration of the conditions and difficulties of successfully dealing with sewage, and dwelt on the difficulty of reconciling proper sizes and gradients of sewers with economy in the depth of the sewers below the surface. He urged the advantages of separating the rainfall from the sewage proper, and showed how the Shoues system enabled the engineer to overcome these difficulties. The automatic action of the ejector and the house-sewer flushing-tank was then described by the aid of diagrams. The author then gave particulars of three typical instances of the application of the system:—1. Eastbourne, where it has been added to the original system, and has been in successful operation for about six years. 2. The Houses of Parliament, where it has been applied recently. 3. Henley-on-Thames, where the whole sewerage of the town has been laid out for its adaptation. He mentioned, also, instances of its use for other and more specific purposes at Warrington and Southampton.

**The Architectural Association.**—The Members' Soirée took place on Friday evening, April 1st. This year there was no "play," the entertainment taking the form of a smoking concert. Mr. Mechin Rogers recited very cleverly a selection from Dickens's "Christmas Carol"; Mr. A. Collard gave a skilful performance on the flute; some humorous musical sketches were given by Mr. Kilmister; and songs by Messrs. Balmer Booth and Guy Dawber.—The fifth Saturday afternoon visit of the Association was made on the 2nd inst. to Lambeth Palace. Mr. J. P. Seddon conducted the members over the buildings, the portions visited being the Lollards' Tower, and the chapel, entered from the Tower by a very fine doorway. The chapel was restored by Mr. Seddon, and decorated by Messrs. Clayton & Bell; the altar frontal, designed by Mr. Reeve, and some time ago illustrated in the *Builder*, is a very interesting piece of needlework. The dining-room has a very good open-timbered roof, and contains some interesting portraits of the archbishops. The Librarian, Mr. Kersehaw, met the party in the Library, and showed some of the valuable and curious books and engravings contained in the Library; he stated that Mr. Christian attributed the roof to Sir Christopher Wren, but that that there was no actual record of his having been employed.—We have received the first number of "A. A. Notes," the magazine of the Association, edited by Mr. Herbert D. Appleton. Among the contents is a short article on "Sketching Tours," in which is shadowed forth a project for helping sketchers by information given by or through "consuls," and "vice-consuls," on the plan of the cyclists' touring clubs. Diocesan architects, county surveyors, and architects generally with good local knowledge, are requested to aid in this work.

**The "Hotel Victoria."**—The large and hitherto unoccupied hotel in Northumberland-avenue, originally designated the Northumberland-avenue Hotel, designed by Messrs. Isaacs & Florence, architects, and executed by Mr. J. W. Hobbs, has just been completed, and is to be opened for business during the ensuing month. The structure was described in the *Builder* during the progress of its erection, and illustrations of it have appeared in recent volumes. It is now announced that the building has been purchased by a company, with a share capital of 200,000l., and it is to be opened under the new title of the "Hotel Victoria." It is described as "the largest hotel in the world." Hotel nomenclature in the metropolis appears to be moving in this direction. The Army and Navy Hotel, in Victoria-street, Westminster, has been formed into a company, with a capital of 75,000l., and will in future be known as the "Hotel Windsor."

**District Surveyors' Elections.**—At the meeting of the Metropolitan Board of Works on the 1st inst., after the amendment proposed by Mr. Williams (see *Builder*, p. 498, ante) had been negatived, it was resolved that, in future elections the number of candidates be reduced to six, at a meeting of the Board, by one ballot, at which each member may vote for six persons whose names are in the printed list; the result of such first ballot to be ascertained by scrutineers, consisting of two members of the Board, to be appointed for that purpose, together with the Clerk or his representative. That the six thus selected be balloted for, each member of the Board voting for one candidate only, until some one candidate has the votes of a majority of the members present, and that at each ballot the name of the candidate having the smallest number of votes, and also the names of all candidates who have less than 20 per cent. of the total number of votes, be struck off.

**New Suburban Stations on the Great Northern Railway.**—The continued increase of traffic in the northern suburbs of the metropolis intersected by the Great Northern Railway Company has led the company to rebuild and enlarge several of their stations in these localities, and within the last few months the stations at Stroud-green, Crouch-end, Highgate, and East-end (Finchley) have all for some time past been in course of rebuilding and enlargement, the booking and waiting room accommodation being much extended. With the exception of the East-end Station, now nearly finished, all the above-named stations are finished. It may be added that the new roof on the west side of King's-cross station, which has for some months been in progress, is now approaching completion.



**The Progress of the Panama Canal.**—Mr. Robert Nelson Boyd, M.I.C.E., who has just returned from an exploration of the Panama Canal, read a paper at the last meeting of the Civil and Mechanical Engineers' Society on the subject, describing the present condition of the cuttings and the canalisation of the Chagres river. He stated that only about one-fifth of the work has been done, and that its completion by 1889 is entirely out of the question. The remaining 120,000,000 of cubic metres are being removed at the rate of 12,000,000 per annum, the maximum as yet attained, which was last year. At this rate the work will not be completed before 1897. Even on the showing of the resident engineers of the canal, who maintain that, counting the preliminary buildings, &c., one-third of the total work has been done, it will need ten years before the canal can be opened. But much of the present completed excavation has been in alluvial and other surface ground, and the elevated watershed at Culebra of 300 ft. depth in basaltic rock will in itself take, according to the resident engineer's estimate, at least six years. This alone shows that there must in future be a reduced rather than an accelerated rate of excavation. Mr. Boyd's own estimate of time, even if all the necessary capital be forthcoming, is nearer twelve than ten years. The lowest estimate of money still required is admitted on the spot to be 2,200,000,000 of francs, in addition to the money already spent, which can only be surmised, as accounts are not forthcoming. Taking this unknown quantity at 1,000,000,000 of francs, which is not excessive, it appears that the total capital will amount to 3,200,000,000 of francs, or 128,000,000. Of course it is possible that for less money and in a shorter time a ditch may be made with water flowing from the Pacific to the Atlantic, but not the canal as designed, 29 ft. 6 in. deep, and available for sea-going ships. Mr. Boyd concludes that the slavish following of the methods employed at Suez has been responsible for much of the failure at Panama, and that different methods must be adopted before the new conditions can be dealt with. These methods have now been partially adopted.—*Globe.*

**The Sunday Society.**—The twelfth annual meeting of this society was held on Monday last, at the Conduit-street Galleries, Mr. Robert Carter, F.R.S., in the chair. Mr. Mark H. Judge, Hon. Sec., read the annual report, which claimed for the past year that never before had there been so many and decisive expressions of public opinion in favour of the society's object. Reference was made to the resolution of Sir Henry E. Roscoe, F.R.S., as M.P. for Manchester, and to the resolutions of which he had given notice in the House of Commons. Other matters touched upon in the report were the attempt to open the Colonial and Indian Exhibition on Sundays, the Sunday Art Exhibitions opened by the society, the Sunday opening of the National Art Treasures Exhibition at Folkestone, and the threats of prosecution in connexion therewith. "Another event," the report said, "of great importance to the Sunday opening movement in this year of the Queen's Jubilee is the announcement that the People's Palace at the East End of London is to be open on Sundays, and that her Majesty the Queen has consented to open the building, which is fast approaching completion." Considering the depression which has existed, and the complications in the political world, the society considered it had been well supported in its work, but appealed to the public to strengthen its hands during the ensuing year. The report was adopted, and on the motion of Mr. Mark H. Judge, seconded by Mr. Chas. H. Stanton, Sir George Macfarren, Principal of the Royal Academy of Music, was elected President of the Society for the current year.

**The Institution of Civil Engineers.**—A list of the members of this Institution, corrected to the 1st instant, shows that there are on the books 1,568 members, 2,275 associate members, 20 honorary members, 481 associates, and 949 students, together 5,296, being an increase of 196 in the past twelve months, or nearly 4 per cent. Mr. Edward Woods, President of the Institution, will give a *conversazione* on Wednesday, May 25th (Derby day). It will take place in the South Kensington Museum, by permission of the Lords of the Committee of Council on Education.

**Strike in the Building Trade at Birmingham.**—The *Birmingham Gazette* says that in accordance with a resolution adopted at a mass meeting of operatives on Saturday evening deputations from the Amalgamated Society of Carpenters and Joiners waited upon some of the principal firms of employers in the building trade on Monday morning, and in all cases where a refusal was given to sign an agreement form agreeing to pay the present rate of wages and continue the working rules the men were withdrawn. Amongst the firms who refused to sign the agreement were Messrs. John Barnsley & Sons, Messrs. Taylor (late Briggs), of Bradford-street, and Mr. John Bowen, of Balsall Heath. A number of employers acceded to the wishes of the deputations, and more are expected to follow. Messrs. Sapote & Son's men turned out on Saturday. So far about 500 men have been withdrawn, out of some 5,000 in all who are affected. The painters, who have received a notice from the Painters' Association similar to that given by the master builders, have, at a meeting of the delegates, decided to abide by the action of the general body. The reduction being pressed for by the master builders means to the men a loss in earnings of 4s. 6d. per week. There is a great objection to this, as the wages were reduced 3s. 4d. in 1880, though of this 1s. 1d. has since been given back. Efforts are being made to settle the dispute by arbitration.

**The Registration of Plumbers.**—Last week's number of the *Builder* contained an advertisement, occupying an entire page, giving the names of London and country plumbers, bath masters and journeymen, to whom the Worshipful Company of Plumbers had granted their certificate of registration. We now learn that on Saturday last, the 2nd inst., eighty-two plumbers were examined at the City and Guilds Technical College, Finsbury, by the examiners appointed by the Company. There were twenty-eight master plumbers and fifty-four journeymen from various districts of London, and from Folkestone, Brighton, Eastbourne, Rochdale, Derby, Cardiff, Swansea, and Leeds. The examinations included practical tests in pipe-bending, jointing, gutter work, &c., and the applicants were afterwards examined in various subjects connected with materials used in plumbing, hose-fitting, and sanitation. Among the examiners present were Mr. George Shaw, C.C. (chairman), Messrs. Charles Hudson, C. T. Mills, W. Titmas, W. H. Webb, J. C. Ashdown, R. J. Lyne, H. B. Lobb, L. F. Gilbert, and R. A. Nurse.

**The Forth Bridge.**—On Saturday last the members of the East of Scotland Engineering Association, headed by the Vice-President, Mr. Bennet, and the Secretary, Mr. F. H. Lightbody, paid their annual visit to the Forth Bridge. The piers on both sides of the river, which have been built by gradually raising the girders which they support a few feet at a time, are now nearly completed, and the level at which the trains will run can now be seen. The three sets of cantilevers, which spring from the caissons in the centre of the Forth, and form the main feature in the design of the bridge, are also well forward. Those on the north and south sides have reached to within a few feet of their entire height of 350 ft. above the water, and the arms extending to the girders on either side are being proceeded with. The middle cantilevers at Inchgarvie are about halfway up.

**Terry's Theatre.**—The new theatre for Mr. Edward Terry, on the site of the Occidental Tavern, Savoy-buildings, Strand, has been commenced. Messrs. Holliday & Greenwood have obtained the contract at a reduced tender of 13,857. Messrs. Doulton and Messrs. Wilcock & Co. have orders for executing the terra-cotta and glazed tile work. Messrs. Battiscombe & Harris have been entrusted with the carton-pierre. Messrs. Matthew T. Shaw & Co. have the ironwork in hand. The hydrants and fire appliances have been put into the hands of Messrs. Rose; the whole of this portion of the work has been arranged under the special supervision of Mr. George Harrison, A.M.I.C.E. Sir Seymour Blane's fire-resisting paint will be used for all exposed woodwork. Messrs. Wilkes & Co. have received the orders for the Eureka concrete. The whole of the works are being carried out under the superintendence of Mr. Walter Emden, architect. Mr. Egan is the clerk of the works.

**Dumfries and Galloway Antiquarian Society.**—At the meeting of this Society on the 1st inst.,—Dr. Grierson, of Thornhill, presiding,—the secretary (Mr. J. Wilson) read a communication regarding a cup-shaped urn recently found at Greystone, in the immediate vicinity of Dumfries. It had been found when digging out an old landmark, known as "The Grey Stone," believed to have been one of a Druidical circle, and which had been buried for a long time. The cup is of red clay, hurned, unglazed, 2½ in. high, 1½ in. in diameter at the base, 3 in. at its widest part, and 2½ inches at the mouth, and is ornamented with three rings and a row of dots. No trace of a larger urn was discovered, although this was obviously of the type occasionally found accompanying larger cinerary urns belonging to the bronze age. Dr. Anderson, Regius Keeper of the National Museum of Antiquities in Edinburgh, who had been communicated with on the subject, recommended further careful examination of the spot, being of opinion that it might possibly be found to have been a small cemetery. Mr. Coles, of the Hermitage, Tongland, read a long and copiously illustrated paper on recent discoveries of cup and ring markings on stones in Kirkcubrightshire. He stated that they had in one small district in the parish of Kirkcubright six out of the seven types of these ancient markings described by Sir J. Y. Simpson (four of them being found on one stone at Dunrod), and also several new ones. The only type not found in the district was the spiral. On a stone on the farm of High Banks could be traced an elaborate design, and composed of central cups and rings of cups or cupped circles. The lecturer was not aware that anything approaching this, either in elementary form or in symmetry of arrangement, had ever before come to light. Oblongs and segments of circles were also discovered, and an oblong hollow surmounted by a four-square groove; and a cast was exhibited of an arrangement of cups and lines, being apparently a primitive attempt to represent a tree. The recorded localities in the Stewartry in which such markings have been found now number nearly thirty. Mr. Coles shortly noticed the various theories advanced to account for these archaic sculptures, which are assigned to the Stone Age, and inclined to the belief that they are of symbolic character.—*Scotsman.*

**Art at the Merchant Venturers' School, Bristol.**—Some eighteen months ago the managers of the Merchant Venturers' school opened a department for the teaching of art. Mr. John Fisher was selected as head of the department, the object of which is to teach art of a practical character,—applied art,—and to give instruction, to quote the words of the prospectus relating to the class, "calculated to meet the requirements of architects, wood and stone carvers, decorators in plaster, art workmen in pottery and terra-cotta, designers and modellers in cast metal, chasers and engravers in silver and hrouse, artificers in ornamental smiths' work, and those engaged in surface decoration of every kind, and of both sexes, in the hope that it may prepare them for remunerative employment in applying art to industrial pursuits." Modelling of the figure is also taught, and classes are held in the day and in the evening. The results hitherto of this practically new art feature in Bristol are (according to the *Bristol Times and Mirror*) most encouraging. To begin with, Mr. Fisher had half a dozen pupils; now he has nearly seventy. On the 1st inst. the work of the students was arranged in one of the classrooms for the inspection of a few friends of the students, previously to its despatch to South-Kensington, where it will be placed in the national competition.

**York City Surveyorship.**—At the meeting of the York Town Council on Monday evening last, the Streets and Buildings Committee recommended the Council to accept the resignation of Mr. Styan as City Surveyor, and to appoint him as Consulting Surveyor to the Corporation, at a salary of 100l. per annum for the remainder of his life. The Council unanimously adopted this recommendation, and discussed at some length the question as to whether the salary of Mr. Styan's successor should be 300l. or 400l. a year. Ultimately, after several resolutions had been put and lost, it was resolved that the Committee should be instructed to advertise for a City Surveyor, at a salary not exceeding 400l.

PRICES CURRENT OF MATERIALS.

Table listing prices for various timber types such as Greenheart, Teak, Fir, and others, with columns for quantity and price.

TIMBER (continued). Table listing prices for Box, Turkey, Gatin, St. Domingo, Porto Rico, and Walnut.

METALS. Table listing prices for Iron, Brass, Lead, and other metal products.

GILS. Table listing prices for Linseed, Coconut, Ceylon, and other oil products.

TENDERS.

BICKLEY.—For building additions to Logs Hill, Bickley, for Mr. A. Machin. Mr. H. Appleton, architect.— Arnaud & Son (accepted)..... £334 0 0 [No competition.]

BROADSTAIRS.—For the erection and completion of a dwelling-house at Coney Nook, Broadstairs, for Mr. Blackwell, jun. Mr. B. L. Edgar, architect:— C. Home, Ramsgate..... £285 0 0 C. Collins, Ramsgate..... 840 0 0 J. H. Forwalk, Ramsgate..... 752 2 0 Newby Bros., Ramsgate..... 655 16 0 H. Miller, Ramsgate..... 620 0 0 J. T. May, Broadstairs..... 632 0 0 W. W. Martin, Ramsgate..... 688 0 0 R. Starke, Broadstairs..... 560 0 0 G. M. Dawson, Broadstairs (accepted) 567 0 0

BROMLEY (Kent).—For rebuilding Napier Laundry and dwelling-house, Napier-road, Bromley Common, for Messrs. Emery & Co.:— Arnaud & Son (accepted)..... £1,037 0 0 [No competition.]

BROMLEY (Kent).—For building additions to Westfield, London-road, Bromley, for the Messrs. Clarke. Mr. W. B. Mallet, architect:— Arnaud & Son (accepted)..... £681 0 0 [No competition.]

DOVER.—For additions to the Convalescent Home for Working Men, St. Margaret's Bay, near Dover. Mr. George Simmonds, architect, St. Margaret's, Twickenham:— J. J. Wise, Deal..... £298 0 0 C. Kent, Easton-road..... 238 10 0 H. Stiff, Dover..... 277 0 0 Johnson & Co., Dover..... 243 0 0 H. Richardson, Dover..... 235 0 0 W. J. Adcock, Dover..... 235 0 0 G. H. Denne & Son, Deal..... 228 0 0 W. J. Wiles, Dover..... 218 0 0 Geo. Lane, Dover..... 210 0 0 Wm. King, Dover..... 210 0 0 W. & T. Dennis, Upper Walmer..... 209 0 0 W. G. Claysen, St. Margaret's, near Dover..... 182 0 0 Anstis & Lewis, Dover (accepted) ... 175 0 0

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Table with columns: Nature of Work, By whom required, Premium, Designs to be delivered, Page. Includes Jubilee Memorial, Chichester.

CONTRACTS.

Table with columns: Nature of Work, or Materials, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes Making-up and Paving Roads, Erection of Boundary Walls, Infectious Diseases Hospital, etc.

PUBLIC APPOINTMENTS.

Table with columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes Surveyor, Bishop's Stortford L. B.

FULHAM.—For the erection of the new Fulham Town-hall and offices, for the Vestry. Mr. Geo. Edwards, architect, Queen Victoria-street. Quantities by Messrs. Widnell & Trollope, Parliament-street:—

Table listing tender amounts for Fulham Town-hall project, including Hart, Ashford, Priestley, Stephens & Bastow, Flew, Martin, Wills & Co., Kirk & Randall, Higgs, Avis, Ward & Lambie, Lucas, Messum, Turtle, Higgs & Hill, Brass, Parrell & Son, Stevenson, Gould, Steer, Smith, Howell & Son, Prestige & Co., Nightingale, Edgington & Co., Balsam, Braid, Chappell, Schwabner, Wall, and Treasure & Son, Shrewsbury.

\* Accepted.

NOTICE.—THE BANNER SANITATION CO. beg to give Notice that having sold over 10,000 BANNER'S PATENT VENTILATORS, also a proportionate number of other Sanitary Appliances, and wishing to keep pace with the times, they have decided to reduce the prices of their goods from 25 per cent. to 40 per cent., thus offering to the public the best appliances at the lowest prices.

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# The Builder.

Vol. LII. No. 236.

SATURDAY, APRIL 16, 1887.

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### Bristol.



THE appearance of the second of this series of volumes has been speedily followed by the third.\* As in the second we had the work of Dr. Freeman, one of the editors, so in this volume we have the authorship of the other editor. Both works have, therefore, additional interest, since in them the editors having the care of the series set before us some of their own views of the aims and objects of the whole.

Each of the cities or towns whose histories will be related, as we have already seen in our notice of the City of London,† are chosen as having special features different from those of others. On this account, Bristol has been selected, and selected with judgment, out of some others, since it owes its place in our national history from its having been the greatest purely trading town in a country that owes its greatness to its trade. It was second only to London for many centuries. Bristol history is different from that of London in an important essential. We are told that its history does not begin until a period that seems almost modern. The first fact that can be referred to does not take us further back than about the year 1000. This fact is one which we owe to the science of numismatics. It is, in reality, the existence of a silver penny of that king of Saxon England with the inglorious name of Ethelred the Unready, struck at Bristol.

We have, therefore, this as a starting-point, that at the period indicated the town had risen to be of sufficient importance to hoast the existence of a Royal Mint in its midst. Of its earlier history there appears to be no record. There are, however, some indications to be derived from its position, its name, and some other circumstances which merit attention. Their consideration will, we think, furnish sufficient evidence to warrant the belief that the site of Bristol must have been occupied for many ages; and they might have been dwelt upon with advantage in the pages before us. Its position seems mapped out for the site of a town. Standing on the banks of a wide river, the Avon, whose British name has survived to our own day, as have also those of so many other rivers, it is surrounded on two other sides irregularly by the Frome, the approach being from the east by a tongue of

some what elevated land between the two rivers. Roughly speaking, this, the original form of the town, is nearly the plan of the British and Romano-British town of Exeter\* over again, while the similarity is still greater, from the position of the castle and the crossing of the main streets in the centre of the town at a carfax. In Bristol the course of the city walls is more curved to follow the irregularities of the site than at Exeter, and the main road does not pass in at the east and out again at the west. Although there is a western road it led only to the marsh; the main road turns at right angles at the carfax and goes over the Frome to the north. Speaking, therefore, from the analogy of the plan, we are inclined to believe that Bristol occupies a very ancient site. The name points in the same direction, for we are told that it appears in its earliest form as "Briegston," or fenced place at the bridge. This name is, doubtless, older than the formation of the Mint, and it gives us one more indication of the beginnings of the town. Other circumstances also help our inquiry, which may be briefly noted. Mr. Karlake has shown us that the name of the British Saint Ewen appears in the dedication of one of the churches in the centre of the town. The name of another, St. Brendan, is associated with a high hill near the town. Another of the churches, as at Exeter, is called after the early Saxon Mercian St. Werburgh. There is again, here, as at Exeter, and in so many others of our most ancient towns, a remarkable group of churches close together, in what must in all probability have been the portion of the town which was occupied the earliest, while they are further apart in those portions that are known to be of the latest formation. When we come to inquire for the records of the foundation of these buildings, however, we find nothing. Lastly, although the Castle of Bristol, strong as was its building, and extensive as was its site, is so completely swept away that only very few traces of its existence remain above ground, yet there are historical evidences that ought to make us pause before we assent to the popular belief that it had no existence until founded in Norman times. It appears that there is no historical record of such pre-existence known. There is, however, evidence that it had a lofty earthen mound. The existence of this peculiar feature in our ancient castles has received much attention of late years, and research has rendered it more than probable that these mounds are the remains of the defensive works of Saxon date, afterwards used by the Normans. Some few years ago there were notices in more than one public journal of the

discovery of a series of subterranean passages, which were then supposed to extend to a great distance beneath the town. We have turned with interest to the volume before us in the hope that some critical notice would have been rendered as to the importance or otherwise of the discovery, since it might have some bearing upon the interesting subject of the antiquity of the town. We are sorry that there is no notice whatever of the subject, either to disprove or to attach importance to it.

Be the antiquity of Bristol, however, ever so great, as we believe it to be, this in no way militates against the choice of the history of the town for the purpose of rendering a record of how trade, and trade alone, has caused the place to rise from obscurity to the position of one of the most important towns in the kingdom. This aim our author keeps steadily before him, and his task is evidently a congenial one. To ourselves it is matter for some regret; for the history of a place which has been developed by trade, and whose records are of bold mercantile effort and voyages to distant regions, does not of necessity render so many indications having relation to architectural art as the readers of our journal may care for. On this account, we propose to ourselves to briefly run over such points of the history as may be of interest to every one, to dwell upon the rise and progress of the governing powers, to linger longer upon what evidences there are of the buildings upon which the merchant princes spent some of the money which they had acquired by their adventures and success in trade, and lastly to follow our author in his happy idea of devoting a whole chapter to "odds and ends."

The work is illustrated by four maps, one showing the town as it is presumed to have been about 1066. Another shows the growth made in two hundred years, which certainly appear to have been years of rapid development, for not only was a new channel dug between the town and St. Augustine's, for the purposes of mercantile traffic, but the large area of Temple was occupied, extending from Bristol Bridge close up to the north side of Redcliff Church, and defended by wall and ditch. The third plan shows the town, in 1480, as known to William of Worcester. Rockhyth, which is shown as having been enclosed at the period of the former map, appears as defended by a strong wall and towers in the third map, which also indicates the development of an extension eastward, beyond the Castle shown in the former plan, the latter space alone being very nearly double in extent the area of the older part of the town. These maps, together with the fourth, which shows the lines of fortification drawn

\* Historic Towns. Edited by E. A. Freeman and W. Hunt. London: Longmans, Green, & Co. 1887.  
† See *Builder*, Jan. 1st, p. 1.

\* See *Builder*, p. 337, ante.

around the city during the troubles of the Civil Wars, render very graphic evidence of the growth and increase of the city. They have been prepared by Mr. A. S. Ellis, not from ancient plans, but from historical evidences. A comparison of them affords interesting evidence with respect to the curious grouping of the churches, to which we have already referred. We have ventured to believe that those in the older portion of the town are of ancient foundation, and in this respect they agree with what we have already spoken of in our notices of similar groups in London and Exeter. Here at Bristol their early foundation seems supported by additional evidence of another kind, and it is this: whatever circumstances may have occurred to cause the erection of a number of churches so close together that there were actually three fronting one another at three of the four corners of the carfax, and several others within almost a stone's throw, yet these circumstances did not exist in so marked a degree when extension was made to the area of the town.

The added districts are vastly larger than that which is shown in the map of Bristol, circa 1066, and, as we have seen, these additions were made mostly before 1250.

If we turn, however, to the map dated about 1480, where all the churches are marked, we shall find that the period from about 1066 to the latter date, which is supposed to have been a church-building age, seems to have done little for the largely-increased area by the foundation of parishes within them. The eastern district has only a single parish church, St. Philip, while the larger area of Temple has only St. Thomas à Becket, now known as St. Thomas the Apostle, a dedication which sufficiently shows the period of its foundation; and Temple Church, which only grew into a parish church out of the establishment of the Knights Templars on the suppression of that order.

The district around St. Augustine's, Billeswick, has the parish church of St. Augustine-the-Less, the monks of the future cathedral "being unwilling to allow their tenants, whose houses were now probably lying thickly about the precincts, to use their church." As a set off to this, the priory church of St. James appears to have been an example of a class of buildings of rather rare occurrence, although not so frequent as was supposed a few years since, of a double church, the western portion of which is still in existence, being parochial. These instructive maps show us other interesting phases of the means adopted in the middle ages of supplying buildings for worship, and we can trace in them how the system varied at different periods. The more recently settled district between the old course of the Frome, which ran round the town wall and the Red Causeway, originally part of Avon Marsh, has but one parish church, St. Stephen's, but there were several chapelries, while there were a goodly number of these smaller buildings scattered about, including one on the bridge; but the mode of forming new parishes appears nearly to have passed away. The various orders of Friars had their establishments in various positions as their orders grew into being, and there are no less than four examples of churches erected upon the city walls, over or beside the entrance gates.

The history of Bristol is well told, and it will be read with interest by more than residents only, for it is an interesting page of the general narrative of the progress of our country. Indeed, it will be apparent to the readers of the volume before us that the events which have occurred within the walls of the town have been of extreme importance. This may be equally true of every town of our historic country, in greater or less degree; and we cannot but think that the investigation of the part played in the general history of our land by each of its towns may prove to be one of the most fascinating and useful of studies.

The Norman invasion inflicted no injury on Bristol, and the town and its trade continued to flourish all through the troublous times which followed it. Robert Fitz-Hamon, who was made Earl of Gloucester in 1119, appears

to have rebuilt the strong castle erected, it is supposed, by Bishop Geoffrey of Coutances. At any rate, he raised a square keep, the largest in the kingdom, except the keeps of Colchester and the Tower of London, and the building played no unimportant part in the town's history until its demolition shortly after the Civil Wars. Its site is now so completely built upon that only the fragments we have already alluded to are to be traced.

There are many interesting details recorded of the existence from an early period, and of the rise and progress, of the trading communities, with notices of their resistance to the power of the local nobles. We hear of these from the beginning, and of their acquisition of rights and privileges which were confirmed by successive charters,—the rights here, as elsewhere, appearing to have had the prior existence, and to be only recognised or regulated by the charters, instead of being created by them. In Bristol, too, we find how completely, from an early period, the burgesses were able to hold their own against all local lords; and in our author's chapter on the Great Insurrection, as it is styled, their contentions with the Lords of Berkeley, and their resistance to the Earl of Gloucester, who came against the city with 20,000 men, indicate that a different spirit animated the fathers of our towns to that which is apparent in the history of many a trading community on the Continent, where the feudal lords became paramount. The contrast between the history of most of our English towns and those of the Continent is not a little remarkable in this respect, and it indicates that a far greater amount of personal freedom was enjoyed by the burgesses within the shelter of their walls than was the case out of England.

In the famous parley between Aylmer de Valence and the chiefs of the defiant town in 1316, we find the following reply rendered by them:—"Certain men tried to deprive us of our rights, and we defended them, as reason was we should. If, therefore, the king will take off the burdens he has laid upon us, and will grant us life and limb, chattels and tenements, then he shall be our lord and we will do his will; if not, we will go on as we have begun, and will defend our liberties and privileges even to the death." The temper which animated the utterance of such words was not slow to support them with corresponding deeds, and the liberty of the people was in safe keeping.

At Bristol we find the Reeve of Saxons times collecting the revenues, and we are told of the relation of the town to the manor of Barton. In the charters we can trace the creation of the office of Mayor, with his council, and of the right of choice exercised by the burgesses, although this may soon have become more nominal than real. In addition to this, there is evidence of the gradual loss of the popular vote until the selection of the aldermen became in fact lost to the townsmen, the corporation being self-elected and the government of the town a local oligarchy of capitalists who had it all their own way, although they appear to have had the happy manner of avoiding collision with what was a formidable power for mischief, a Bristol mob. "The change was gradual; it grew up during the fifteenth century, though it was not recognised by charter until the reign of Charles II." The history of this charter, and of its being granted just at the close of the reign of Charles II., is told elsewhere in the pages before us. When the old spirit of independence was dormant, Bristol, as well as other towns, had to surrender their old charters by an arbitrary and illegal act of the king's.

Bristol, owing, as it did and does, its existence and its wealth so entirely to its trading pursuits, might be expected to afford in its history, as recorded in the volume before us, interesting records of those important factors in Mediæval life, the trading and religious guilds, and we are not disappointed. The charter of John, while Count of Mortain, granted probably in 1188, fully recognises the existence of these associations, and at an anterior date. It runs thus: "They may have

all their reasonable guilds as well or better than they had them in the time of Robert and his son William, Earls of Gloucester." We may briefly give the following summary of the nature of these guilds. They all had more or less of a religious character. They acted somewhat like the benefit clubs and mutual insurance societies of our own time; each had its patron saint. A common feast and much drinking together were common features. They existed for special objects, in some the religious element being uppermost. The Guild of Kalendars undertook, in addition to other works, those of education and learning; the name, not uncommon, being derived, it is supposed, from the meetings being on the kalends of each month. Women as well as men were members of the various guilds. Our author objects to the generally-received title of craft-guild, as applied to those societies which were associated with specific trades, for the terms "craft" and "guild" express two distinct ideas. He says:—"A craft or mystery was a particular trade carried on by men who had a knowledge of it; a guild was a means of association based on certain acts of religion and mutual help performed at the common cost." This may be well enough, but surely it is hardly supported by our author's statement which follows on,— "the money necessary for these and for all other acts of the society being raised by a rate or *gylde* levied on each of the members." Surely this definition would apply equally to whatever was the nature of the work which the society had to do, and we cannot but think that the generally received name of craft-guilds is a very good one. The trades or crafts took common action to protect their common interests, whether from the hurgher aristocracy, to shut out external competition, or the like. Our author is on more certain ground when he speaks of the trading associations having more of a corporate existence than those hodies, we think more or less cognate, which were of a more voluntary nature. Still, we can but consider that all such communities had their beginnings in voluntary combinations, and that as they grew in wealth and importance they would seek for incorporation, which they would obtain for payment or otherwise. We are speaking of Mediæval times, but these remarks may perhaps equally apply to the growth of earlier societies in Roman times.

No one might exercise his trade unless he belonged to its guild. The guilds had their own halls. Many had their own chapels, and the Kalendars had a free library. Their mass priests were often turned to good account, we suppose, to fill up their time by teaching or such matters. Indeed, the records of some guilds as to the employment of their priest are not a little curious in evidence of the shrewd bargains sometimes made by our ancestors. Our author does not think that there is reason for belief that the guilds had any connexion with the government of Bristol before the end of the twelfth century, although, he says, there can be no doubt that these institutions existed before the Conquest. So far as one of the guilds, at least, is concerned, our author's own evidence appears to point the other way; for he shows that the important function of choosing the mayor and his assistants was exercised by the most important guild of the town,—that of the merchants. If he means that when there was no popular Government in existence, there could be no guild connected with it, then this is obvious enough. But since we find the election of mayor thus exercised, it appears evident that some sort of government did previously exist before mayors are heard of, and that it was exercised by the principal body, the recognition of government being acquired by it but as a continuance of its already existent powers. The earliest reliable charters are addressed to the burgesses, and this alone is sufficient to show that some sort of associated body of men was already in being. In some cases elsewhere, which are named, the municipal privileges were conferred on the merchant guild, by the terms of a charter, and in these cases there is direct evidence of the governing character of the guild, and also, it must be added, of its prior existence.

The objection taken to the name of craft-guilds is supported by evidence that while all the guilds were suppressed in the time of Edward VI, yet the crafts continued to exist as incorporated societies. May it not rather be that the parts of such societies which were devoted to superstitious usages were suppressed, leaving the remainder intact? The societies which were thus mostly concerned with the finding of money for masses or the like ceased to exist, while the others remained. In London we find much evidence of the suppression of the obits and chantries founded by the various trading or craft guilds, which societies, however, continued to exist notwithstanding.

The various crafts at Bristol, which were inguiled to the number of twenty-six, as in other towns exercised their callings each in its own district. Thus the weavers were established in Temple fee; their guild chapel, dedicated in 1299, still stands against Temple Church. The tuckers or fullers were in Tucker-street, the butchers in Bocherew, the cooks in Cooks-row. The bakers had their hall adjoining the Dominican Priory. The names of the patron saints of several of the guilds have been recorded, and they are curious. Thus, the tailors called upon St. John the Baptist, the bakers St. Clement, the weavers St. Katharine, while the merchant guild appears to have had St. Clement and St. George.

The merchants of Bristol engaged largely in church-building and other like good works. William Canynge the elder, as is so well known, rebuilt a great part of St. Mary Redcliff. John Shipward built the fine tower of St. Stephen's, while the almost equally fine tower of St. Werburgh's appears to have been built at about the same time. The removal of this beautiful monument is not mentioned, nor is any passing remark made as to its re-erection elsewhere.

The recent removal of a great number of the old timber houses of the city, which gave so characteristic an appearance to the older streets, is also unrecorded. But then the volume before us has many passing allusions to matters less architectural, although of no little public interest. Passing onward in our hasty sketch of this volume, we may say that it is replete with references to old-world customs and past events, some of momentous interest, as are those relating to the discovery of America, the planting of New England, and the siege of Bristol in the Civil Wars. Some are but of local interest, as are those of the private warfare of the nobles, the tossing of dogs and cats on Shrove Tuesday, the whipping of thieves, the use of the pillory and ducking-stools; this latter machine of punishment having been used for the last time in 1718. The Mayor's presence at duck-hunting and at the preaching of the boy bishops, the performance of Bristol mysteries,—all come in for passing mention. The continuance of trade, and its fluctuations, are ably treated, well-deserved censure being meted out to the traffic which existed in slaves in early as well as in recent times,—meriting condemnation even by the not too nice Judge Jeffreys in 1685. The soap, the woollen trade, the success of privateers fitted out by Bristol merchants, the building of ships,—all these are mentioned; as are also some of the great merchants, such as Canynge in early times, and Colston in later ones, while the use of sledges for the transit of merchandise is noted. The foundation of the cathedral on the suppression of the monastery is only briefly alluded to, but it appears that the old nave and aisles had been removed for rebuilding prior to the latter event, a work only recently accomplished, and not altogether unlike the contemplated design which has been preserved to us.

We have now said enough to show that the volume before us is of no little interest, and that it forms a worthy addition to the volumes which have preceded it, and we may conclude with two brief extracts:—"Looking back on the history of Bristol, as a whole, we can see that, while the career of a trading town during the Middle Ages was marked by attempts at isolation and was fostered by exclusive privileges the national life of England

has happily been strong enough to make the prosperity of such a town part of the general welfare of the country, and that in tracing its fortunes we have been reading an important chapter in the history of the English people." "While the wiser of her citizens do not look forward to a future in which she will outstrip cities and towns which, though some of them in comparison with her are but of yesterday's growth, have now left her far behind, they have reason for their confident expectation that the commerce of their ancient city will continue to grow and flourish, and that she has a career before her not wholly unworthy of her glorious past."

ON THE THEORY OF THE ABANDONMENT OF ANCIENT LIGHTS.\*

BY GEO. H. FOWELL, BARRISTER-AT-LAW.

FROM these examples it surely follows that if "to abandon" means to cease to use, then the above principle, which requires the position of the new window "substantially to coincide" with that of the old one, is based on a fiction, and that the application of it must constantly produce absurd and (it is submitted) unjust results. Yet it will be observed that learned judges continue to apply it, while, almost in the same breath defining the prescriptive right as a right to a certain "cone" of light, or to the enjoyment of certain specific pencils of light, the access of which has been enjoyed for the requisite number of years. But these pencils of light must come from some part of the sky area, and in so far as they come from a portion of the sky area not intercepted by the new aperture, in so far the new aperture does not enjoy the same light, is not "lighted in the same manner," and finally does not "correspond" (in any sense relating to light) to the aperture of the original window. To refer once more to fig. 3, which we reprint for the convenience of our readers. Surely nothing could be clearer than that *cd* (and not *ef*) is the aperture in the new wall which corresponds, so far as is possible (in respect of the light intercepted by each), to *ab* in the old wall. If the plaintiff's light were derived from an area equal and exactly opposite to *ab* on the surface of the wall of the servient tenement, then and then only could the aperture *ef* be said to "correspond" (in the above-mentioned sense) to the aperture *ab*; for in that case, and in that case only, would identity in position involve identity (so to speak) of light.†

Now, without denying that a principle based on a fiction (legal or otherwise) may sometimes be practically useful, is it not possible here to apply one which is based upon facts, and which would yet afford a sufficiently clear test of the rights attached to the dominant and servient tenements respectively?

The result of the above considerations is this, that a prescriptive right to light having been acquired in respect of the aperture *ab*, over the obscuring horizon at *g*, the owner of the servient tenement is restricted in the exercise of his *prima facie* right to build as he pleases by two lines of limitation shown in fig. 4.

(1.) Below the level of the obscuring horizon *g*, he cannot advance his building (supposing him to have on other grounds the right to advance it) beyond the line *gb*—*gb* representing one side of the sectional volume of light, § *gop*, illuminating the window, *ab*.

(2.) Above the level of the obscuring horizon, *g*, he cannot raise his building (supposing him to have on other grounds the right to retire it, and to raise it) above the line *ga'*,—*ga'* representing (in section) one side of the inverted pyramid shown in fig. 1 A, whose base represents the intercepted area of sky. He can, for instance, advance his building below the present horizon *g* (fig. 4) to the point *n*. He can raise it above the horizon *g* to the

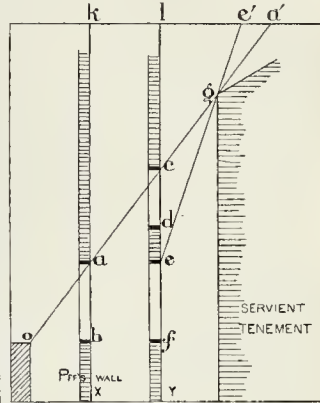


Fig. 3.

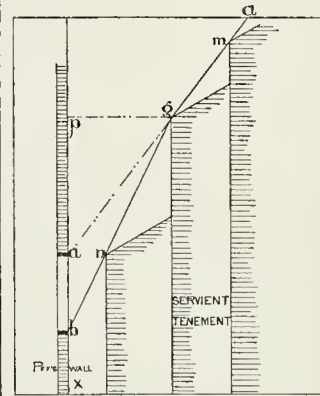


Fig. 4.

point *m*. But he can do no more than this. And the positions of the lines of limitation *ga'* and *gb* are (it is needless to observe) always easily determined, depending, as they do, on the angles which *ga*, *gb* (straight lines drawn from the obscuring horizon to the top and bottom of the window respectively) make with the straight line *ab*.

The above being the restrictions imposed on the defendant in the enjoyment of his property, it only remains to add that (assigning but its ordinary common-sense meaning to the term "abandonment") whenever the plaintiff so changes the position of his window that it becomes possible for the defendant to advance or to raise his building beyond either of the aforesaid lines of limitation without interfering with the enjoyment by the plaintiff of whatever of his original prescriptive rights he still continues to enjoy, the defendant can so advance or raise his building with impunity.

Now to return to the questions originally propounded, and to answer them on the principles above laid down.

(1.) When for the original window *ab* is substituted\* a window at *cd* (fig. 3). Here there is no abandonment, since whether we consider the prescriptive right to be a right to

\* Continued from p. 539, ante.

† See remarks of Bowen, L.J., referred to above, and *passim*.

‡ It will be observed (fig. 3) that the aperture *cd* is smaller than the aperture *ab*. If it were not so, *cd* would, of course, intercept a larger area of sky than was intercepted by the original aperture, *ab*. But this would confer on the plaintiff an advantage which he would have no right to retain, and of which the defendant could at any moment, before a fresh period of prescription had elapsed, deprive him. In practice, the plaintiff would often take his chance (since the decision in *Tapping v. Jones*, q.v. ante) of acquiring a new right. We are here considering only the continued enjoyment of his old rights unimpaired.

§ Shown as applied to a horizontal skylight, in fig. 1 B.

\* In this and the following examples, the original window is, of course, assumed to have been blocked up when the new light is opened.

the enjoyment of certain specific pencils\* of light, or a right to intercept (in the manner shown in fig. 1 A) a certain area of sky, the plaintiff is in either case, so far as is compatible with the change in the plane of his wall, in the same position as he was before.

The defendant's rights are similarly unaltered. He is still entitled to advance his building to any point on the line  $g b$ , or to raise it to any point on the line  $g a'$ . He cannot do more than this without obstructing the passage of light which used to fall upon the original window  $a b$ , and now falls upon the new window,  $c d$ ; and on what ground could he be justified in doing this?

(2.) When for the original window  $a b$  is substituted one in the (so-called) "corresponding" position  $e f$ . In this case there is an abandonment of the enjoyment of all the light coming from the sectional area of sky between the points  $e'$  and  $a'$  (fig. 3). At least all the said light (which certainly was used before) is now used no longer; for it is clear, if the sectional area  $e' a'$  were the only luminous part of the whole area  $k a'$ , that, while a window in the position  $a b$  would be lighted, a window at  $e f$  would receive no light from the sky at all. There being, then, to a certain extent, an "abandonment," how far does this affect the defendant's rights?

It is surely of the essence of the theory of "abandonment" that these rights (in the case supposed) should be enlarged in so far and only in so far as those of the plaintiff are, by his acts, shown to be "waived." *Prima facie* if he ceases to enjoy a right he may be taken to have "waived" it. In any case the defendant cannot be deprived of his previous right to build up to any point on the line  $g b$ , as, for instance, to raise an obscuring horizon at the point  $n$  (in fig. 4). Now it is clear that a window "in the same position" as  $a b$  (in the advanced wall) might be totally obstructed by an obscuring horizon at  $n$ . So far the plaintiff would only have incurred a loss by his own act, but the defendant gains something. Whereas he could previously raise his building (above the horizon  $g$ ) to any point on the line  $g a'$ , he can now raise it to any point in the line  $g e'$ , since, as we have seen, the light from the area between  $e'$  and  $a'$  does not reach the plaintiff's window in its new position at  $e f$ , and there can be no reason why the defendant should not obstruct the passage of that which the plaintiff, through his own act, no longer enjoys, and for that very reason has no longer a right to enjoy.

(3.) When supposing  $e f$  to be the original window, there is substituted for it a new window in the same plane, in the position  $c d$ .

Here the original "line of limitation" below the obscuring horizon  $g$ , would be a line drawn from  $f$  to  $g$ .† But since the plaintiff has, by the substitution of his new window,  $c d$ , for the old window,  $e f$ , relinquished the enjoyment of all light passing below an imaginary line  $g d$ , there has, therefore, been an "abandonment," *pro tanto*, an "abandonment" of something affecting the defendant's rights. The latter may now advance his building to any point on the line  $g d$ . But he cannot do more than this without obstructing the passage of light which the plaintiff enjoyed before and is still enjoying.

But the same, or rather a larger area of sky, is intercepted by  $c d$  than was intercepted by  $e f$ . But this, as has been already explained, cannot impose any further restriction on the defendant. He has still the right to raise the servient tenement (above the horizon  $g$ ) to any point on the line  $g e'$ .

(4.) Still supposing  $e f$  to be the original window, for which a new one (in another plane) is substituted in the position  $a b$ . In this case the line of limitation below the obscuring

horizon  $g$  will be advanced to  $g b$ , for similar reasons to those given in the last case, and (also as in the last case) the defendant may still raise his building (above the obscuring horizon) to any point on the line  $g e'$ .

(5.) Lastly, supposing  $c d$  to be the original window, and a window in the same plane in the position  $e f$  to be substituted for it. Here there is indeed a practical abandonment. It only remains (as in the said case, *ante*) for the defendant to take advantage of this. The plaintiff has moved his window into a position where the acquired line of limitation,  $d g$ , is of no use to him, since the defendant, by raising his building, as he had always a right to do, to a point on the line  $d g$ , might totally obstruct the new window at  $e f$ .

This case, therefore, requires no further consideration. The plaintiff has, so to speak, advanced into the defendant's territory, and if he loses by this step has clearly only himself to blame.

It will be seen that of the above five propositions the greater part are directly contrary to the law as at present applied. Yet they all result from the consistent application of a perfectly simple principle, which, moreover, finds a considerable amount of support (implied if not express) in many judicial expositions of the law of ancient lights. The inconsistency (as it is submitted to be) in these expositions, taken as a whole, which suggests the adoption of such a principle, may be shortly summarised as follows:—

It is unquestioned that, according to existing law, when the plane of a wall is advanced or retired the prescriptive right existing in favour of a window in the old wall is held to be retained in favour (only) of a window in the new wall, substantially "in the same position" as the original window.

But when we inquire why this is so, the answers are various, though all equally unsatisfactory.

In one place we are told that it is because the two windows are lighted "in the same manner." But any meaning which can be assigned to this rather loose expression involves an untruth, since both the total amount of light received\* and its angle of incidence are in each case different. In another place what is perhaps the same idea is expressed in more definite language. The new window, we are told, enjoys the same "cone of light" and receives "the same pencils of light." This explanation is even more openly repugnant to common sense and common observation. "The same pencils of light" (assuming the obscuring horizon to be above the level of the window), unless they follow a zig-zag course like that of a flash of lightning, could by no possibility reach the two windows, and the "cones of light" in the two cases are not even similar cones. Therefore, if the object really desired is that the new window should be lighted in a similar manner, or in as nearly the same manner as possible (in respect of pencils, cones of light, and intercepted area of sky), as the original window, then to put the new window "in the same position" relatively to the wall as the old one, is to go out of our way to avoid the attainment of that result.

In fact, if the prescriptive right be a right to the enjoyment of light (as it is universally described) and not a right to the enjoyment of a window in a certain position, the present law, under the pretence of preserving the exercise of that right, in fact insists on its abandonment. The owner of the dominant tenement is constantly held to have abandoned that which he still continues to enjoy, and as often to have preserved his prescriptive right (strangely enough) by giving up the enjoyment of it. Surely such confusion in the theory of the law is not unavoidable. It has been said that a Court of Justice will not listen to elaborate mathematical calculations, and it is, no doubt, in the highest degree desirable that the rules governing the acquisition and destruction of this most important of "urban servitudes" should be clearly intelligible not only to the judicial but to the ordinary lay mind. But if a mere observation of well-known facts

and obvious phenomena provides us with an intelligible test, should we not accept it?

Whether or not the above suggestions contribute to the attainment of such a result the desideratum clearly is this,—That, given the dimensions of the window in the dominant tenement and the position of the obscuring horizon, we should be able at once to lay down a definite line of limitation, any material transgression of which by the owner of the servient tenement, except in so far as such transgression interfered with the enjoyment of that which the owner of the tenement had elected no longer to enjoy, would constitute, *ipso facto*, a breach of the prescriptive right.

#### NOTES.

**T**HE evidence given by Mr. R. N. Boyd, as quoted in our last number, as to the state and prospects of the Panama Canal, should be compared with that given by M. Rodrigues, in September, 1885, by M. Bigelow, in April, 1886, and by M. Beyerler, in October, 1886. One hundred and twenty millions of cubic metres, according to Mr. Boyd, remain to be excavated,—figures which fairly tally with those cited by the other writers on the subject. At the maximum rate of progress yet attained, this will require at least ten years to effect; and the present incidence of interest and sinking fund is one million and a third sterling per annum. The total cost of the canal is estimated by M. Rodrigues at 108 millions, if completed in 1894; by Mr. Boyd at 128 millions, if completed in 1897; and by M. Beyerler at 136 millions, if completed in 1896. The last figure amounts to more than three millions sterling a mile, or fifteen times the cost per mile of the Suez Canal. These figures are for the most part taken from the Reports of the Panama Canal Company. The *Bulletin*, however, ceased to publish the grand totals of excavations executed, in January, 1885. M. Beyerler states the amount at 16 millions of cubic metres excavated up to October, 1886, leaving 134 millions of cubic metres then untouched. The sum for which the Company are now responsible is a little over 59 millions sterling; made up from original capital, 12,000,000*l.*; three loans, 24,747,740*l.*; and new obligations, issued at a rebate of 55 per cent., 18,352,080*l.* How the remaining sixty or seventy millions are to be raised has not been indicated. The terms on which the new obligations are issued are significant.

**M**UCH has been either done or promised during the past few weeks in furtherance of various projects for providing open spaces in London. Before the end of next June the Metropolitan Public Gardens Association will have finished the laying out of certain areas as follows:—Haverstock Hill Playground (one acre); All Saints' and St. Clement's Grounds, Notting-hill (one acre), and the disused burial-grounds of the parish church of St. Dunstan (seven acres), and Holy Trinity, Stepney (one acre and a half). Miss J. Durning Smith undertakes to defray the cost, 620*l.*, of converting the churchyard of St. Anne, Limehouse (four acres); another lady contributes 500*l.* in aid of laying out the closed burial-ground of St. George, Camberwell (one acre), together with a recreation-ground at New Cross. Edward-square, Islington, is to be similarly dealt with, and Mr. J. R. Knight pays for the new gymnastic appliances in the East London Cemetery Playground at Ilford. On May 11th the Countess of Lathom will open a playground in Winthrop-street, Whitechapel, purchased for 2,300*l.*; and the Duke of Westminster has offered to take over Ebury-square Inclosure (half an acre) and to maintain it on behalf of the public. The Metropolitan Board have agreed to advance 1,600*l.* towards the works which are about to be jointly carried out by the St. Pancras Vestry and the London and North-Western Railway Company at the St. James' burial-ground, in Hainpstead-road (three acres); they have also granted a loan

\* *I.e.*, to pencils from a specific point in the sky area,—inclined at any specific angle to the vertical. This is presumed to be the meaning of the expression used in the judgment above mentioned, of Bowen, *L.R.* (see 31 Ch. Div., at p. 572).—The pencils of light which had passed through the original aperture, &c. But pencils of light falling upon two windows in the position  $c d$  and  $e f$  respectively (see fig. 3) must of necessity either come from different points in the sky area, or differ in their angle of incidence; whereas a considerable number of identical pencils would pass through  $a b$  and  $c d$ .

†  $g f l$  would represent the original volume of light illuminating  $e f$ , as shown in section.

\* Which varies as the intercepted area of sky.

of 1,160l. to that same vestry for the throwing open the disused Holy Trinity grave-yard (two acres) in Gray's Inn-road, together with sundry small plots of land at Highgate. It is further anticipated that the burial-ground of St. George-the-Martyr, Holborn, will shortly be thrown into one with the adjacent grave-yard of St. George, Bloomsbury, that was lately opened mainly by the exertions of the Kyrle Society.

THE Hammersmith Vestry, supported by the Metropolitan Board of Works, presented a Bill to the present Parliament for securing Ravenscourt, or Scott's, Park, Hammersmith, as a recreation-ground for the public. But pending the passing of the Bill, we hear that the ground, whereof the estimated value exceeds 50,000l., has been sold into private hands. The enclosure is one of the finest in the neighbourhood of London, and is justly famous for a beautiful avenue of elm trees.

THE room of archaic sculptures in the Louvre has been in part re-arranged, and that to considerable advantage. The statue known as the "Hera of Samos" has been placed in the centre, the only part of the room which is adequately lighted. Every portion of this remarkable and,—in its archaic fashion,—beautiful piece of work can now be examined with comfort. The head of a Laphis belonging to the sixth metope in the British Museum is now enclosed in a glass case at a convenient height. It will be remembered that the head was acquired in 1880, but not identified till much later, by Dr. Waldstein. A cast of the portion of the Parthenon frieze of which the original is in the Louvre is now placed in the archaic room, where the original also stands. The cast—to which we have previously drawn attention—used to stand in the Ecole des Beaux Arts. Its value consists in the fact that it was apparently taken from the original before the heads were lost. In the cast all these, with the exception of one, are intact. At the same time, it is within the limits of possibility that the heads in the cast are restored.

A NEW species of philanthropy, in the shape of Sanitary Aid Associations, seems to be developing throughout the country and in the metropolis. These associations are principally composed of clergymen and ladies, who visit the dwellings of the poor and inculcate the importance of practising sanitary precepts. A movement has been set on foot in Richmond, headed by Lady Russell, to establish an association of this character, and some enthusiastic clerical members of these organisations on the south side of the Thames have posted notices on their church-doors inviting persons in whose houses are sanitary defects to apply to them in order that steps may be taken to have such defects remedied. Although these sanitary philanthropists will find their work in this respect much more delicate and disagreeable than the giving of alms or the preaching of sermons, yet there is undoubtedly room and need for the operations of such associations among the poor. The regular religious visitor sees many insanitary sights, which necessarily escape the view of the inspector or the medical officer, because the law only gives the latter limited powers of initiatory entry and inspection; and a regular system of frequent house-to-house visits would involve an amount of work which only a vastly increased sanitary staff throughout the country could undertake. Such associations may be useful in a special degree in the early discovery of cases of overcrowding, in the notification of infectious diseases, and in assisting to carry out the necessary precautionary measures of isolation and disinfection. The recent fatal case of overcrowding at Chiswick, where two children out of five were suffocated by the impure air of the bed-room in which they slept, was one which could hardly have occurred if an efficient Sanitary Aid Association had existed in the parish, because, though the house appeared externally large enough to amply accommodate the family, death of furniture and clothing had compelled the family to huddle together in one bed-room.

The visitor of the Sanitary Aid Association is much more likely to find out such a state of things than the sanitary inspector or medical officer.

EFFORTS are being made to revive the Southwark Children's Mission by re-building, at an outlay of 2,000l., what is known as the Rowland's Old Castle School, in Castle-yard, a *cul-de-sac* leading westwards out of Holland-street, Bankside. Established by Rowland Hill in 1802, this is reputedly the first Sunday School opened in London, and Castle-yard is considered as the parent home of the subsequent Ragged School movement. The hekkaidetagonal edifice in Blackfriars-road, long known as Rowland Hill's, or Surrey Chapel, but now serving for an agricultural engineers' warehouse,—was opened for worship on Whitsun-day, June 8th, 1783. Here the Rev. Rowland Hill (he had taken deacon's orders) ministered for fifty years. Dying in the parsonage-house adjoining thereto, on April 11th, 1833, he was buried beneath the pulpit, on which occasion his nephew, Lord Hill, Commander-in-Chief of the Forces, acted as chief mourner. After an interval, Hill was succeeded in the Surrey Chapel by the Rev. James Sherman, who in turn was succeeded by the Rev. Newman Hall, who remained here for more than twenty-five years. On July 4th, 1876, his congregation migrated to their new quarters in Westminster Bridge-road, at Christ Church, which, together with the adjacent Hawkstone Hall and Lincoln Tower, had been erected for them at a total expense of 64,000l. Hawkstone Hall was so named from Hill's birthplace, his family's ancestral seat near to Shrewsbury. On April 14th, 1881, Hill's remains were removed to Christ Church. The Primitive Methodists took over old Surrey Chapel, but, failing to secure a renewal of the lease, celebrated a final service therein on the night of Sunday, 20th March, 1881. For their use has been undertaken the erection of a new chapel, close by, and to face towards Blackfriars-road, on the freehold-sites of Nos. 190-2; to which we briefly adverted in our number of February 27th, 1886. Surrey Chapel had been renowned for its organ, built by Elliot. The pulpit we mention was frequently occupied by such eminent Dissenters as James Parsons and Jay, together with the Evangelical churchmen Berridge, Henry Venn, and Thomas Scott, disciples, like to Hill, of Whitefield. This historical chapel, indeed, may he not inaptly regarded as the Westminster of Nonconformists.

THE "British Coffee House," in Cockspur-street, now in course of demolition, was designed about 1770 by Robert Adam. The front is a fine piece of red brickwork, beautifully jointed, the vase in the niche on each side of the large central window being also a good specimen of such work. An elevation, now before us, carefully drawn and shaded in Indian ink, according to the practice of the time in architects' offices, and stated to be from the office of the architect, shows a front of 20 ft., of four stories, including the ground floor, surmounted by a balustrade, and being 46 ft. in height. The centre part on each floor is formed of a large Palladian window, 19 ft. 6 in. wide, divided into three by columns, perhaps projecting one-half diameter. This is recessed between piers, each 5 ft. wide, having an entrance in each on the ground floor. On the first floor is the niche, as above stated, and a small plain window to each of the upper floors. The vases are not shown in the drawing, but one is slightly sketched in pencil. It is to be regretted that so ornamental a specimen of the school of the brothers Adam is being demolished.\*

MR. F. VULLIAMY, the uncle of the late Mr. George Vulliamy, writes to us in reference to the obituary notice of the latter which appeared in the *Builder* of November 20

\* Cunningham, "Handbook of London, 1850," states that "The British coffee-house was kept in 1759 by the sister of Bishop Douglas, so well known for his works against Lauder and Bower, and was then, and indeed, long after, much frequented by Scotchmen. It is now principally used for temporary public meetings."

of last year, to say that it was not Mr. George Vulliamy's father who sank the first artesian well at Norland House, but his grandfather, the father of our correspondent. Mr. F. Vulliamy adds a word in reference to the portrait of the late Architect to the Board of Works, which we published in the same issue of November 20 last year, and which he says is an excellent likeness.

THE house in Fetter-lane at the corner of Fleur-de-lis Court, which is about to be pulled down, has an inscription on the front to the effect that John Dryden resided there. Mr. Saintshury, in his *Life of Dryden*, notices the popular belief that Dryden lived there, but states that he can find no ground for this belief. The house is old and is probably contemporaneous with the poet, and there are some features, particularly the lions' heads, which incline one to think that it may have been designed by Captain William Winde, of Bergen-op-zoom, who had a considerable practice during the Restoration.

A SMALL pamphlet, prepared by Mr. James Thropp, County Surveyor of Lincolnshire, by the direction of the County Authority, containing "Suggestions to Surveyors of Highways on the Management of main Roads and other Highways," contains a great deal of practical advice in a concentrated form. We have some doubts, however, as to the statement that "the practice of picking up and loosening the old surface before spreading a new coat of materials on a road is productive of no good whatever." We should certainly expect that it would aid in the incorporation of the new material with what then becomes its foundation. Mr. Thropp deprecates the frequent annual change and retirement of Surveyors of Highways in some quarters, and urges that their work would be much better done if the same surveyors were to retain the position for some years. We quite concur in this view, if the surveyor means business and does not intend to be only an ornamental official. He can only have begun to know his district and its peculiar conditions in the first year.

THOSE who are not prepared to go to the expense of lighting their houses by electricity, and who, perhaps, think the time has hardly arrived yet when this system of lighting can be advantageously adopted as the general system for private houses, may now, however, utilise electricity to assist them in lighting their gas. Messrs. Woodhouse & Rawson have patented a system whereby gas can be turned on and lighted, and turned off, by electric agency, from any convenient position, irrespective of the position of the gasfittings. They say, "the principle of the attachment is analogous to that of the portable electric gas-lighter, now so well known, i.e., the gas is lighted by an electric spark; but the general arrangements are for permanent fitting." The application is in various forms; by the automatic gas-lighter, the gas may be turned on, lighted, or turned off, by pressing a push button. By the "hand lighter" the gas is lighted by a pull at the end of a pendant chain, after the gas has been turned on by hand in the usual manner. This appears to us rather a pleasing toy than a serious convenience; at least it is hardly worth while to have a special electric mechanism merely to light the gas. The automatic turning on and lighting may be very convenient, as it obviates the necessity of reaching up to gas taps which are not within easy reach, and avoids the chance of burning ends of matches or other lights falling on the tables or carpets. Of course the electric power for this purpose does not require a dynamo, or the expense would be entirely disproportionate to the result; a battery similar to those used for electric bells will answer the purpose. The system requires careful fitting by skilled hands, however; and whether many persons would think it worth while to have an extra system, with its extra chances of getting out of order, for the mere purpose of lighting their gas, remains to be seen. Most persons

who are particular about the manner of lighting their houses, and have money to spend on it, are now avoiding gas to great extent in their residences.

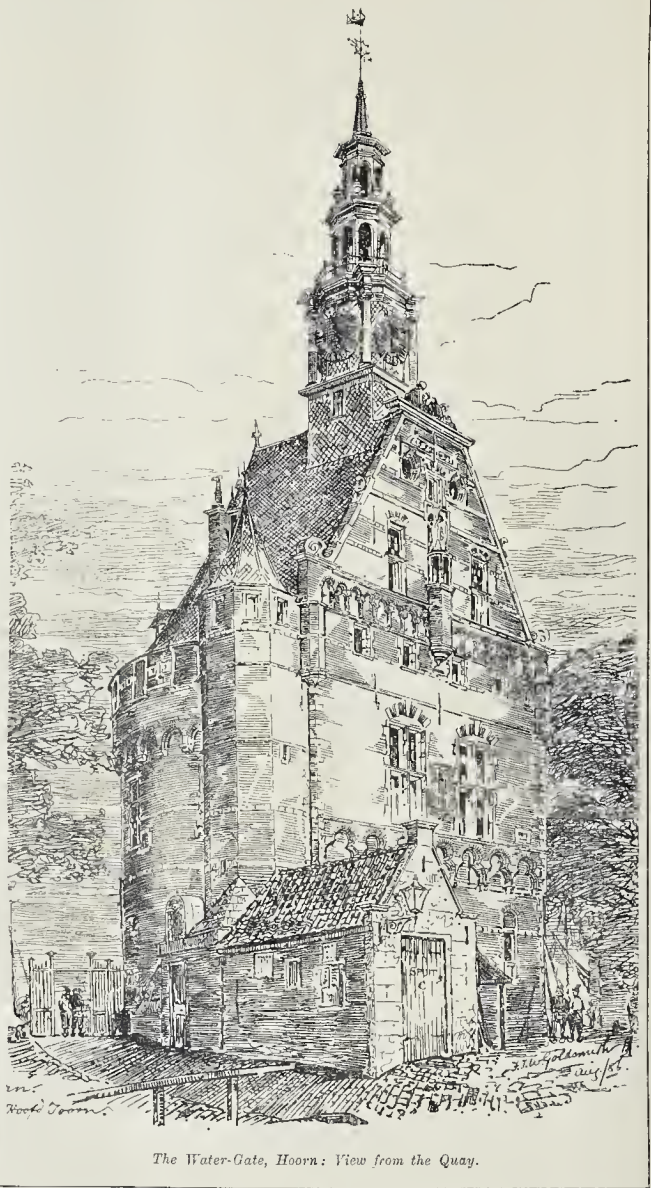
#### SCIENTIFIC OPINIONS ON LONDON SEWAGE.

The recent debate on the disposal of sewage sludge, at the Institution of Civil Engineers, extended over four evenings; and no fewer than thirty-seven gentlemen, the names of most of whom are well known in connexion with the subject, took part in it. Unanimity of opinion is, of course, out of the question. Neither do the regulations of the Institution admit of what is often the most useful result of a debate, namely, a division on some definite issue. But the value of the discussion is not to be discredited for these reasons. The speakers have put on record the most matured views of the different schools that they represented, and the reader may, at all events, have the satisfaction of reflecting that he is in possession of the last utterances of science, much as he may desire that they were more definite and more harmonious.

The motive of the debate appears to have been the endeavour, on the part of the chemical advisers of the Metropolitan Board of Works, to justify the proposal to boat the solid impurities which they may extract from the sewage of the metropolis into the open channel. Sir Robert Rawlinson, who represented the sceptical side in the debate, asked if the Board of Works could be really serious in proposing to barge away to sea a thousand tons of sludge per day, or 365,000 tons per annum. But Mr. Dibdin, the Chemist of the Board, admitted that this large quantity was less than a fourth part of that with which he proposed thus to deal, a quantity which he put at 4,620 tons per day, or 1,686,300 tons per year, for a volume of sewage one-sixteenth less than that now discharged into the Thames.

The essential point, to the inhabitants of London and to those interested in the commerce of the Thames, of what is to be effected by the present scheme of the Board of Works for the purification of the river, was, however, almost entirely blinked by the various speakers. Mr. Dibdin stated that the average London sewage at the outfalls contains 87 grains of foreign matter in the gallon, of which 27 grains are in a state of suspension and 60 grains in a state of solution. Assuming this to be the case, it follows, from the well-known analyses of which we have a large supply, that some 15 grains of suspended matter must either have been dissolved during the run of the sewers, appearing at the outfall in solution instead of in suspension, or that about the same approximate quantity had been deposited in the sewers by the way. The latter supposition is in accordance with the evidence, brought before the Committee on the drainage of the Houses of Parliament, as to the cost and nuisance involved in clearing out the Metropolitan sewers by hand. At all events, it is highly desirable that the chemical constitution of the sewage as collected in London should be ascertained so as to compare with its state at the outfalls.

Of yet more urgent importance is the question, What is the character of the effluent to be delivered into the Thames after the treatment now proposed? It is extraordinary to find no statement of this important feature of the case. Over the broad average of those cases of which the analyses are accessible, the mean result of the various modes of treatment employed has been the removal of about nine-tenths of the matter in suspension, accompanied by an increase of the matter in solution. If this rule applies to the London sewage, as described by Mr. Dibdin, the result of the precipitating process will not very materially benefit the Thames. The remark of Dr. Edmunds that all matters in solution are free from infectiveness, is one that is in contradiction to the views of every other speaker in the debate. That the difficulty of dealing with dissolved impurities is far greater than that which occurs as to suspended matter, is evident from Mr. Dibdin's table, which shows the different effects of the same dose of lime applied to, as far as appears, the same kind of sewage. This is shown to remove, in one instance, two per cent., and in another twenty-six per cent., of oxidisable matter in solution. With such wide differences, not as stated by opposing authorities, but in the same table, it is evident that all discussion is entirely in the air without some



The Water-Gate, Hoorn: View from the Quay.

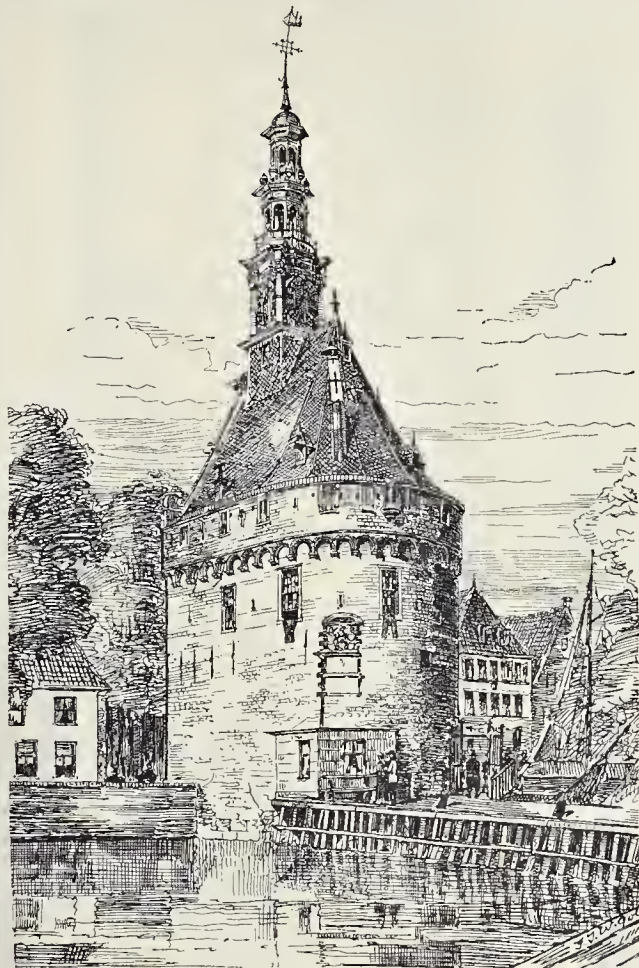
definite statement as to the effluent actually produced by the process which throws down 4,620 tons of sludge per day, although removing only 337 tons of dry foreign matter from the sewage.

To another point of primary importance an equal want of due attention was betrayed in the debate; that is, the secondary action of any such admixture of lime and salts of iron as is now proposed by Mr. Dibdin. As to this there is ample evidence. Mr. Latham stated in the debate that "at Northampton iron salts were used in the proportion of  $4\frac{1}{2}$  grains per gallon to 15 or 16 grains of lime, with the result that the river was as foul after treatment as before. The sewage at the outfall works was made to appear clear, and the river seemed to be inoffensive; but after it had flowed a short distance, it began to turn, and was soon as black as ink, one putrefying mass." Nor is this experience confined to Northampton, or to the action of either per-salt or sub-salt of iron on lime. At Bradford, at Clifton, and at Cheltenham the same thing has occurred,

chloride of iron being used in some instances, and sulphate of iron in others. Before a vast expenditure is incurred for a process which Mr. Latham says "he knew from personal experiment" would be ineffective for good, it is surely important to show that due care has been taken to prove that, for some yet undiscovered reason, it will not be effective for mischief.

Sir Robert Rawlinson, Mr. Bailey Denton, Mr. Jacob, Mr. Melliss, Dr. Edmunds, Dr. Angell, and Dr. Tidy concurred with Mr. Latham in the view that the proposed treatment of the metropolitan sewage was altogether inadequate. What we want, however, is not to be driven to count, or even to weigh, opinion against opinion, but to balance facts against facts. That a small quantity of lime in solution may be more effective than a much larger quantity in suspension is not a new discovery. Whether Mr. Dibdin has or has not allowed enough is a matter that will have to be brought to the test, not of opinion, but of fact. But that reaction of a most offen-





The Water-Gate, Hoorn: View from the Jetty.

THE WATER-GATE, HOORN:  
VIEW FROM THE QUAY.

THE water-gate of Hoorn is a most picturesque building, whether seen from the narrow quay or on the other side, from the jetty run out into the waters of the Zuider Zee. The elevation towards the quay is the most ornamental, and is built of a warm red brick, a white stone being used sparingly in the string and window jambs and mullions. The upper part projects slightly over the lower at the level of the trefoils (of chamfered brick and stone), just above which are two deeply-recessed mullioned windows, with a small niche between. In the centre of the gable is a small oriel or look-out, surmounted by the arms of Hoorn,—a horn,—and at the top, immediately under the cornice, are two dates, 1552 and 1631,—the latter that at which additions were made and repairs done.

The turret at the side of this gable is quite plain, and the window openings at the top, except one, have been built up. Beyond this turret is the circular end of the gate, seen better in the view from the Zuider Zee. A dark and dangerous way it is up to the tall flèche on the roof. In the flèche is the usual one-handed clock, and in the upper part bells; the whole is crowned by a gilded model of a ship, perhaps one of Schouten's, who first doubled Cape Horn, or Hoorn; or one of Abel J. Tasman's, both natives of this once busy but now dead city.

VIEW FROM THE JETTY.

This side of the gate is built of stone in narrow courses; the only brick used is in the circular corbels to the upper part of the chimney-stack. The stonework is joined abruptly to the brickwork; bands of the stone are carried round to the turret on the other side.

The lower part towards the sea is plain, and only relieved by a tablet with the arms of Hoorn, and three windows with a few masonry holes; but the upper oversailing part has a quaint little oriel or look-out, and many shuttered openings, from which, no doubt, many anxious and joyous faces have watched the coming and going of their own strong fleets when Hoorn built ships which beat the Spanish admirals and sailed up the Thames.

There is another gate, the east gate, but it is not nearly so interesting, and is made hideous by the generous use of white and red paint.

F. T. W. GOLDSMITH, A.R.I.B.A.

PICCADILLY CIRCUS.

THE *Daily News*, in a leading article, on Friday in last week, rejoices at the prospect of the Metropolitan Board of Works erecting a fountain on the vacant site in Piccadilly-circus, but opines that all who are concerned would be glad to know that the fountain to be set up was a fountain of water. Our contemporary, enlarging upon this idea, acknowledges that Piccadilly-circus is not altogether the best place for setting up a haunt of the Naiads, and is even willing to allow that it may be a site demanding something of a compromise between Nature in her most artless and unsophisticated forms, and Art in its stiffest and staliest phases, only it should be a fair compromise, and proceeds to lay down as a postulate that which nobody will be disposed to deny, that a fountain should be "a type and emblem of all that is glowing and generous and never-failing in its bounty," and gives some general directions as to the manner in which the fountain should be designed. We are informed that no decision has as yet been arrived at with regard to the disposal of the site in Piccadilly-circus which has so long remained an evidence of our want of system in matters appertaining to municipal improvements, except those of a negative character, and that there is not the slightest chance of a fountain being established there. We have no hesitation in saying that the site in question is quite inappropriate for the erection of a fountain, unless the design were treated in a somewhat similar manner to the Fontana di Trevi at Rome, or the Fontaine Ste. Michel or the Fontaine Molière at Paris, that is to say, with an architectural background. In these examples the water overflows from a basin, instead of being forced up in a jet, and this treatment is the most appropriate and effective for fountains in cities.

A fountain which is formed by a jet or jets of

sive nature may take place when small quantities of lime are used with apparently good results at first, is indisputable. At Hertford the exact quantity per gallon now proposed by Mr. Dibdin was applied to a very weak sewage. The result was that the effluent contained absolutely more foreign matter per gallon than the original sewage, and that an abominable nuisance was created lower down the river, at Ware.

What public opinion will expect of the Metropolitan Board of Works, before they make any further heavy demand on the ratepayers, we take to be this: first, to explain what effluent they propose to turn into the Thames; and secondly, to show what proof they adduce that the proposed treatment will not, by the secondary action of lime and iron, leave the river nearly as foul as it was before. If we take the figures cited by Mr. Dibdin, 13 per cent. of 20 grains, that is to say 2 2/3 grains, of dissolved organic matter will be removed from the sewage by the proposed process; add to this 90 per cent. of the total suspended matter, which comes to 24 2/3 grains, and we find that, from a total of 87 grains of impurity, 26 2/3 grains will be removed, leaving the effluent charged with 60 1/3 grains of foreign matter, plus so much of the 4 2/3 grains of precipitant as have not been thrown down. If that be the case, the effluent will still be much fouler than the sewage which, in many towns, has been found to be intolerably offensive. And there remains the question, why will such an admixture of lime and salts of iron as has been found to produce an

intolerable nuisance wherever put in practice hitherto, prove innocuous in the Thames? These are not matters of bohoy or of craze, but questions affecting the health of London, and the safety and salubrity of the Thames. We venture to submit that it will be wiser to reply to them now, than to leave them to solve themselves, under the action of natural law, eighteen months hence.

**An Electrical Smithy.**—The *Newcastle Chronicle*, in a long account of the electric lighting installation at the forthcoming Jubilee Exhibition at Newcastle-on-Tyne, says that it has been proposed to erect a small smithy to demonstrate how iron and steel can be welded by means of heat produced by the electric current. "The village blacksmith is likely to open his eyes wide with astonishment at the information to follow. For instance, it has been found that bars of iron which have thus been welded together, when placed under a testing machine have been found to break at any part rather than at the weld. Specimens of this kind of work will probably be appreciated by many who know the difficulties with which the smith has to contend. To produce a current suitable for this purpose at a considerable distance from the engine-house, it will be necessary to use a transformer, whereby a small current of great electrical motive force can be exchanged for a great current at a correspondingly lower pressure."

water forced upwards requires a sheltered situation to set off its beauties, when

"at its height o'erturn  
It shakes its loos'd silver in the sun,"  
and the ill result of an exposed situation may be seen at the Crystal Palace or Trafalgar-square on a windy day, when the effect of the fountains is completely destroyed.

It is certainly time, however, that something should be done with the vacant site in Piccadilly Circus. We recently published designs by Mr. E. J. Tarver and Mr. Leonard Stokes for dealing with the site and the adjacent property, but these designs, although exhibiting considerable ingenuity of treatment, are too ambitious in character to hope for realisation, and would certainly require an Act of Parliament for their carrying out. The suggestion to ornament the space with a statue, a clock-tower, or a fountain appears to us to be inadmissible. What is wanted is to restore the plan of the circus, and this can be best accomplished by placing a building upon the vacant site. The elevation should harmonise as regards height with the existing buildings, but the design of the existing buildings need not be adhered to. If the building were to consist of an open arcade on the ground-floor the effect would be good and the convenience of the public consulted. We hope we have heard the last of the proposal of the Vestry of St. James, Westminster, to utilise the spot for a gigantic public convenience. Such things are greatly needed at the West End of London, but there is no necessity for appropriating one of the finest and most conspicuous sites in the metropolis for that purpose.

#### LECTURES AT CARPENTERS' HALL: WOOD: ITS CHEMISTRY, ITS DECAY, AND ITS PRESERVATION.

The last of the present series of free lectures was given at the Carpenters' Hall on the 6th inst., by Professor A. H. Church, M.A., on "Wood: its Chemistry, its Decay, and its Preservation." The chair was occupied by Mr. Joseph Freston, Past-Master of the Carpenters' Company.

The lecturer said he could only touch the fringe of so extensive a subject, which was connected with a number of the arts, as well as with the sciences of botany and of chemistry. His treatment of it would be essentially chemical, but he would, at the same time, make his observations as simple as possible, and assume that his audience were not acquainted with the intricacies of chemical language. Having given a description, by means of diagrams, of the growth of wood, and the manner in which the rings and bark were formed, the lecturer added that the bark was a very important factor in connexion with the seasoning and preparation of timber. Experiments had shown the enormous influence exercised by the bark in retaining the moisture of the stem, and allowing the wood to dry slowly. Of some young trees, felled in the month of June, half were harked, and the remainder left in their original condition, the whole being exposed to the air in sheds with open sides. The result was that the harked trees had lost 34½ parts of their moisture in July, 39 in August, 39½ in September, and 39½ in October, so that in one month they had practically lost all the water they could get rid of by exposure to the air; while the unharked trees had only lost 0.41 part at the end of July, 0.84 at the end of August, 0.92 in September, and 0.98 part at the close of October. Thus by a judicious paring of the bark it was possible to regulate the amount of water to be lost by a log of timber, and so to get it to dry with more or less rapidity. Passing on to the chemical aspect of wood, the lecturer said its first constituent was air. When wood was put into water it became, sooner or later, water-logged. The gas contained in wood might be said to be common air, but practically it was not so. Common air contained, roughly speaking, three gases, chiefly nitrogen, which was unimportant from this point of view, besides oxygen, a powerful agent for causing chemical change, and carbonic acid. But these gases were not found in timber in the same proportions as they existed in the atmosphere, there being more carbonic acid, less oxygen, and more nitrogen. The quantity of air was greatest in the driest woods; for when the water went out something else must come in. Water existed as an important constituent of the wood in three states.

It was partially free, as in the sap and the cell contents generally, and even amounted to half the weight of the wood. It took sometimes as many as ten years, even in a comparatively thin piece of wood, before the free water disappeared. Even then there was always some water left, which existed in the second condition, and was termed hygroscopic water, dependent for its quantity on the state of the air. On a dry day, with an east wind blowing, wood exposed to the breeze lost a part of its hygroscopic moisture. The lecturer here exhibited a thin plate of sycamore-wood, varnished on one side, which he had placed in a bottle with a piece of lime half an hour previously, the result being that the unprotected side had lost its hygroscopic moisture, and the wood was slightly curved. By putting a similar piece of wood into a bottle containing some water, the result was that the wood curved the other way. It might therefore be taken that dry air produced the concavity, and moist air the convexity of the wood, and that explained the contractions and expansions which were so annoying in various pieces of joinery under certain conditions of the atmosphere, it being this peculiar hygroscopic nature of wood which was most difficult to deal with. Thirdly, there was combined water, requiring a high temperature to drive it out, and sometimes that could not be done without destroying the wood. Water, therefore, was present in these three forms, and they had to consider two of them in dealing with ordinary timber,—free water, which had to be got rid of before seasoned wood could be had; and hygroscopic moisture, dependent on the atmosphere and the temperature. He would say nothing about the mineral matter of wood, as it rarely amounted to 1 per cent. of the timber, and in pine, deal, and fir was often much less than that in quantity. The real substance of the wood was the organic structure, which the water, gases, and minerals had all helped to build. That organic structure consisted essentially of two substances, which he would term cellulose and lignose. The lecturer here took some prepared cellulose and put some sulphuric acid upon it, when the cellulose quickly disappeared. He next tried the same experiment with deal sawdust, but the acid merely darkened the sawdust. Dr. Hngo Miller, who had paid a great deal of attention to the manufacture of paper from different materials, had determined the proportion of lignose and cellulose in several woods. The following numbers represented portions in 100 in different woods, containing also from 9 to 14 per cent. of water:—

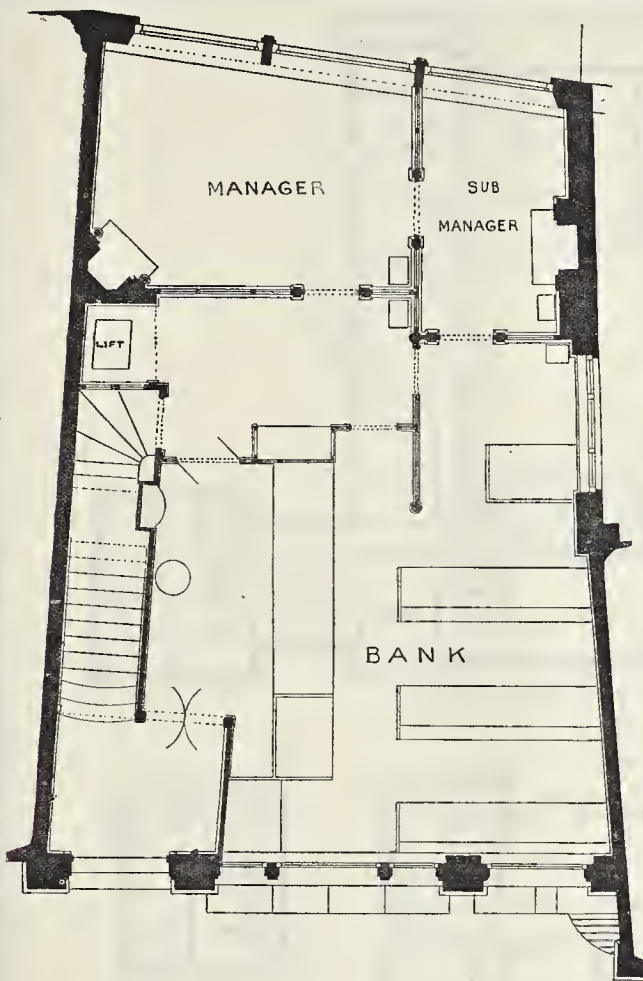
|               | Lignose. | Cellulose. | Extract. | Water. |
|---------------|----------|------------|----------|--------|
| Poplar.....   | 21       | 63         | .....    | 3      |
| Fir.....      | 27       | 57         | .....    | 14     |
| Beech.....    | 23       | 55½        | .....    | 12     |
| Mahogany..... | 28       | 49         | .....    | 12½    |
| Lime.....     | 29       | 53         | .....    | 10     |
| Oak.....      | 34       | 39½        | .....    | 13     |
| Bor.....      | 36       | 48         | .....    | 13     |
| Teak.....     | 38       | 43         | .....    | 13     |
| Beech.....    | 39       | 45½        | .....    | 11     |
| Ebony.....    | 43       | 30         | .....    | 13½    |

The third column consisted of what were termed "extractives." Besides the tissues of the wood there were also the contents of the cells, and these substances were most important. One substance contained in the cells was termed albumen, and was an important thing in the preservation of timber. It was the first substance to decay by any change in the wood, and was the material on which the vegetable and animal parasites fed. If albumen were not present the parasites could not live, or they at least remained dormant and did not multiply; but the moment the albumen was present, accompanied by moisture and a suitable temperature, those vegetable and animal organisms found a material on which to feed. The fibre of the wood was unchangeable unless albumen were present. If, therefore, the albumen was got out of the wood or locked up and made insoluble so as to render it unfit for feeding those minute organisms, the wood did not decay. By locking up those organisms, making the wood poisonous, or saturating it with substances which would not allow the parasites to exist, wood would be prevented from decaying. Professor Church here exhibited a piece of cedar found by Sir A. H. Layard in the small temple at Nineveh, about 2,800 years old. This had been preserved by being excluded to a great extent from the action of the atmosphere, and though the exterior had decayed, the decay had not penetrated to any large degree into the interior. It had suffered some change,

but that change had been arrested or made very slight by the fact that dryness was inimical to the lives of animals and plants which preyed on wood. It was now believed that wood did not decay simply by the action of moisture and air, unless the germs of living beings were also present, and that was the reason why the three classes of materials which prevented decay had been found to be effective. Some of these agents altogether excluded air and water, and were termed hydrofuge substances. A coating of excessively hard paraffin, melting at a temperature of 150 degrees Fahr., excluded all the germs of those minute organisms, and prevented decay. Paraffin was absolutely indestructible, and was unaffected by alterations of temperature or exposure, consequently it offered one of the best materials for the treatment of wood in cabinet or joinery work; and although it slightly increased the inflammability of the material for floors and parquet, nothing was better than paraffin. The second group of substances which prevented the decay of timber were of the poisonous class. Air and moisture might be permitted to penetrate the wood, but by putting minute quantities of chloride of mercury, carbolic acid, acridine, cryptidine, or naphthaline into it, the timber would show no alteration, except that the colouring matter was changed, until the preservative substance had escaped. Then there were substances which were non-poisonous, and not hydrofuges, but which yet prevented decay and paralysed the organisms. A small quantity of the vapour of chloroform, and many other substances, were, without being actually poisonous, able for a time to prevent the decay of wood. On all grounds, therefore, they arrived at the conclusion that timber decayed on account of the presence of living organisms, and not by direct chemical action. The lecturer then touched upon the creosoting of timber, and showed a sleeper (kindly lent, with other specimens, by Mr. S. B. Boulton) which had been in use for twenty-eight years on the London and North Western Railway, the interior of the wood being perfectly sound. Now what was the substance in coal-tar which effected the protection of timber? It had always been supposed to be the creosote,—the so-called tar acids present in the coal-tar. Experiments made lately had shown that although these substances were present in the coal-tar, and were useful in killing the germs and rendering the timber poisonous, so that neither plants nor animals would touch the wood, it was important, if the timber was to be maintained in its integrity, that solid oily substances which were not volatile under ordinary conditions should be present. Prof. Church concluded by saying he had found time to speak only of one or two of the four sections of his subject, but if he had shown that there was something in the chemistry of wood which might appeal to one's ordinary practice, and that a good deal remained to be learned about it, his object in coming there that evening would have been happily answered.

A cordial vote of thanks to the lecturer closed the proceedings.

**The College of Preceptors.**—The new building for this institution in Bloomsbury-square was opened on the 30th ult. by H.R.H. the Prince of Wales. The architect is Mr. Frederick Pinches, and the building and its fittings have cost 15,000l. The style of the new edifice is Renaissance, freely handled. The ground-floor is a few steps above the ground-line; and the façade, which has a breadth of 46 ft., rises to the extent of three stories. The depth of the new building from front to back is 87 ft. The entrance corridor is wide and lofty. On one side of it is a general or club-room for members, and on the other side the secretary's and the clerks' rooms. The Council room is on the first floor. The ceiling is panelled and picked out in colour; and the walls lined to a height of 6 ft. with a polished oak-pannelled dado. The remainder is hung with hand-painted Tynemouth tapestry finished in rich lacquer. Annexed are two smaller rooms, one for the committee, and the other for the officers of the college. The chimney-pieces are of carved oak, and have been executed by the School of Art Wood-carving at South Kensington. The second-floor is wholly devoted to the lecture-hall. Around it are oak book-cases, adapting it also to the purposes of a library. Mr. James Hill supplied all the locks and lock furniture.



Premises of the Commercial Banking Co. of Sydney.—Plan.

room, and guardians' retiring-room, lavatories, and conveniences.

Externally the buildings are faced with best red pressed bricks, with Grinshill stone dressings, the roofs being tiled. Internally all the corridor floors are of concrete, laid with encaustic tiles. The timbers of the board-room roof are partly left to view, panelled and richly moulded. All the internal joiner's work is of pitch pine.

In addition to the open fireplaces provided, the buildings will be heated by employing the excess of steam now generated by the laundry-boilers.

New vagrant-wards, in part on the "separate-cell" system, with caretaker's house adjoining, and new receiving-wards for males and females, are also being erected, from designs by the same architect.

Messrs. Horsley Bros., of Birmingham, are the contractors for the whole of the works. Mr. J. Jackson, of Newcastle, Stafford, has the heating in hand. Mr. Lovatt is acting as clerk of the works.

THE COMMERCIAL BANKING COMPANY OF SYDNEY'S NEW BANK.

This corporation, established in Sydney in the year 1834, has recently constructed new banking premises in Birchin-lane, Lombard-street, of which we give an illustration.

The Birchin-lane front is constructed in Portland stone, with red Peterhead polished granite pilasters and Aberdeen grey polished granite bases.

The building has been designed in a Classic style with somewhat of Greek feeling, in order to give massiveness of character while preserving as much light as was possible under the circumstances of the frontage being to a very narrow street. The rear is lighted from the churchyard of St. Edmund's.

The fittings are throughout in polished fumigated wainscot.

The general contractors were Messrs. Ashby & Horner; the granite was supplied by Mr. A. Nicholson; the constructive ironwork by Messrs. Handyside; the beating apparatus by the Æolus Waterspray Co.; the mosaic work by Messrs. Burke & Co.; the lift by Messrs. Waller & Co.; the strong-room doors and fittings by Messrs. Chubb; and the gasfittings by Mr. Biggs. Mr. E. Roscoe Mullins was the sculptor.

The building was designed and constructed under the direct superintendence of the architect, Mr. W. W. Gwyther.

The Housing of the Poor in Edinburgh.

The question of dealing with insanitary houses in Edinburgh has, it would appear, reached a stage at which it will demand henceforth careful consideration. The Public Health Committee have very large powers of dealing with this class of property. They can (according to the *Scotsman*) summon a proprietor before them, and make him show cause why he should not be called upon to repair the property, or if in the opinion of the Court the houses are past repairing, an order may be issued closing them up altogether. This is only done, however, after a careful report by the Burgh Engineer. In 1885, 309 houses were condemned as being uninhabitable, of which a considerable number were put into decent repair. The rest were either left as they were, or pulled down. Last year the number of such houses reported on was 491, of which 190 were shut up as uninhabitable, while at September last 179 were in course of being dealt with. These houses are of the poorest class, ranging in rent from 30s. to 5s. a year,—the rents being collected weekly. The difficulty which has arisen is in connexion with the housing of the poor people who are dispossessed of their wretched dwellings by the operations of the Public Health Committee. Any new houses which are being built in the poorer localities cannot be let at the same rents, and it would seem that the families who have been turned out of the old houses experience great difficulty in finding shelter. There are several organisations in the city doing something to meet the difficulty, which, it would appear, has been presented to the Public Health Committee in a concrete shape by a report which, it is understood, the Burgh Engineer has prepared on the subject.

Illustrations.

EDINBURGH MUNICIPAL BUILDINGS DESIGNS.

WE give this week plans and elevations of the designs submitted in this competition by Mr. Brightwen Binyon, under the motto "The Heart of Midlothian," and commented upon in our remarks on the collected designs in a former number.

GARRISON CHURCH, STUTTGART.

This church, built a few years since from the designs of Professor Dollinger, is much admired in its neighbourhood, and has not, we believe, been illustrated in England.

It is built of yellow and red brick, with stone dressings, and is vaulted throughout, the actual masonry and brickwork being shown everywhere. The small plan appended shows the general arrangement, and the manner in which the gallery staircases are introduced in the transepts. The nave, which, as will be seen, is planned with side aisles for passage only, is 12 metres wide over all (about 40 ft.). The interior derives a rich effect from the employment of stained-glass windows, as well as the introduction of statues in the niches of the large piers at the crossing. The church seats 1,400 persons.

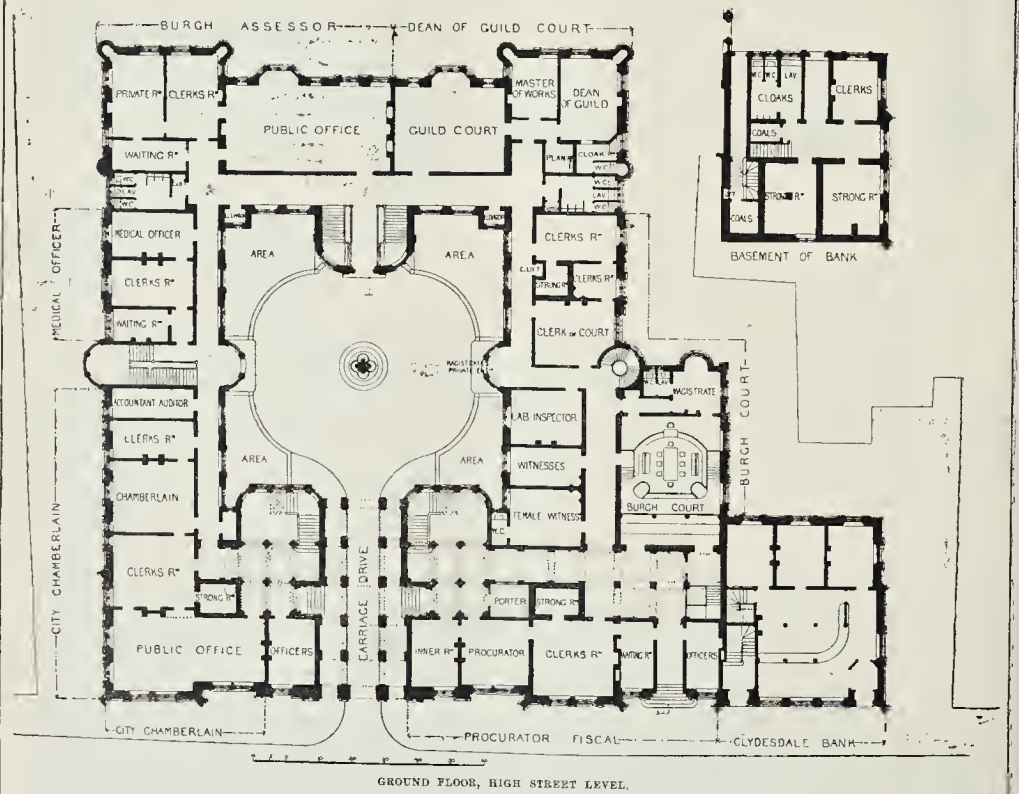
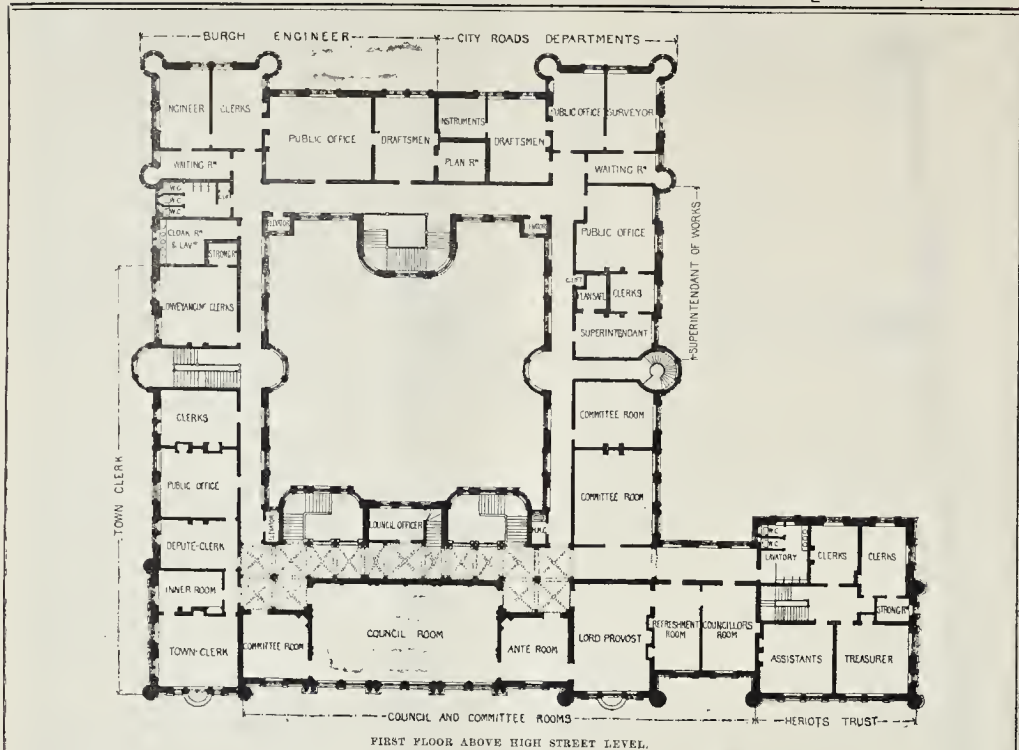
ST. MARGARET'S CHURCH, IPSWICH.

THE drawings which we illustrate to-day are part of a set which obtained the National Silver Medal at Kensington last year for Mr. Harry Percy Adams, of Ipswich; they illustrate a fine specimen of a Suffolk church, containing a beautiful example of a double hammer-beam roof. The church stands on the north side of a large open square facing the town. Among its curiosities is an octagonal font bearing on one side the singular inscription, "Sal et Saliva," on a scroll. On each side of the porch is a gargoyle, that on the west side representing a monk and that on the left a nun.

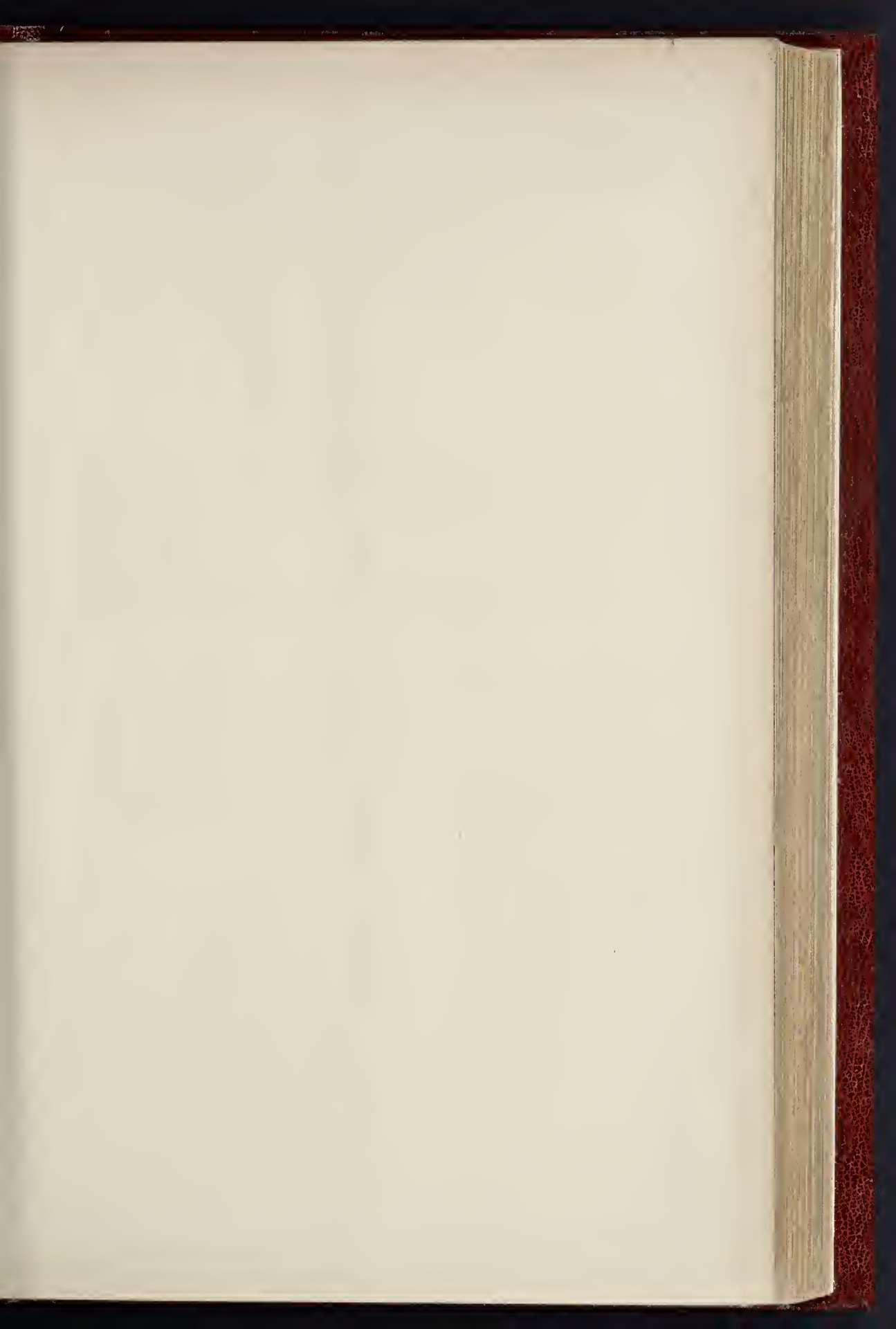
WEST BROMWICH UNION OFFICES.

THE accompanying illustration represents the new hoard-room and relief offices now in course of erection in Hallam-street, West Bromwich, on land adjoining the workhouse buildings, from the designs and under the superintendence of Messrs. Henman & Timmins, architects to the Board of Guardians.

This block of buildings is entirely detached from the rest of the workhouse, and contains, on the ground-floor, separate entrances for the guardians and for the applicants for relief, two committee-rooms, a large waiting-room and relieving officer's rooms, lavatories and conveniences; on the first floor, the board-room, another committee-room, clerks' offices, strong-



Edinburgh Municipal Buildings Competition.—Plans of Design by Mr. Brightwen Binyon.



THE BUILDING, APRIL 13, 1887

THE BUILDER, APRIL 13, 1887

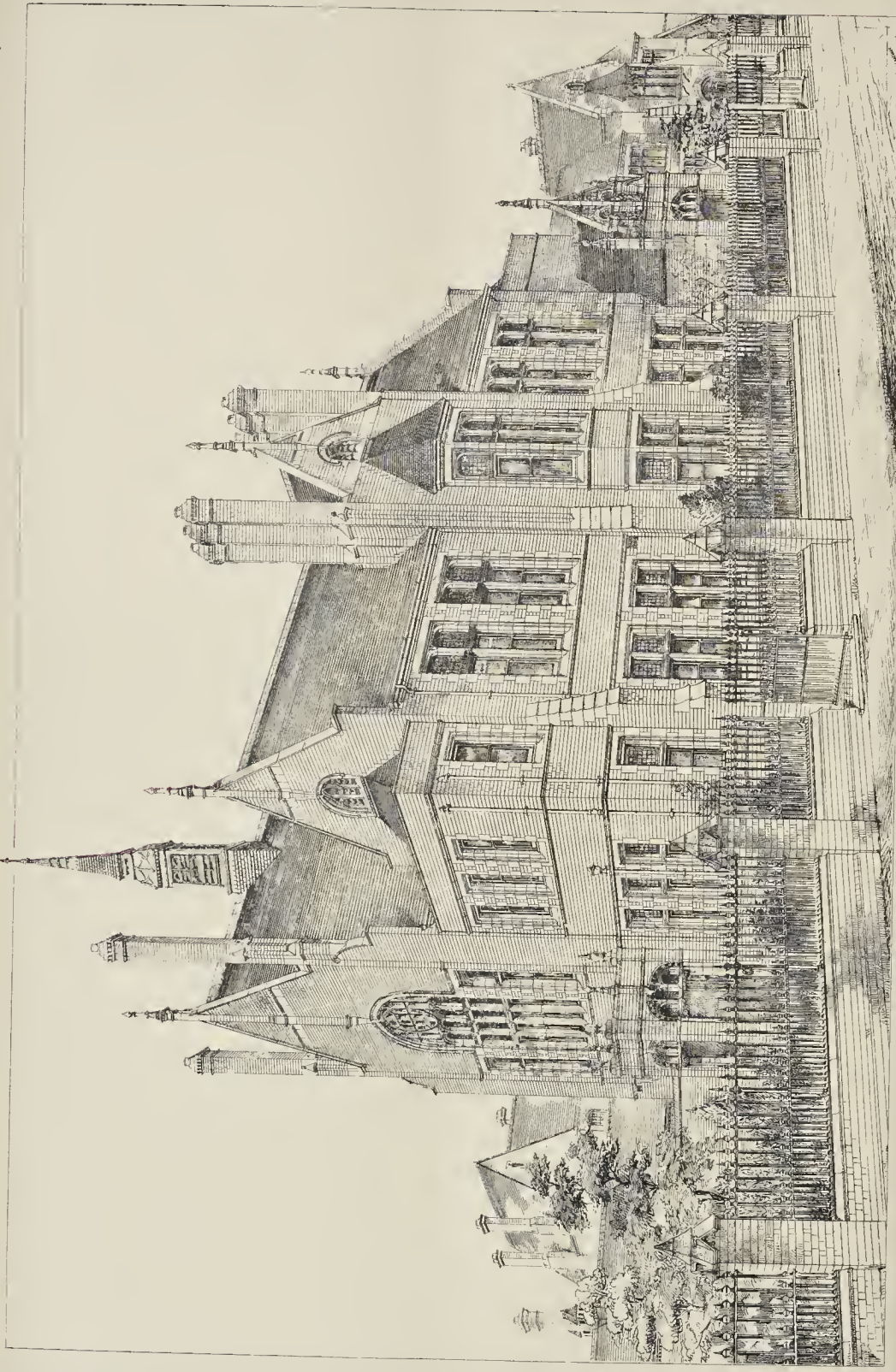


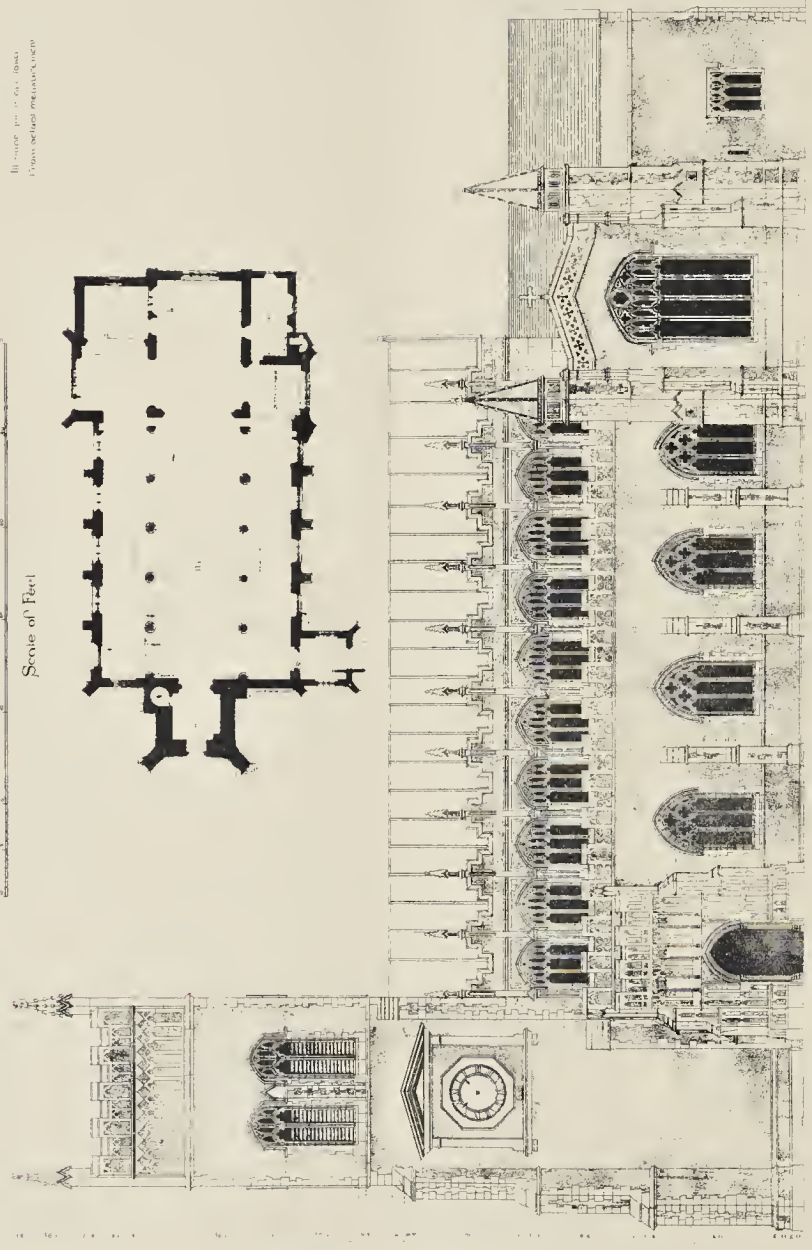
PHOTO LITHO. SPRUCE & CO. 22, MARK LANE, LONDON, E.C.

WEST BROMWICH UNION, RELIEF OFFICES, ETC. Messrs. HENMAN & CO. LTD.



THE BUILDER, APRIL 16, 1887.

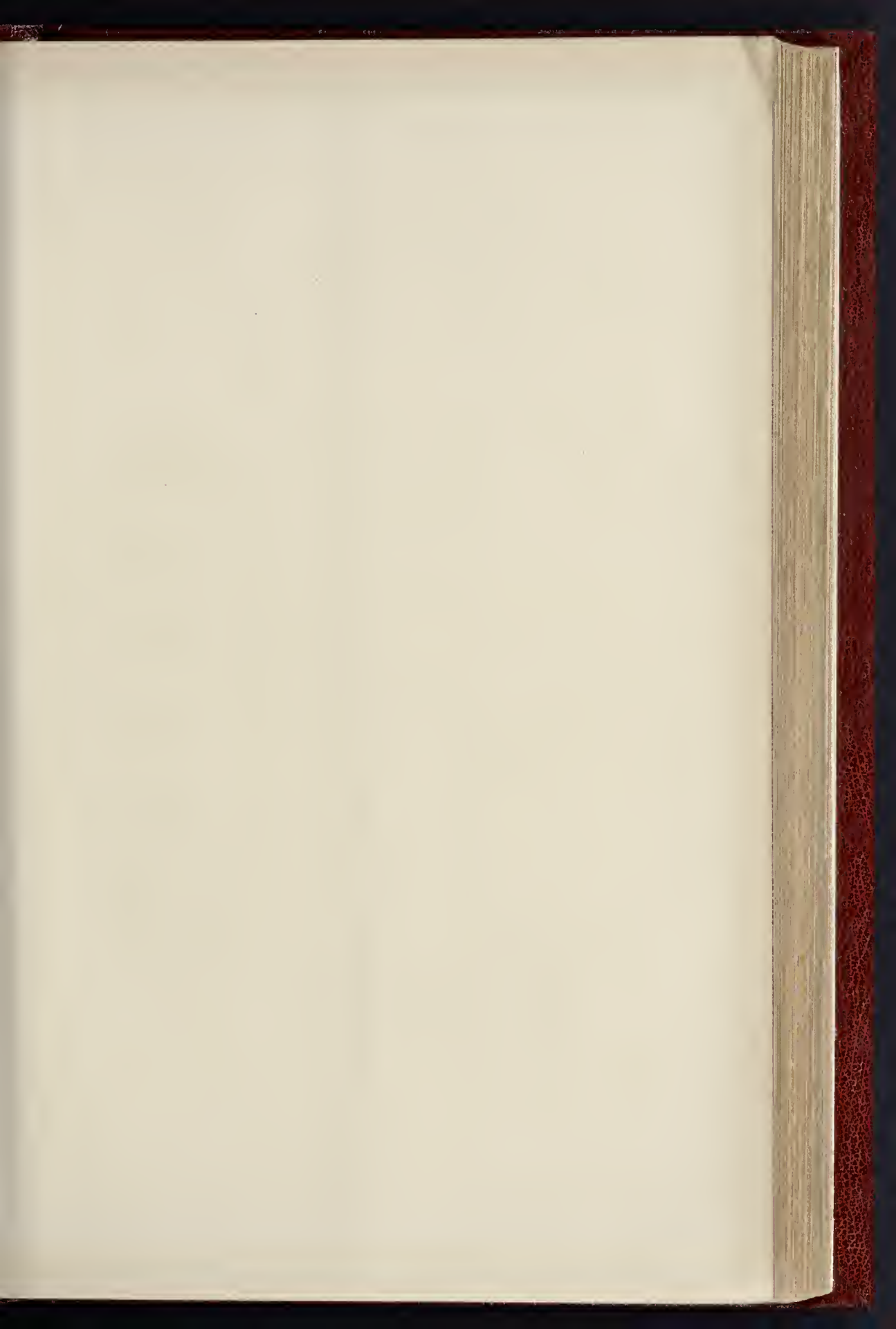
# SAINT MARGARET'S CHURCH, IPSWICH



All measurements in feet and inches.  
Drawing reduced in accordance with the scale.

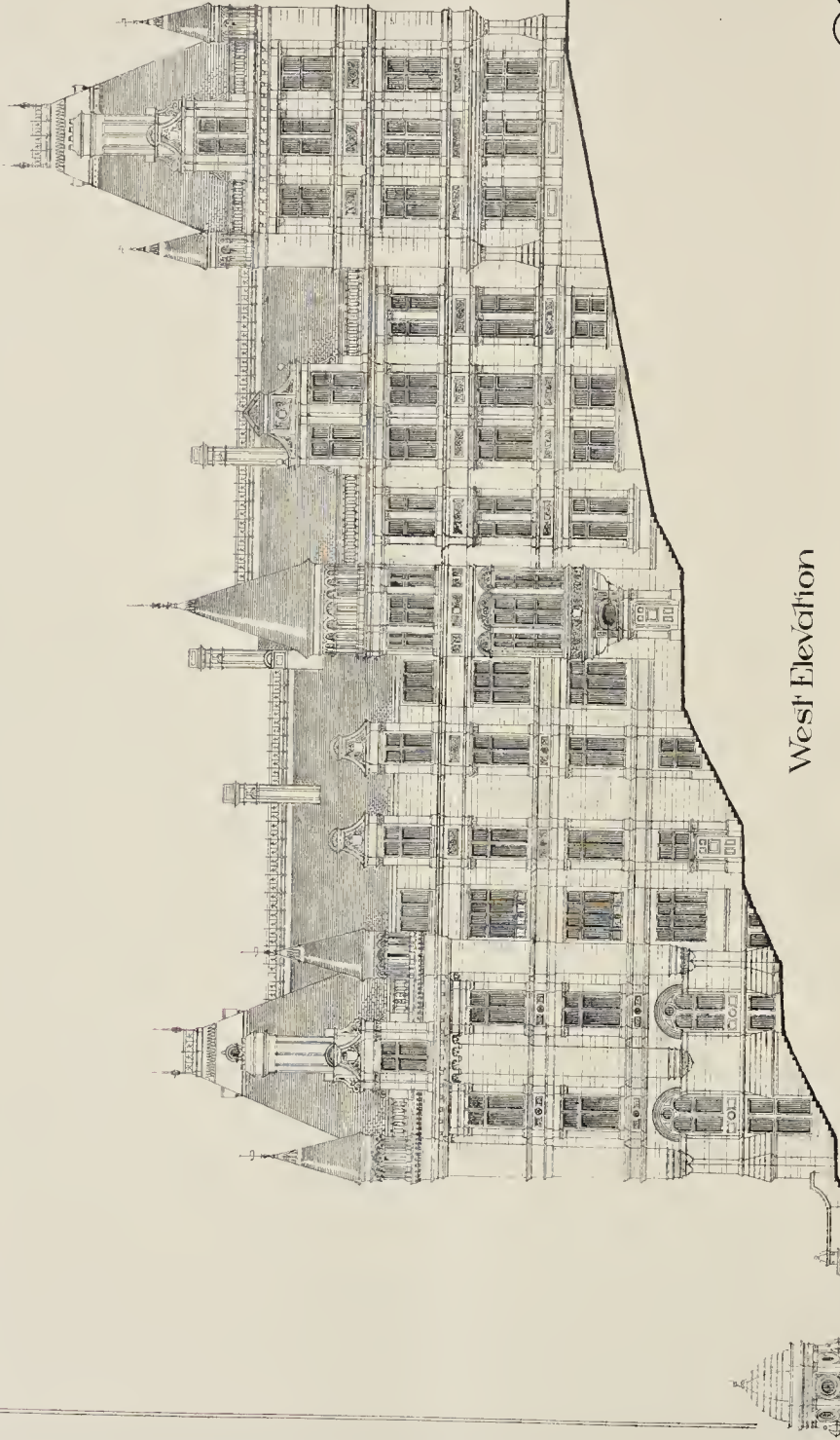
South Elevation





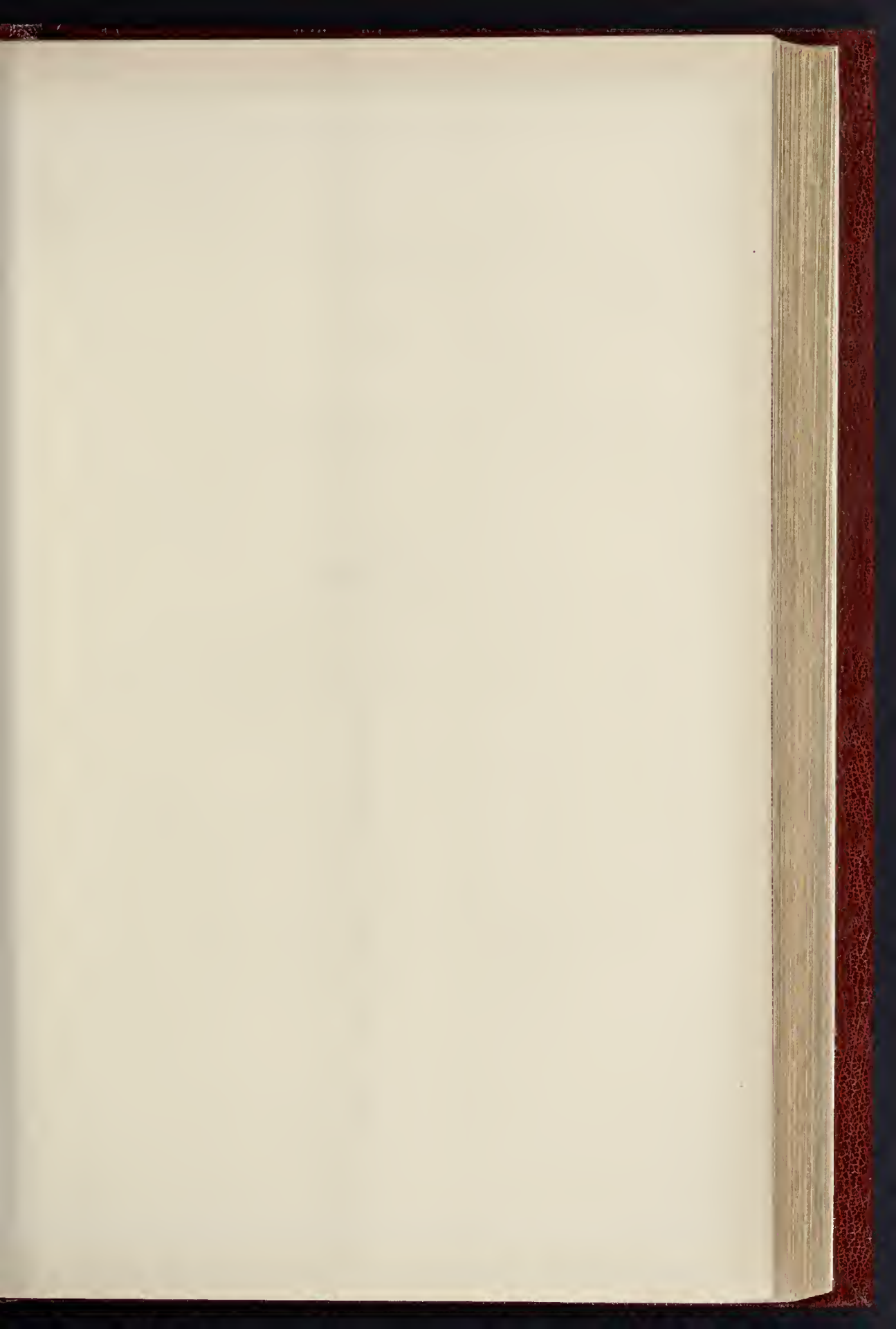
THE BUILDER, APRIL 16, 1887.

THE BUILDER, APRIL 16, 1887.



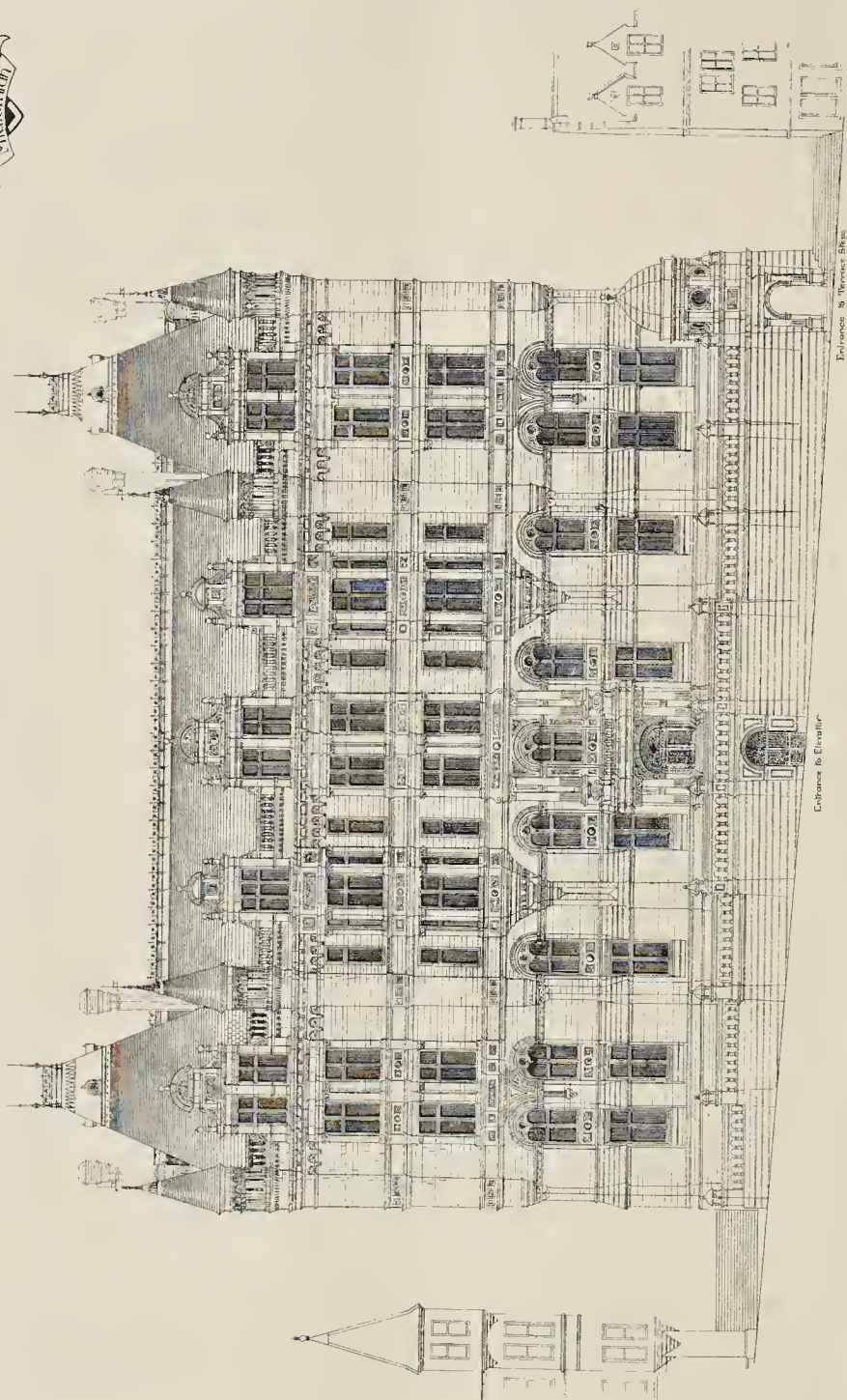
West Elevation





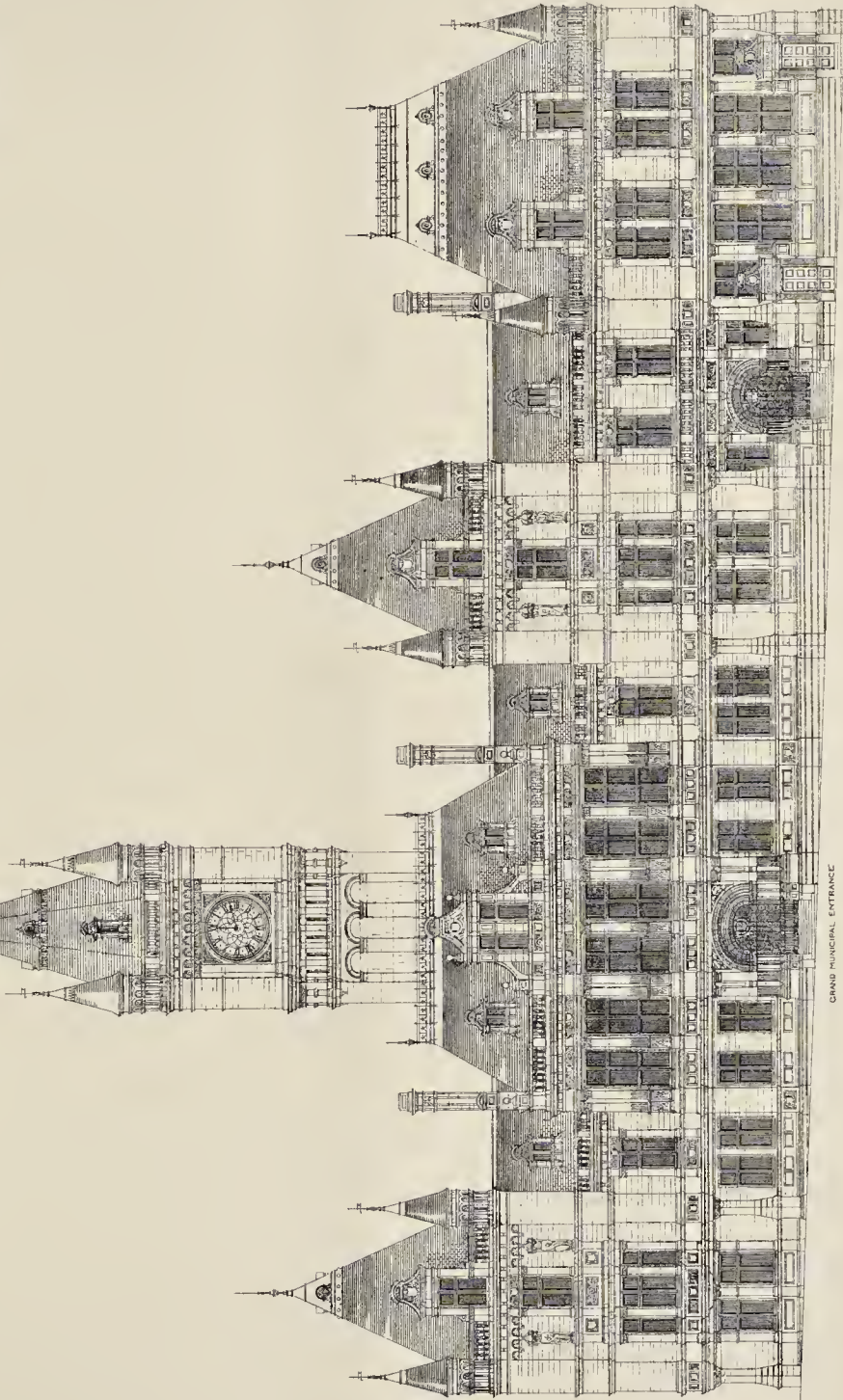


THE BUILDER, APRIL 10, 1907.



# Cockburn Street Elevation

EDINBURGH MUNICIPAL BUILDINGS COMPETITION.—DESIGN SUBMITTED BY MR. BRIGHTWEN BRYNOS, A.R.I.B.A.



GRAND MUNICIPAL ENTRANCE

SMALL COURT ENTRANCE

# High Street Elevation.

C. F. G. & P. Architects & Surveyors, 15, Abchurch Lane, London, E. C. 4.





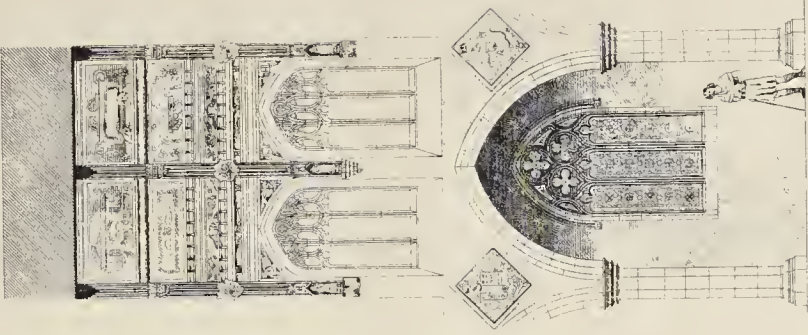
GARRISON CHURCH, STUTTGART.—PROFESSOR DOLLINGER, ARCHITECT.

PLATE XXXIII. MARSHES, 1882.



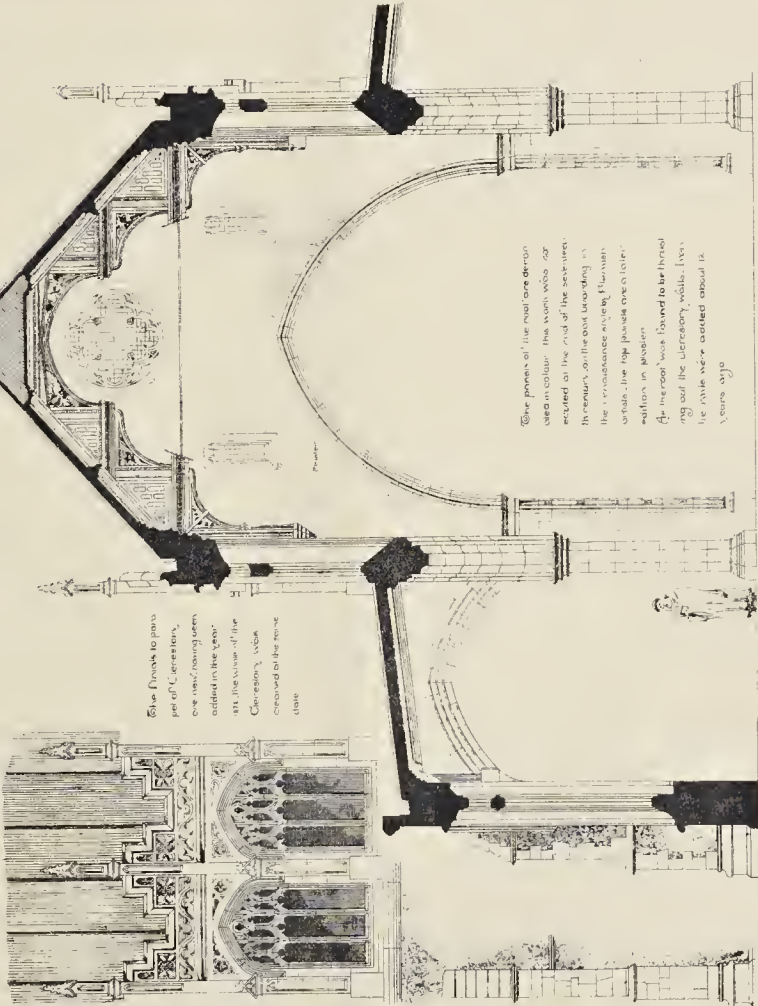
# SHINE MARGARETS Church Ipswich

## DETAILS OF THE NAVE



Interior Elevation of One Bay

All glass panels cut  
Note: Golden light central  
of west window



Transverse Section

Blue Panels to pass  
per of Clerestory,  
one each, having been  
added in the year  
1871. Because of the  
Clerestory, which  
occupied at the time  
date

Some panels of the roof are drawn  
seen in colour: the work was not  
executed at the end of the sixteenth  
century, or the oak being strong in  
the circumstance of the Clerestory  
which the top panels are of oak  
solid in places.  
The Clerestory was found to be broken  
and the Clerestory, which has  
the date 1571, was erected about 16  
years ago

North Aisle

Exterior Elevation

ST. MARGARET'S CHURCH, IPSWICH.—From Drawings by MR. HARRY PERCY ADAMS



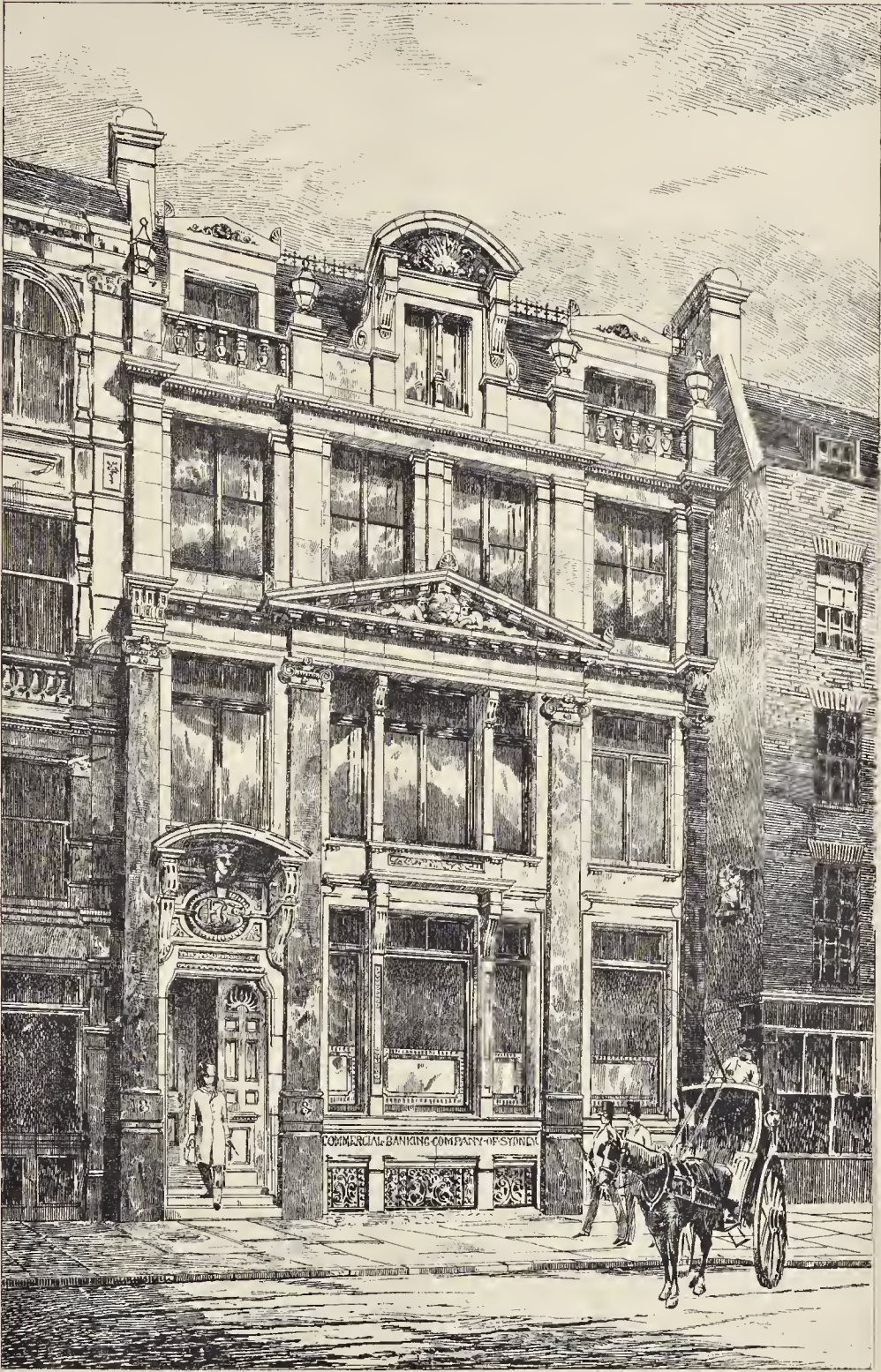


PHOTO LITHO. SPRAGUE & CO. 25, MARK LANE, LONDON E.C.

PREMISES FOR THE COMMERCIAL BANKING COMPANY OF SYDNEY.—MR W. W. GWYHER, F.R.I.B.A., ARCHITECT.

THE UNIVERSITY OF CHICAGO

METROPOLITAN SEWAGE DISPOSAL.  
PARKES MUSEUM OF HYGIENE.

A PAPER dealing with this important subject, by Mr. J. Bailey Denton, M.Inst. C.E., was read at the Parkes Museum of Hygiene on the 6th inst. Professor Corfield occupied the chair, and there was a good attendance.

The paper was read by Mr. Bailey Denton's son. At the outset the author said that the subject was unique in the difficulties and contradictions that surrounded it. Sewage in itself was a complex substance, consisting of that which was theoretically very valuable, and practically, at the present time, nearly worthless. Made up of two parts,—the liquid and solid,—sewage, to be dealt with in any way satisfactorily, must have those parts separated from each other, when the liquid portion might become clear and bright, whilst retaining both its fertilising and obnoxious qualities, and the solid portion might be rendered ductile and portable, though it had lost the major part of that which would make it worth the cost of carriage. Upon the question of the value of sewage as a fertiliser of land, England seemed to have changed its mind for a time, not because it had failed in producing an increased supply of food for the people, but because the means adopted for its utilisation had in some instances commercially failed to secure a profitable return. As he did not in any way participate in the views which held possession of the minds of the Metropolitan Board of Works and other local authorities in relation to sewage farming, who made the difficulties attending it (and there were many) an excuse for getting rid of the "nasty stuff" in the quickest way they could, he desired, as a close observer of what could be done in the way of sewage utilisation, and as a sewage farmer himself, to place on record in a few words his conviction that it had been solely owing to the want of technical knowledge on the part of the farm managers that the expectations formed with regard to the application of sewage to land had not been realised. Like every other trade or business, sewage farming could only be learnt by apprenticeship, and only perfectly practised when experience had shown what to do and what to avoid; yet every member of a local board, whether he was a draper, or a printer, or a publican, thought he could direct every step that should be taken, either to cleanse the sewage or to make the farm pay. He believed, in point of fact, that as a member of a local board he knew as much about farming as a Lothian or Lincolnshire farmer, and as much about the cleansing of sewage as a Liebig or a Frankland. That was an anomaly, for he did not find that a farmer or a chemist, however successful, would turn draper, or printer, or publican with equal confidence. Why the governing sanitary authority appointed for the "better management" of London, the capital of the British Empire, and the most important if not the most populous city in the world, should exhibit a twofold want of loyalty to the common interests of the nation by polluting the Thames, at the same time that it disregarded the reproductive value of the sewage to be disposed of, would remain unexplained so long as the Metropolitan Board of Works continued indifferent to one of its primary duties,—for the performance of which it was called into existence,—the purification of the Thames. The fact that Paris, the capital of France; Berlin, the capital of Germany; and Hamburg, Breslau, and Dantzic, the capitals of subordinate states, were turning to advantage the sewage they discharged, whilst St. Petersburg, Moscow, and Warsaw were preparing to do the like,—seemed to have no influence whatever on the Metropolitan Board; although these European cities had all been treated upon examples afforded by, and information obtained in, England. Instead of closely studying what had been done in this country and abroad, the Board had been content to represent to their constituents that it would be extravagant to expend between three and four millions of money in extending the outfalls a distance of twenty miles down the river, although, that plea could be readily shown to be a fallacy. Directly those big figures were turned from capital into interest, they happily meant no greater charge upon the ratepayers than the annual cost of chemicals and labour in mixing would involve, apart from the interest on the capital outlay in additional permanent works at the outfalls. Nevertheless, it had been decided

to construct underground tanks,—which in themselves were very objectionable,—to be followed by an expenditure of three times that amount if persevered in. Most unfortunately for the interests of agriculture, the Board had determined that those tanks should be added to those at present existing at the Barking outfall, in a district where the population was increasing at a greater ratio than in any other metropolitan suburb, and where the extension of building was so rapid that it would soon crowd out all possibility of using the collected sewage free from local nuisance, in the way which Sir Robert Rawlinson had said might be adopted for distant distribution from the outfalls. It was, indeed, difficult to understand how a body of men ordinarily engaged in various important branches of commerce should reject the recommendations given them by the Royal Commission, when a careful investigation with unprejudiced minds would have shown them that for the expenditure of three and a half millions,—meaning a rate of only a penny in the pound,—in extending the outfalls to a point beyond Hole Haven Creek, with an addition for works there of no more money than the Board were now about to expend at the outfalls, they could purchase 4,500 acres of land and construct the necessary works for the treatment of the sewage in a locality where they could not only have secured for future generations the utilisation of the sewage, but could do so in a way to entirely free the river from pollution into the bargain. As his (the lecturer's) name for some years past had been more closely associated with intermittent filtration than with other means of sewage treatment, he wished to say, by way of parenthesis, that he was not less the advocate of wide irrigation, which he deemed to be the most profitable mode of utilising sewage, than his friend Dr. Alfred Carpenter, or Sir Robert Rawlinson, though he adhered strongly to the opinion,—after a somewhat wide experience,—that intermittent filtration ought always to be combined with wide irrigation as a safeguard, or perhaps it would be better to say as a means of removing the difficulties of the sewage farmer when the land under his care required relief on occasions of great downfalls of rain, or by reason of the condition of the cropping, or when it was desirable to save labour in the night time and on Sundays. Up to the commencement of the present century water-closets were unknown; the stately mansions of the wealthy and the humble dwellings of the poor were alike provided with receptacles for fecal refuse, which had to be removed by nightmen, and which process was attended with very great nuisance. When water-closets were introduced in 1810 they were only intended to wash the putrescible matter from dwellings into cesspools, from which the overflow found its way into the watercourses and rivers, thus producing a polluted condition, and substituting one class of nuisance for another. It was not fifty years since the first effort was made at district house sewerage. That was superinduced by the copious use of water attending the introduction of water-closets and the establishment of additional water companies which took place about the same time. Nothing could be more regretted by all earnest thinkers than the conduct of the Metropolitan Board in 1887, which must bring upon us the ridicule of the world, in resorting to the homoeopathic doses of 37 grains of lime and 1 grain of sulphate of iron, with a sprinkling of permanganate of soda, per gallon, for the purification of the sewage of the metropolis in face of the truth that the great towns of the North of England, Leeds, Bradford, Sheffield, &c., after trying every known kind of chemical applicable to sewage treatment, had come to the conclusion that nothing less than one ton per million gallons (taking the average quality of town sewage) could render their sewage effluents admissible into rivers. Common sense told us that to apply a minimum quantity of chemicals, as proposed by Mr. Dibdin, to an average outflow of sewage from a densely populated city of the character of London, was in itself an absurdity, and the manner in which the Metropolitan Board of Works seemed to have arrived at those homoeopathic doses was,—if rumour spoke truly,—as singular as it was unworthy the magnitude of the object. Although Sir Christopher Wren in the seventeenth century proposed certain works connected with the "new sewers and backwaters of Westminster" and the Fleet Ditch and other tributaries of the Thames

were turned into common sewers,—which in the eighteenth century, it was not until John Martin, the eminent painter, had called public attention to the disgusting state of the Thames that it was found necessary by systematic design to intercept the sewage of dwellings and prevent its discharge into the Thames. It was twenty-two years subsequently to Martin's appeal that the Metropolitan Board of Works took the place of the several Commissions of Sewers then existing for "the better management of the metropolis." The Act constituting the Board, however, was not passed until after the Consolidated Commissioners of Sewers had sought plans for the drainage of London by public competition (1849), the result of which was the adoption of the concrete design of Mr. Frank Foster and Colonel Haywood, the present City Engineer. The government of that day, by the First Commissioner of Works, Sir Benjamin Hall, referred the whole question to Captain Douglas Galton, R.E., and the late James Simpson and Thos. C. Blackwell, C.E.'s (1857), who proposed that, instead of adopting the points of outfall recommended by the engineers of the Metropolitan Board of Works, the sewage should be taken down the river and discharged on the northern side of the river, near Mucking Light-house, in Sea Reach, and on the southern side near Higham Creek, in the Lower Hope. He gave this brief history because it was desirable at the present juncture to realise the fact that the referees of 1857 recommended the extension of the outfalls to points almost as far down the river as the point suggested by the Royal Commission on Metropolitan Sewage Discharge in 1844, with the simple but very important difference that, whereas the referees would have been satisfied with the discharge of crude sewage into Sea Reach, the Royal Commission, after the experience gained, objected to any discharge into the river until the solid matter had been separated from the liquid, when they would admit the latter only if carried down and discharged "at least as far as Hole Haven." It was true that the Metropolitan Board, in 1857, successfully over-ruled the opinions expressed by the referees, but that was not done until several leading members of both Houses of Parliament had forewarned the Board that the river might be made (as it had now been made) a main sewer for the whole of London, and that our magnificent river might be turned into a "cesspool" by the discharge into it of the sewage which it was the duty of the Metropolitan Board to dispose of without causing any nuisance. The late Lord Derby called attention to the fact that there was no express provision in the Act constituting the Metropolitan Board that the *modus operandi* was to be by intercepting sewers, though it was well understood, his lordship said, "that the sewage of the metropolis should not be allowed to be poured into the river until it had undergone the process of deodorisation." And what was also true and even more pertinent to the present condition of things, was that Robert Stephenson, whose opinion would ever command the attention of Englishmen, stated that he believed that sewage would eventually be made useful for agricultural purposes, and he therefore thought it impolitic to enter into any larger expenditure than could be helped for the present (1854-5), even if it were found necessary to carry the sewers down to Sea Reach. Robert Stephenson stated those words twenty-eight years ago, and it was "Sea Reach" that the Royal Commission (Lord Bramwell's), after eighty-one days' close attention to the subject, now declared should be the place of discharge, believing "that the existing evils imperatively demand a prompt remedy." Could any words more closely prove the foresight of Robert Stephenson? Lord Bramwell's Commission consisted of men occupying the highest position in practical science, and known to be specially acquainted with the subject they were selected by the Government and appointed by her Majesty to inquire into and report upon, i.e., "the system under which sewage is discharged into the Thames by the Metropolitan Board of Works." They made two reports, and in the second they said:—"We are of opinion that some process of deposition or precipitation should be used to separate the solid from the liquid portions of the sewage. . . . That the solid matter deposited as sludge can be applied to the raising of low-lying lands, or burnt, or dug into land, or carried away to sea. . . . But we believe

that the liquid so separated would not be sufficiently free from noxious matters to allow of its being discharged at the present outfall as a permanent measure. It would require further purification; and this, according to the present state of knowledge, can only be done effectually by its application to land. . . . And if suitable land in sufficient quantity and at reasonable cost cannot be procured near the present outfalls, we recommend that the sewage liquid, after separation from the solid, should be carried down to a lower point in the river, at least as low as Hole Haven, where it may be discharged." Apart from chemical considerations, it had been made manifest that it was not in any way desirable to turn the sewage liquid after separation into the Thames at the present outfalls, however much the upland water might be mixed with tidal water in that locality. That would appear certain from the fact that whereas the quantity of upland water flowing at times down the river to mix with the sewage as it left Barking and Crossness at ebb-tide might be as little as 750,000,000 gallons in twenty-four hours, the quantity of sewage discharged might reach 100,000,000 gallons in the same time, or more than one-fifth of the upland flow; the least proportion of sewage recognised as safe for riparian interests being five per cent. of the river flow, or one-twentieth part. The Royal Commission in their first report called attention to that fact in the following words:—"The flow of sewage proper is estimated at an average of 16,000 cubic feet per minute, which is 23,000,000 cubic feet per diem. Now the river at low water in the neighbourhood of the outfalls is about 2,000 ft. broad, and has a sectional area of about 30,000 square feet, so that there is discharged into it every day as much undiluted sewage as would fill a length of 750 ft. of this part of the river at low water." These facts, the lecturer thought, were sufficient of themselves, without any reference to chemistry, to prove that the metropolis was committing a suicidal act in allowing the Metropolitan Board to maintain a pollution which, though it might be slightly mitigated by Mr. Dibdin's recipe, would still reduce the river into a flow of liquid sewage through the dock region of its course,—a fact which could not fail, on a re-visitation of cholera, to be attended with fatal results. The reason given by the Metropolitan Board, or rather the Works and General Purposes Committee, was most curious. While actually putting on one side the recommendations of the Royal Commission, they stated that, with a view of complying with their recommendations, they had voted 1,000l. for the purpose of experiments on successive quantities of 1,000 gallons of sewage, subsequently increased to 100,000 gallons, and then to 250,000 gallons. Those experiments they afterwards declared were sufficient to show, in face of what all past experience had so strongly proved to be the reverse, that no practical advantage accrued from the additions to the sewage of more precipitating matters than 3·7 grains of lime and 1 grain of sulphate of iron, which they deemed all that was really necessary for facilitating the natural tendency of solids to deposit. They further stated that the effect of adding large quantities of chemicals insured only a more perfect clarification without materially affecting the solid constituents of sewage. The committee having come to these conclusions induced the Board, as a body, to vote a sum of 5,000l. (in November, 1884) for the erection of works at Crossness outfall for the experimental treatment of 1,000,000 gallons of sewage daily, which is just one 160th part of the actual quantity of sewage discharged at the outfalls. The result of those experiments, the Committee declared, confirmed the results first arrived at by the Chemist of the Board, and authoritatively asserted that the sewage could be "sufficiently" clarified by the addition of 3·7 of lime and one grain of protosulphate of iron to each gallon of sewage, which he (the Chemist) had, by that funny calculation of his own, arrived at as the exact quantity that would effect the desired precipitation; and the Committee took upon themselves to add that, in addition to the removal of the solids, the "grosser odours of the sewage are destroyed, and the foul and offensive appearance of the sewage removed." These were strong words after the experiences of the last thirty years. With regard to the Canvey Island scheme, its governing features were that it obviated altogether any discharge of the dry-weather sewage, both solid and liquid, into the

river between Blackwall and Sea Reach, and that its area, 4,383 acres, with its attendant physical conditions, afforded remarkable facilities for (1) the deposition or treatment of the solid portion on its surface without nuisance of any kind or occasion for removal from the site of deposition; (2) the utilisation of the liquid sewage for irrigation on the island or on lands in Essex and Kent; and (3) the purification of the liquid after its separation from the solid by filtration through soil before discharge into the Thames Estuary. The island, which was separated from the mainland of Essex by Benfleet Creek, being  $\frac{1}{4}$  miles from Southend, and well away from all residential properties, was free from any chance of nuisance. Its surface, which was 8 ft. above Ordnance datum, and 6 ft. 6 in. below the highest tides, was as flat as a table, not varying in height more than 12 in. throughout its entire length and breadth. It was at present surrounded by a sea-wall, 9 ft. or 10 ft. high, and there was room within that marginal bank, which formed the island into a monster basin, for the sludge of the whole of the sewage of the metropolis for two centuries to come, if no part of it were disposed of otherwise, without raising the accumulating solid matter above the height of the banks, whilst two-thirds of its extent, i.e., 3,000 acres, would suffice for the treatment of the sewage for 100 years, if the deposit were raised only 100 in. That would leave one-third of the island to be converted into a sewage farm or planted with osiers, or otherwise dealt with, as might be found most advantageous. The soil of the island was alluvium on clay, and as there were no rocks nor stones in it to obstruct steam cultivation, it could be as readily rendered fit for filtration by stirring, trenching, and mixing as any land in the kingdom. It was singularly capable of both surface and under-drainage, owing to its insular character, low tide (near) being 10 ft. below the surface, thus allowing the discharge from the under-drains to be constant by the construction of proper outfall channels connected with internal tidal ponds or reservoirs, which would empty their contents as soon as the tide receded. But the local features which most favoured treatment of the sewage on the island were:—1. That the alluvium would turn into ballast. 2. That under the surface and for a considerable extent there existed a clay-puddle technically termed "cement mud." 3. That on the shores surrounding the island there existed inexhaustible beds of very fine sand and cockle-shell debris,—the best of filtering materials. 4. That on the opposite shore of the river (Kent) there existed chalk, which could be obtained at comparatively small cost, to be ground and used as chalk, or burned into lime if desired, as a precipitant and disinfectant. 5. That within easy reach there existed on the River Medway the well-known cement works. The substances enumerated were specially valuable for mixing with the sewage to give it solidity, and for mixing with the soil to fit it the better for filtration and give that capability of percolation which might be found desirable. The island at present was used simply for agriculture, and having only 300 inhabitants upon it, with one small church, vicarage, schools, and village, all built of wood and easily removable, it presented the most inviting conditions for the utilisation of the sewage of the metropolis, seeing that whatever had been done elsewhere, and might be done in future with the advance of science, could be done upon the island without any nuisance whatever.

The Chairman proposed a vote of thanks to Mr. Bailey Denton for his most interesting and important paper.

Dr. Poore seconded the motion, which was agreed to.

Dr. Drysdale said he considered that Mr. Bailey Denton's scheme was conclusive as against the scheme of the Metropolitan Board of Works. The latter seemed to be in opposition to those schemes of physiological treatment which were being adopted in Paris, Berlin, and other Continental cities. It really appeared as if England would be behind rather than before the rest of Europe in regard to sewage treatment. The effect of Mr. Dibdin's plan would, he believed, be quite appreciable, as no chemical product could have any effect in neutralising the injurious results of sewage in a large city like London. The only chance of dealing with the

sewage of the metropolis was by what might be termed the physiological plan.

Dr. Alfred Carpenter said that the wasteful manner in which the Metropolitan Board of Works intended to deal with the sewage of London should call down shame upon that body. Mr. Bailey Denton's proposal to utilise Canvey Island for the disposal of the sewage commended itself as a sort of half-way house or compromise as between wide irrigation and chemical precipitation. Many people might be convinced that irrigation was the best way to utilise the sewage, while others might think it an unsatisfactory process, and attended with evil consequences. Therefore, until the majority came round to the view that sewage irrigation was a safety and not a danger, it was not likely to be generally adopted. If the Canvey Island scheme could show this it would have done a great work, and would be a step towards preventing the destruction of the trade of the port of London, which must come about if the present condition of things was to continue for another fifty years. The mass of material being deposited in the Thames was preparing the way for what would one day bring down a severe punishment. The Metropolitan Board might as well "spit in the sea" as use chemicals in the manner they propose doing. By the Canvey Island scheme there would be three or four thousand acres of land producing an increased amount of produce, and an enhanced milk supply for the metropolis.

Mr. Shone remarked that he had visited Canvey Island for the purpose of studying the "sewageology" of the place, because he understood that the proposal was to create land out of the *debris* and other sewage matters to be conveyed there. He believed that the island would be a very suitable place for carrying out the scheme designed by Mr. Bailey Denton and Col. Jones, and it would be far cheaper in the end for the Metropolitan Board of Works to purchase the place as a site for a huge laboratory than to keep on conducting their experiments at the outfalls at Crossness and Barking.

Mr. Sillar, though a strong advocate for precipitation versus irrigation or intermittent filtration, did not think one word had been said too strong in denouncing the scheme of the Metropolitan Board of Works, taken as a whole. At the same time, there was something to be said for it. Mr. Bailey Denton appeared to assume that the Royal Commission had given an unqualified approbation to the scheme for conveying the sewage down to Canvey Island; but that was a mistake. What they had recommended was precipitation if possible, and to carry the effluent down the river. If, therefore, precipitation was to be adopted, it was not altogether foolish of the Metropolitan Board of Works to put up works for the purpose, and to delay the carrying down of the effluent water until they found it must be done. After having erected the tanks, if they found they could produce an effluent which might pass into the Thames, it would be a needless expense to erect a costly sewer to carry it further down the river. He must confess that he did not expect the Metropolitan Board to produce such an effluent by the proposed plan, although if they had adopted the Aylesbury scheme,—which, by the way, they did not understand,—there would be no necessity for any lengthened sewers. The Board would doubtless learn the best treatment of sewage by experience when the tanks were constructed, and they would thus save the expenditure of over three millions of money, with its burdensome interest, on an immense sewer, which in the end might be found to be unnecessary.

The discussion was continued by Dr. Poore and the Chairman, who supported Mr. Bailey Denton's views, while Mr. G. R. Strachan and Mr. Helmer took up a somewhat neutral position.

A vote of thanks to Professor Corfield for presiding closed the proceedings.

**Royal Academy: Architecture School.** The Modelling Class having terminated for the session, a course of demonstrations on "Mouldings and Profiling" will be given by Mr. Stannus, at six p.m. on Monday evenings, as follows:—April 18, Use and General Contour; April 25, Composition of Crown and Foot Mouldings; May 2, Composition of Framing Mouldings; May 9, Returns and Suppression of Mouldings; May 16 and 23, Enrichment of Mouldings; June 6, Profiling of Vase Forms; June 13, Profiling of Baluster Forms.

## SANITARY LEGISLATION CONFERENCE.

The first meeting of this Conference was held at 5, Argyle-place, Regent-street, last week, when representatives were present from the following institutions:—Sanitary Assurance Association, Royal Institute of British Architects, Surveyors' Institution, Public Health Medical Society, the London Sanitary Protection Association, and the Association of Municipal and Sanitary Engineers and Surveyors, also Sir Henry E. Roscoe, M.A., and Mr. C. C. Lacaita, M.P., two of the members having charge of the Sanitary Registration of Buildings Bill. The representatives present included Lieut.-Gen. Lord Chelmsford, G.C.B., Sir Joseph Fayer, K.C.S.I., M.D., F.R.S., Sir Vincent H. Kennett-Barrington, Mr. Edward T'Anson, President of the Royal Institute of British Architects, Professor T. Roger Smith, Mr. J. Lohley, President of the Association of Municipal and Sanitary Engineers and Surveyors, Mr. Timothy Holmes, F.R.C.S., Dr. David Finlay, F.R.C.P., Mr. Mark H. Judge, Mr. H. Rutherford, Mr. J. W. Fenfold, Hon. Sec. of the Surveyors' Institution, Mr. Hugh Leonard, C.E., and Mr. E. B. Ellice Clark.

Sir Joseph Fayer was elected President of the Conference, and the following vice-presidents were appointed:—Lord Chelmsford, Sir Gayer Hunter, M.D., M.P., Mr. Lacaita, M.P., Mr. Edward T'Anson, President R.I.B.A., Mr. J. Lohley, President of the Association of Municipal and Sanitary Engineers and Surveyors, and Mr. H. Rutherford. Mr. Joseph Hadley, F.R.S., and Mr. Mark H. Judge were appointed Hon. Secretaries.

Sir Joseph Fayer, as President of the Sanitary Science Association, welcomed the representatives, and explained that the Conference had been convened by the Association on the suggestion of the Association of Municipal and Sanitary Engineers and Surveyors for the purpose of considering the Sanitary Registration and Buildings Bill, which had been introduced by Mr. Lacaita, at the request of the Sanitary Assurance Association, the second reading of which was fixed for the 22nd of June. The Bill had been prepared after most careful consideration by the Council over which he had the honour to preside. They were fully convinced that some measure of the kind was absolutely necessary in the interests of the public health, and they were glad to have been so fortunate as to receive the assistance which this Conference would give to sift the details of the Bill, so that their representatives in the House of Commons might be made aware of the provisions of the Bill, and of its bearing on the general health of the community, in order that the principle of the measure might be embodied in an Act of Parliament. He felt sure that however those present might differ with regard to the details of the measure, the principle of the sanitary registration of buildings would meet with their approval. In a meeting composed of eminent jurists, medical men, architects, and engineers, there was no need for him to speak at any length upon the necessity which existed for improvement in the sanitary conditions in which our people had to reside. It might be urged that Government already dealt with sanitary matters, and had taken charge of the sanitary condition of our towns; but that was only true to a very limited extent. Unless the authorities had reason to believe that a nuisance existed, he believed that there was no power under which public officers could demand admission to buildings for the purpose of sanitary inspection. By the present measure it was proposed to give this power, but they did not seek to impose upon the owners and occupiers of buildings need for public or semi-public purposes, the duty of satisfying the public sanitary authority that such buildings were in a satisfactory sanitary condition. In proposing that addition to our sanitary law, the Bill expressly provided that in no respect whatever would the powers and responsibilities of authorities under existing Acts be interfered with in the least.

Letters were read from some associations requesting to be permitted to send representatives to subsequent meetings of the Conference, but it was resolved for the present to limit the Conference to the institutions already represented, with the exception of the Institution of Civil Engineers, which it was decided to invite to appoint representatives.

The Conference then proceeded to consider the principle of the Bill, upon which Mr. H.

Rutherford proposed,—"That the sanitary registration of buildings is desirable in the interests of the public health." This was seconded by Mr. Holmes, and supported by Mr. Robins, F.R.I.B.A.; Mr. Angell, Borough Engineer, West Ham; Mr. Ellice Clark, Mr. Judge, Professor Roger Smith, Sir H. Kennett-Barrington, and Mr. Lohley, and carried unanimously.

Mr. Lewis Angell proposed, "That it is desirable that the law should forbid any building being used for public or semi-public purposes, unless and until the arrangements for the water supply, drainage, and ventilation of such buildings have been certified as satisfactory by some properly qualified person." This was seconded by Lord Chelmsford, and, after considerable discussion, was carried unanimously.

Mr. Mark H. Judge proposed, "That the provision of a Public Sanitary Register for the voluntary registration of private houses would be instrumental in promoting Sanitary Improvement." Sir H. E. Roscoe, M.P., seconded, and this was also unanimously agreed to.

It was then proposed to consider the details of the measure by taking the Bill clause by clause, and for this purpose the Conference adjourned till April 18.

## BUILDINGS FOR POOR LAW ADMINISTRATION.

*Lambeth.*—Early last year the Lambeth Guardians had seriously to consider the want of sufficient accommodation for the increasing number of inmates at their workhouse, Renfrew-road, Kennington-lane, and after much discussion it was eventually decided to reconstruct the old workhouse, Princess-road, and to transfer the whole of the able-bodied inmates thereto, leaving the aged and infirm at Renfrew-road. In accordance with that decision, the Princess-road workhouse is now being reconstructed, or rather virtually rebuilt, from the designs of Mr. T. W. Aldwinckle, F.R.I.B.A., accommodation being provided for 200 men and 150 women. The new workhouse (the foundation stone of which was laid on the 6th inst. by Mr. George Howlett, Chairman of the Board of Guardians) is to be a "test house," that is, an establishment where a rigid test of isolation and work will be applied to the able-bodied loafers of both sexes,—those who are perfectly able to earn their living outside the workhouse if they were willing to do so,—while the deserving poor will meet with every consideration. This desirable end will be arrived at by a strict system of classification, as already arranged by the same architect at the workhouse at Renfrew-road, and also at the new workhouse of the Wandsworth and Clapham Union. Each sex will be divided into three classes, according to conduct and antecedents, and this classification will be strictly maintained throughout by providing, for each class, distinct and separate day rooms, dormitories, staircases, airing yards, lavatories, baths, &c. This arrangement, while distinctly protective towards the deserving poor, will act as a great deterrent towards those of bad character, as it is found that strict discipline and isolation are very distasteful to the latter.

For all three classes there will be ample opportunities for work, and no one will be allowed to remain idle. Those of the first class (good character) will be provided with associated workshops and workrooms of the usual description, but the remaining classes, comprising those of bad character, will perform their daily tasks in isolation, having no communication with each other. This separate system will, in exceptionally bad cases, be extended to the day rooms and dormitories. In order to ensure discipline, each ward is overlooked by a window in an officer's room, and, with a view to safe exit in case of fire, each large ward has a staircase at each end. Special attention has been paid to the warming and ventilation. The several wards will be warmed by hot-water pipes. For ventilation, fresh external air will be admitted by means of Tobin's tubes and Boyle's inlet brackets, and the vitiated air will be removed by means of vertical brick shafts, terminating with air-pump ventilators, the temperature of the interior of these shafts being raised by means of conical gas-burners. The drainage will be laid in straight lines from one manhole to another, and will have inlet and outlet ventilation, the latter by means of

exhaust-shafts higher than the buildings. The drains will be flushed automatically. Great care will be taken to prevent sewer gas from entering the house. All soil-pipes will have air inlets near the foot, and will be carried up as ventilators above the roof. All waste-pipes will discharge into external traps, giving air-separation from the drains. Every part of the buildings will be of the plainest possible character,—absolutely devoid of all ornament,—and the internal fittings perfectly simple. The buildings will cost 20,000*l.* The contractor is Mr. William Smith, of Eldon Works, Kennington; and Mr. Chutter is the clerk of works. In addition to these works, the Lambeth Guardians, at their last meeting, instructed Mr. Aldwinckle to prepare plans for the enlargement of the Infirmary, Renfrew-road, by 250 beds.

*St. George's-in-the-East.*—The Guardians of the Poor of St. George's-in-the-East have instructed their architects, Messrs. Wilson, Son, & Aldwinckle, to prepare plans for extending and remodelling the casual wards upon the cellular system.

## ARCHITECTURAL SOCIETIES.

*Birmingham Architectural Association.*—The tenth ordinary meeting of this Association for the current session was held on the 5th inst. The Vice-President (Mr. John Cotton) was in the chair. A paper entitled "Notes on a Tour in Germany" was given by Mr. H. H. McConnell. The paper was illustrated by a number of very good pencil sketches by the author. A vote of thanks, proposed by Mr. W. Doubleday, and supported by Messrs. T. W. F. Newton, J. Cotton, A. V. Ingall, and Victor Scrpton (hon. secretary), was heartily accorded to Mr. McConnell for his interesting paper, and after a response from that gentleman, the meeting terminated.

*Edinburgh Architectural Association.*—At the fortnightly meeting of this Association on the 7th inst., Mr. Hippolyte J. Blanc, president, in the chair, an interesting paper was read by Mr. G. Godfrey Cunningham, advocate, upon recent discoveries made by him at Liberton House, originally known as Liberton Place, the ancient mansion-house of the Barony of Over Liberton, and the country residence for generations of the family of Little, now represented by Mr. Walter J. Little-Gilmour, of Lamberton and Craigmillar. Though not possessing many external features to attract the passer-by, the house, in spite of alterations and vicissitudes innumerable, remained a tolerably complete specimen of the domestic architecture of the early part of the seventeenth century, when it was no longer necessary to construct a fortalice to keep off foreign enemies, but when it was still advisable, from the unsettled condition of society, to be prepared against sudden attack by neighbouring marauders. The general plan of the main building was somewhat unique, and investigation has revealed quite an unexpected number of antique features, some of them of unusual interest, which had been for a long and unknown period concealed under lath and plaster and modern masonry. Particular attention was directed to the great fireplace which terminates the drawing-room, to the defences of what was originally the chief entrance of the house, and to the characteristic wall decorations, of which a few traces remain. The absence of any very remarkable associations, historical or romantic, was no doubt a reason why Liberton House had not hitherto attracted the attention of the architect or the antiquary. It, however, well deserved notice for the sake of the name with which it had been linked for so many generations. The Littles of Liberton were prominent citizens of Edinburgh in the seventeenth century. One of them, whose initials might be seen at Liberton, and whose sumptuous monument, with recumbent effigy, stood over the family burial-vault in Greyfriars, occupied the civic chair; and to the literary taste of another the University was indebted for the foundation of its library, a few hundred volumes bequeathed to it by Charles Little having been the nucleus round which it had since grown and flourished. It was to be hoped that the present laird, who had recently done so much to preserve the venerable walls of Craigmillar from sinking into hopeless decay, might see his way to restore, in some measure, Liberton House; or, at least, to remove the modern additions which disfigured the edifice without improving it as a residence. On the

conclusion of the paper, a vote of thanks was proposed by Mr. Thomas Ross, who expressed the opinion that Mr. Cunningham had presented the profession with a most interesting, and until now unknown, study of an old Scottish mansion, and he hoped that both the fabric and its history would undergo exhaustive examination, with a view to the preservation and development of the ancient features that remain, in the prosecution of which objects, he said, the Association would willingly co-operate.—On Saturday last, under the leadership of Mr. Hippolyte J. Blanc, the members of the Association visited the castles of Duntarvie and Niddry. Mr. Blanc said that Duntarvie Castle, situated in the parish of Abercorn, though comparatively unknown, was interesting as an early example of the group of manor-houses classed in the fourth period of MacGibbon and Ross. The building was a long rectangle of about 80 ft. by 23 ft., and had winged extensions to the back at each end. Though not what one would now consider a commodious residence, for its time it was a compact and conveniently-arranged manor. Niddry Castle, in Kirkliston parish, was also described. It was, Mr. Blanc said, a fairly interesting relic of one of the earlier forms of castle structures found in Scotland. It had massive walls, pierced irregularly with small openings for light and observation, and it had also a corbelled parapet and an angle turret. As accounting for the late forms of detail that might be found on the fireplace jambs in the interior, it was recorded that on the 19th of January, 1570, in revenge for the assassination of the Regent Moray at Lintlithgow, Niddry, among other neighbouring castles, was burned by the English army. Those features might, therefore, be the result of subsequent repairs. Mr. Blanc pointed out the architectural features of the castle, and at the close received the thanks of the company for his papers.

#### OBITUARY.

Mr. Alexander Bassett, C.E., of Llandaff, died on the 9th inst. The *Western Mail* says that he first suggested the advantages of a dock just outside Newport, and, with Mr. Abernethy, planned and carried out the Alexandra Dock, Mr. J. A. B. Williams, the present Water Engineer for the Cardiff Corporation, being the resident engineer and superintending the work as it proceeded. Mr. Bassett was the engineer for the Cowbridge Railway Company, and planned and laid down that line of railway from Llantrisant to Cowbridge. He held the office of County Surveyor for Glamorganshire for over thirty years, and when he resigned that appointment in 1885 his son, Mr. A. B. Bassett, was appointed his successor.

#### COMPETITIONS.

**Lavenham Guildhall.**—We hear that the successful competitor for the restoration of Lavenham Guildhall, in the competition advertised by its present owner, Mr. Cuthbert Quilter, M.P., for which he offered a premium of 25*l.*, is Mr. John S. Corder, of Ipswich.

**Wesleyan Chapel, Helderby, near Ripon.**—For this building, to cost 1,000*l.*, there were eight competitors. The design submitted by Mr. T. Butler Wilson, of Leeds, was selected.

#### COMPETITION FOR THE WEST FAÇADE OF MILAN CATHEDRAL.

Sir,—Referring to your paragraph on this great work in your last week's issue [p. 531], allow me to correct a little misconception. The authorities at Milan nominated at the outset three foreign architects as jurors,—namely, a German (Baron Schmidt), a Frenchman (Professor Dartein), and an Englishman (myself). Now the idea of your German correspondent is altogether excellent, but it would be a misfortune if, through ignorance of any of the above-mentioned appointments, any competitor's vote were thrown away upon those who are already appointed members of the selecting jury.

I would beg, therefore, while acknowledging my deep sense of the honour you have done me by engaging me in conjunction with Mr. Pearson as jurors to be chosen by the com-

petitors, that you should forthwith propose another name in place of my own.

ALFRED WATERHOUSE.  
New Cavendish-street, April 13.

P.S.—I may mention that though the instructions allow the competitors to choose four jurors, only two are to be architects, the others being a painter and a sculptor.

\*\* Then we will beg to suggest Sir F. Leighton as the other name, if the idea of our German correspondent is carried out, about which we can say nothing. We were merely appealed to to assist in enabling him to carry it out, which we did as far as in our power.—Ed.

#### THE VENTILATION OF SEWERS.

Sir,—Under the above heading you recently printed extracts from Professor Atfield's lecture,\* and the suggestions there made should, I venture to think, receive the best attention of sanitary authorities.

Without discussing the assertion that the whole of the fresh air introduced for the purpose of ventilation becomes saturated with the vapour, there can be no doubt that the air, gas, or vapour proceeding from drains or sewers should be conducted to a point above the house-tops. It will also, I think, be admitted that sewers wherein men have to work must be provided with air.

The present method of putting an intercepting trap between the house-drain and the sewer is doubtless a wise one where the ventilation of drains is the exception rather than the rule, and is in self-defence, otherwise the ventilation of the sewer would also be carried out at those points; but if every house draining into a sewer were provided with an outlet vent-pipe at its highest point and carried above the house top, then I think the intercepting trap might be dispensed with, resulting in each house bearing its own share of ventilation of both drain and sewer. The gratings in the roads might then safely remain, and would become the inlets for air. Of course, in this case, inlets to individual drains would be unnecessary.

Under the present system, every house-drain will shortly be supplied with its interceptor, consequently the evils of the exhalations from the road gratings will increase. This was fully demonstrated last summer on an estate where the surveyor is exceedingly careful about the modern system of house-drainage. The stench from the gratings was horrible, and the houses had a very good chance of letting into their doors and windows the enemy they had striven at considerable expense to keep from passing through their pipes, for fear of doing a trifle more than their fair share of the common duty of carrying the foul vapour above the house-tops. H.

#### KITCHEN BOILER EXPLOSIONS AND SAFETY VALVES.

Sir,—I thank Mr. Buchan and Mr. Crane for their letters, kindly printed by you at p. 561 of your last issue; they, however, both ignore the main question as to the desirability or otherwise of having any safety-valve at all. A safety-valve will not prevent the bursting of a boiler by the sudden irruption of water into it when the boiler is highly heated, and this is the most frequent cause of these explosions. For other purposes the benefits to arise from the use of a safety-valve are, in my opinion, more than counterbalanced by the inconveniences and dangers likely to result from it, as pointed out in my previous letter [p. 520, ante]. Is it best to fix such a valve or to dispense with its use?

Replying to Mr. Buchan, I may be permitted to mention that the hot-water system supposed in my letter did not refer to that in common use in the North, where the primary circulation is from the boiler to a hot-water tank in the kitchen, but to the system more usually adopted in London and the South generally, of the boiler at the bottom and a hot-water tank and feed-cistern at the top of the house, or, at any rate, above the highest draw-off. I am not interested in recommending one system as against the other, but take the usual arrangement I find nearest to me. By my third precaution I meant the word "tanks" to include this top hot-water tank as well as the cold feed-cistern, the word in its dictionary sense as a "receptacle for water." I agree with Mr. Buchan as to the necessity for the hot blow-off pipe having a rise upwards in every part of its course, but my precautions were meant as recommendations to householders when they find their pipes frozen or otherwise blocked, and not as advice to engineers or plumbers in fixing the apparatus; and further, I had in my mind the London tap hot cistern practice, where the relief pipe performs a different function to his blow-off pipe, and is almost always of short length, and quite perpendicular, and is merely a steam relief-pipe from the expansion space at the top of hot tank. Mr. Crane gives no opinion as to whether a safety-valve should be used, but advocates the return pipe as a proper part on which to fix one, on account

\* See p. 367, ante.

of the lesser corrosion in that pipe. I, however, submitted that if such a valve be fixed at all, it should be on a separate short pipe from the boiler in which pipe there should be no circulation, and consequently, practically no corrosion, or, at any rate, much less than in either the flow or return pipe. I agree with him that no good engineer thinks of putting a draw-off cock to a circulating boiler; but these hot-water circulations are so often fixed by those who are not as good engineers as Mr. Crane, that I recommended "never to have a draw-off tap in the boiler"; in effect, that where there were such taps they should be removed.

ROBERT WISTON.

#### THRONDHJEM CATHEDRAL.

Sir,—In your report of a lecture at a recent meeting of the Edinburgh Architectural Association [p. 513], delivered by Mr. Scott Dalgleish on the above cathedral, I see him stating that the name was Throndhjem (it should be spelt with an *h*) was derived from the German word "Dronthjem," as signifying "Throne-home." This is doubly incorrect, there being no such word in German, and the name signifying the "Home of the Thrüder," i.e., the exact name given till this very day to the dwellers in Throndelejan, viz., the district around the Throndhjem's Fjord, these forming, at the time when this city was the most important in Norway, the "backbone of the country."

I always understood that the name Dronthjem was a distinct English denomination. I ought also to add that the original name of the cathedral was "Nidaros" cathedral, this being the name of the city down to the fifteenth century. Finally, I may say that the work of restoration is greatly attributable to King Oscar, who devotes particular attention thereto, and has already given a large sum of money towards it.

CARL SIEWERS.

#### PROVINCIAL NEWS.

**Bath.**—The Sanitary Committee of the Bath Town Council has lately been considering a long report from the Abattoir Committee recommending the erection of buildings covering three-quarters of an acre, and consisting of five slaughter-houses for beasts, sheep, and calves, with lairage; one slaughter-house for pigs, with lairage; one cooling-room for pigs; cooling-room adjoining slaughter-house for beasts and sheep; a manager's house, a house for hlood and offal tubs; a hoiler for hot water; two or three pens; a receptacle for dung, and proper sanitary conveniences for men using the premises. The estimated cost, exclusive of land, is 3,000*l.* No decision has yet been come to on the subject, but the report was ordered to be printed and circulated. The butchers are up in arms against the project.

**Cheale.**—The Cheale and Gatley Local Board having applied to the Local Government Board for permission to borrow 1,400*l.* for the purpose of providing offices for the local board and a town's yard, an inquiry was recently held by Major-General Phipps Carey into the scheme, to which there was no opposition. The Clerk stated that the rateable value of the township was 56,855*l.*, the population 7,336, and the area 5,818 acres. The township had no debts under the Sanitary Act.

**Coventry.**—At a recent meeting of the Coventry City Council, a draft deed of conveyance by Mr. David Spencer to the Corporation of property situate at No. 38, Earl-street, was sealed. The property is conveyed to the Corporation in perpetuity "upon trust that the said hereditaments and all buildings now standing and hereafter erected thereon shall be and for ever remain dedicated, used, and enjoyed for technical schools and schools of science, especially the sciences applicable to industry and manufactures, and so far as at any time not wanted for such schools for any other of the institutions contemplated and provided for in and by the Public Libraries (England) Act, 1855 to 1884, and to be so used and enjoyed either gratuitously or on payment by the persons using the same, of such fees for admission or subscriptions as may from time to time be appointed by the Corporation, so that the said fees and subscriptions be expended in the maintenance and repair of the said buildings, and the providing of custodians, tutors, apparatus, furniture, materials, and things in and for such schools or institutions some or one of them." The thanks of the Council were voted to Mr. Chadwick for his gift.

**Hull.**—The new "Globe Warehouses," a large block of buildings erected in High-street by Messrs. Bilton & Co., at a cost of upwards of 30,000*l.*, have lately been opened. The new



buildings have been erected on a site upwards of three-quarters of an acre in extent, which includes the whole area between High-street, Chapel-lane Staithway, Oriel Staithway, and the River Hull, with the exception of the two blocks of offices at the corners of the High-street frontage. The buildings comprise three separate warehouses, divided by areas open to the sky for light and ventilation, and communicating only on the ground-floor by double iron doors. The north warehouse is 40 ft. in width, and extends from the river to the back of Oriel-chambers; the south warehouse is also 40 ft. in width, and extends from the river along Chapel-lane Staithway to the back of the offices fronting High-street; while the centre warehouse is of an average width of 70 ft., and extends from the river to High-street. All the buildings are five stories in height, the floors being supported by cast-iron columns with grooves in the sides to admit of the several floors being divided up into bins by division boards. Two inside staircases lead from the ground-floor to the first floor, but above this level all the floors are reached by two iron staircases on the river front placed entirely outside the building; this arrangement is of great advantage in point of protection against fire, as direct communication between the warehouses and openings in the floors is thereby avoided. All three warehouses have a frontage to the River Hull, and the topmost floor across this frontage is considerably higher than elsewhere, so as to accommodate the hopper and hand machinery in this part of the building. The machinery consists of cranes for discharging barges lying alongside the wharf, and "carriers" for distributing the grain over the floors of the warehouse. The cranes, of which there are three (one to each warehouse), are worked by hydraulic power on the high pressure or "accumulator" system introduced by Sir William Armstrong. They are fixed on the outside of the building, and constructed to make a lift every minute, and as the jibs are of great length, and are fitted with hydraulic lifting or "topping" gear, they will command a double tier of barges lying alongside the quay. The grain is lifted in Priestman's "grab" hockets, holding  $\frac{3}{4}$  quarters of wheat, and discharged into hoppers in the roof, at a height of about 70 ft. above the quay. The buildings have been designed by, and carried out under, the superintendence of, Messrs. Botterill, Son, & Bilson, architects, Parliament-street, Hull. The whole of the works have been executed by Messrs. George Jackson & Sons, contractors, of Witham, Hull, except the cast-iron columns, which were supplied by Messrs. King & Co., Limited, of Hull. Mr. W. Gravel has been the clerk of works. The crane and hand machinery has been designed and executed by Sir W. G. Armstrong, Mitchell, & Co., of Elswick Works, Newcastle-on-Tyne.

**Leek.**—At the Town-hall, Leek, on the 31st ult., Mr. J. T. Harrison, C.E., one of the Local Government Board's inspectors, sat for the purpose of receiving evidence relative to the extension of the gasworks, cemetery, and Town-hall. The first part of the inquiry was with respect to repealing and altering the Leek Improvement Act, 1856, by means of a provisional order, so as to enable the Commissioners to extend the area of the gasworks from two acres to four, and to borrow 1,500*l.* for this purpose. There was but little opposition to this proposal. Then came the question of enlarging the acreage of the cemetery from seven to twelve, and a similar consensus of opinion was elicited. With regard to the extension and alteration of the Town-hall, however, there was strong opposition, about half the Board itself protesting against the proposals made. The relative merits of three sets of plans, prepared respectively by Mr. Waterhouse, Mr. J. W. Critchlow (Leek), and Messrs. Sugden & Son, also of Leek, were discussed at length. The first, which had been adopted by the Board by a majority of one, was characterised as costly and unsuitable; Mr. Critchlow's met with some favour owing to its simplicity and economy; and that of Messrs. Sugden was generally approved as being calculated to remove at a moderate cost some of the defects of "the most defective room in the county." Mr. Harrison, after patiently listening to those who opposed the decision of the Commissioners, said he should advise the purchase of the adjacent property at a cost of 1,000*l.*, and recommended the Board to reconsider the

plans, and make a fresh application to the Local Government Board. He thought the plan of the Messrs. Sugden was a good one, inasmuch that it dealt effectively with a staircase which could not fail to prove highly dangerous in the event of fire or panic.

#### CHURCH-BUILDING NEWS.

**Begelly (near Tenby).**—On the 27th ult. Begelly Church was reopened, after restoration. The architect for the work was Mr. Bruce Vaughan, of Cardiff, and the contractors were Messrs. George Watkins & A. Davis, Begelly, the amount of whose tender was 964*l.*

**Belfast.**—Windsor Presbyterian Church, Belfast, was opened on the 27th ult. It occupies an elevated site at the junction of Derryvolgie-avenue with the Lisburn-road. The plan comprises a nave with transepts. At the rear, the session room, ladies' room, ministers' room, and large class-room, approached by a small staircase, with lavatories, &c., form a distinctive group. The main entrance is situated opposite to Derryvolgie-avenue. The principal feature is the tower, placed at the north-west angle of the church, terminating in an octagonal spire and nave rising to a height of 160 ft. The church is paved to accommodate 520 persons on the ground-floor, and 145 on the gallery. The heating is effected by hot water, carried out by Messrs. Riddell & Co.; the lighting by gas pendants, by Mr. J. Dowling; the stone carving by Mr. J. Malcolm, and the upholstering work by Mr. J. C. Mayrs. The general contractor was Mr. R. Corry, and the architects are Messrs. Young & Mackenzie. The cost of the church, enclosing walls, &c., will be about 6,700*l.*

**Boroughbridge.**—St. James's Church, Boroughbridge, was reopened on Sunday last, after redecoration, which has been carried out by Mr. Knowles, of York.

**Cardiff.**—A meeting of the congregation of St. Catherine's Church, Cardiff, has been held for the purpose of considering the best means of raising the funds necessary for the completion of the church. The building was to have cost 8,000*l.*, 3,250*l.* of which has already been expended in the construction of the nave, and there remains the east portion of the church, consisting of the chancel, transept, vestry, and organ-chamber, also the greater part of the west portion, to be built before the church is completed, the erection of which is estimated will cost 5,000*l.* The architect is Mr. Kempson, the diocesan architect.

**Clerkenwell.**—The exterior of St. John's Church, Clerkenwell, has recently been renovated, from the designs and under the supervision of Mr. John Oldrid Scott, F.S.A., acting under whose direction Mr. Harry Hems, of Exeter, was commissioned to execute a sculptured panel over the western entrance to the church. The panel is in fine-grained wood, and the sculpture is in bold and high relief. In the centre is seen St. John the Almoner, the patron Saint of the Knights of St. John; he is seated, and wears an eastern mitre, which might readily be mistaken for a diadem. He carries the double or patriarchal cross, and is in the act of dispensing alms from an open money-bag. St. John the Evangelist sits upon his right hand, with a chalice (out of which a serpent is issuing) and the eagle by his side. On the north side John the Baptist is seated, clad barely in camel-skins, and hearing and holding a pilgrim's staff. Behind the figures, and at either end, are palm trees, and the heads of the two outside statues are surmounted by nimbi.

**Peebles (N. B.).**—The new Parish Church of Peebles was opened on the 24th ult. It has been erected, at a cost of about 10,500*l.*, during the past two years on a commanding site at the head of High-street, which was occupied by the former church. The church, which contains upwards of 1,200 sittings, has been erected from the designs and under the direction of Mr. William Young, architect, London. It is of stone both outside and inside, and is designed in the style of the thirteenth century period of Gothic of the Scottish type. It is about 118 ft. in length by 63 ft. in width, and is composed of nave, north and south aisles and chancel, with entrance lobby and staircases extending the whole width of the church on the east. A spacious vestry or session-house, which communicates with the chancel, has been added at the north-west corner of the church, and has

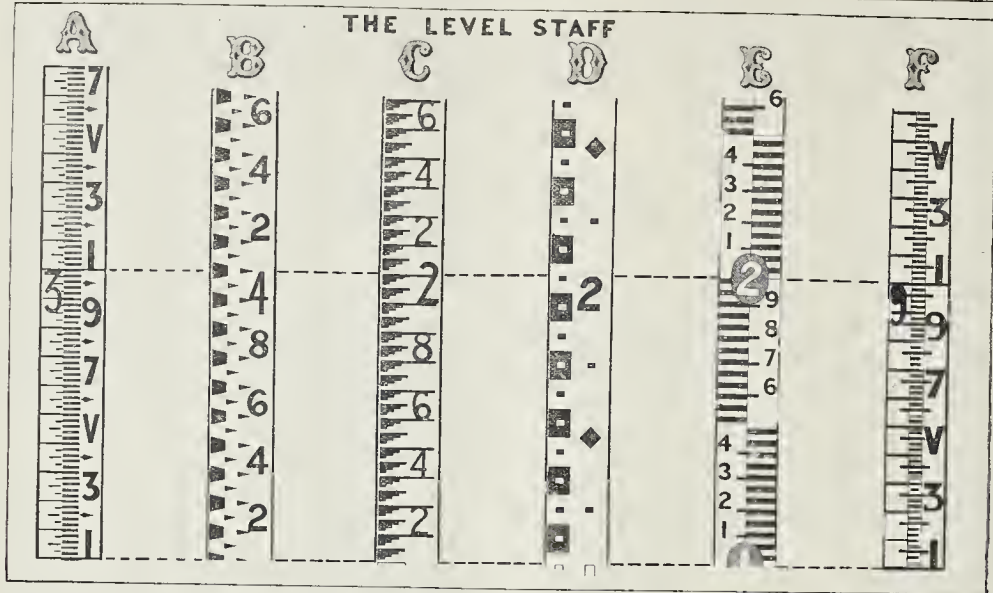
been planned so as to be able to accommodate the Presbytery. The nave, 85 ft. long by 31 ft. wide, is divided into four bays, and connected with the aisles by arcades of four large pointed arches on each side, springing from stone columns with richly-moulded capitals and bases. In the walls of the aisles, opposite each of the arcade arches and central therewith, are triplet windows, with richly-traceried heads, to the two central bays, which are varied by four lancet windows in the two end bays, similar windows being repeated on the return wall of the aisle. The two central windows of the south aisle are made a special feature by being carried up above the gallery, and form double transept gables intersecting with the main roof of the nave. The chancel, which is about 23 ft. by 21 ft., has the floor raised two steps above the level of the nave floor. The principal feature of the church is the tower, which is placed at the south-east corner, and forms a picturesque addition to the view from the High-street and Tweed Bridge. At the base it is about 20 ft. square, the height to the vane being about 120 ft. The contractor for the whole of the works in connexion with the building was Mr. Alexander White, builder, Edinburgh. Mr. William Fox, Peebles, acted as clerk of works.

**Plymouth.**—The scaffolding has lately been removed from the tower of St. Matthias's Church, Plymouth. The tower measures on plan 22 ft. square from wall to wall, and 32 ft. from buttress to buttress, extreme measurement. The walling-stones of this tower, like the material used in the erection of the fabric generally, are of blue limestone from the Pomphlet Quarries; whilst the dressings in the main are of brown-hed Portland stone. Messrs. Hine & Odgers, the architects of the new church, chose the Perpendicular period of Gothic for the style in which to design the church. Each angle of the massive parapet is surmounted by lofty crocketed octagonal pinnacles, from the bases of which spring a number of lesser pinnacles, also crocketed. In the centre of the parapets, on all four sides, are slender pinnacles boldly carved and of graceful form. The belfry windows are double ones, each 25 ft. from sill to head. The higher parts of these are filled with tracery, whilst the louvre panels between the nullions are carved with open work. Lower down, the buttresses break off with carved pinnacles, and the turret at the north-east corner of the tower makes a pleasing and piquant break to the formal outline of the erection generally. Mr. Weymouth, clerk of works, has superintended the course of the building, stone after stone, as the representative of the architects' and building committees. Messrs. J. Finch & Son, builders, of York-street, Plymouth, have erected the tower, and are also carrying out the building of the church. The whole of the stone carving and sculptural work upon the tower and upon the church generally is by Mr. Harry Hems, his foreman of carvers being Mr. George Edmed.

**Streatham.**—On the 2nd inst. a new church in Streatham Park, dedicated to St. Alban, was consecrated by the Bishop of Rochester. It is built in the Romanesque style, from designs by Mr. Edward H. Martineau, of Weymouth-street. It is faced inside and out with red bricks, the columns, dressings, &c., being of red Newhaven stone. There is a substantial open-timbered roof covered with Bracknell red tiles. The floors of the nave, &c., are paved with Gregory's wood blocks, and that of the chancel with mosaic. Messrs. Haden & Son, of Trowbridge, have carried out the heating, and Messrs. Strode & Co. the gas lighting; the general contractors being Messrs. Gregory & Co., of Clapham Junction. The cost of the portion of the building erected is about 6,500*l.*

#### The Taylor Art Scholarship, Dublin.

The *Freeman's Journal* reports the result of the competition for this scholarship, and says that the scholarship and prizes are derived from the income arising from the sum bequeathed by the late George A. Taylor for the promotion of art in Ireland. They are open to all Irish students not exceeding twenty-five years of age, who shall have attended twelve months at least a school of art. The scholarship has been awarded to Mr. Henry Stein Cairnes, for a painting which he has named "The Model."



Various Forms of Level Staff.

### The Student's Column.

#### FIELD WORK AND INSTRUMENTS.—XVI.

##### Surveying Instruments.

##### IX.—THE THEODOLITE (continued).

**I**N the methods described as (a) and (c) two distant points or stations are required. The points ranged by method (a) are both in front of the instrument, and the angle between their directions is observed before and after reversing the telescope upon its trunnion axis, and after traversing the body of the instrument half round upon its vertical axis with the vernier plate clamped. In method (c) the points ranged are upon opposite sides of the instrument. If the surveyor is satisfied that the trunnion axis of the telescope properly reverses over the vernier plate when the latter is set level, and that the vertical capstan-headed screws in the diaphragm plate need no adjustment, then it is not necessary for the two objects viewed to stand upon the same level. In method described as (b) a single station, at as great a distance as possible, is sufficient. The line of collimation is set upon the point selected, and the readings upon the vernier plate are taken both before and after reversing the trunnion axis or traversing the telescope round vertically end for end, but instead of the body of the instrument being traversed half round, as in methods (a) and (c), the vernier plate is traversed half round from the position shown in fig. 39 to the position shown in fig. 40 (page 522, ante).

The accuracy of the azimuthal axis may be further tested by turning the vernier plate 90° upon its vertical axis, or one-quarter round backwards and forwards, so that the telescope may be over the other parallel plate screws marked Z Z, the centre line joining which is at right angles to the centre line U U, joining those over which the instrument has been tested (see figs. 3 and 4, page 370, ante).

The measurement of horizontal angles being the most important function of a theodolite, it is best to adjust the collimation first for horizontal planes and the measurement of vertical angles; then, secondly, for vertical planes and the measurement of horizontal angles. By this means the telescope will remain finally adjusted under conditions in which it is most generally employed.

In order that the telescope may traverse a vertical circle and its line of collimation set out vertical angles or find any number of points in a vertical plane, it is necessary that its trunnion axis should be truly horizontal. It will be

observed in fig. 39, which represents a transit instrument, that one end of the trunnion axis of the telescope, where it rests in the Y's, is arranged with an adjustable block. This block which is technically called a slipping-piece, is raised or lowered by turning the capstan-headed nuts attached to its screw connexion with the upright marked E. A long and sensitive spirit-level, marked H in fig. 4, is placed transversely, spanning the instrument from one trunnion bearing to the other. The feet of the standards to this level are formed of two inverted V-shaped notches filed where they rest on the trunnion as shown in fig. 3. The telescope is placed diagonally over the parallel plate screws U U, and the instrument set up level. The spirit bubbles Q and T will then be in the centre of their run. To adjust the horizontality of the trunnion axis the spirit level H is first placed upon the trunnion bearings and set level if it appears out of the centre of its run, by its under parallel plate-screws marked Z Z. It is then lifted carefully off and reversed end for end upon the trunnion bearings. A small wooden handle, omitted in fig. 4, is often attached to the centre of this level at H to prevent the heat of the hand affecting the bubble when touching it. The bubble tube being properly graduated, it is at once seen if the bubble remains in the centre of its run. If it deviates when reversed, half the error must be corrected by means of its own capstan-headed adjustment screws and half by the two parallel plate-screws beneath it marked Z Z. The trunnion axis will then be parallel to the run of this level marked H, when it is set level, but in adjusting it for reversion the vernier plate as indicated by the spirit-levels Q and T step, therefore, will be to reset the spirit levels Q and T in the centre of their run by working the parallel plate-screws U U, and Z Z, then raise or lower the slipping-piece in the upright marked E until the bubble in the axis level tube marked H is in the centre of its run. By this means the trunnion axis can be set parallel to the level of the vernier plate, when it will be at right angles to the vertical axis of the instrument, and is thus finally adjusted for reversion.

After the preceding operation has been gone through, set the index of the verniers upon the vertical arc to zero, fix the clamp M, and level the bubble on the telescope by means of the adjacent screws marked L L in figs. 3 and 4. Make the bubble reverse by traversing the horizontal vernier plate half round the vertical axis, and adjust half any error that may exist by means of the screws L L, and the remaining half by means of the capstan-headed screws

which connect the longitudinal bubble to the telescope. Having done this, unclamp the screw M and point the telescope to some well-defined distant object. Take the angle of altitude or depression of this object, after clamping the arc and bisecting the object viewed with the cross hairs by means of the tangent screw J to the vertical circle. Then reverse the telescope in the Y's, and revolve the instrument half round horizontally. Repeat the operation of again setting the vertical arc to zero, and level the bubble by the screws L L (fig. 3). Set the telescope upon the point in the object first ranged, and if the vertical angle is found to be the same in both positions, no adjustment of the vertical collimating screws will be necessary, but if the first and second readings do not coincide, set the verniers to the mean angle, taking care all through that the axis bubble H appears perfect, and move the vertical screws upon the diaphragm plate until the intersection of the cross wires accurately cuts the distant point employed for the purpose. If preferred, a distant point upon a level with the line of collimation when the verniers on the vertical arc read zero and the longitudinal spirit bubble is set in the centre of its run may be used for the purpose instead of a point above or below the horizon.

##### X.—THE LEVEL STAFF.

Before proceeding to describe the optical instruments employed for taking levels, it is necessary to be acquainted with the level staff, by means of which heights are read. Six different kinds of graduations are illustrated in our diagram. The vertical distance between the two horizontal dotted lines indicates a height of one foot decimally divided. By placing a straight edge across in any position parallel to these dotted lines the reader will be able to compare the patterns A, B, C, D, E, and F, and to select the one he would prefer for use in the field.

**Romford.**—The new Post-office here is nearly completed, and will shortly be opened for business. It is situated on the west side of South-street, and has a frontage of 51 ft. The front elevation is faced with red bricks, the style adopted by the architect being a modification of what is popularly known as "Queen Anne." The building has been erected for the architect, Mr. E. Clerk Allam, of Romford, by Mr. H. Booth, the plumbing and decorating being carried out by Mr. A. T. Yull. The office fittings have been made by Messrs. Hammond & Sons.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

15,203 Pulleys. W. T. Kellogg. The improvement which is the subject of this invention consists mainly in giving a curved shape to the pulley-socket, so that it may be driven into the opening made in the wooden frame by a series of auger-holes. Spikes or projections are made or cast upon the pulley-holes, so as to aid the fixing of the same in the window-frame. 15,552, Roofing Tiles. H. W. Lowden. According to this invention, a double clip or clips is formed upon the back of the tile, which fixes upon the tile lath, and secures the same against falling off. 5,241, Seal-pipes. W. Cheal. By this invention a counter-sunk hole is made in the floor of the water-closet, and a coupling hoop of lead is then affixed and beaten in so that the leaden soil-pipe is joined to the earthenware closet-pipe. Putty is sometimes used for additional security in making the joint, which in every case is made effectually water and gas tight. 273, Corner Clamps. J. Scherbel and T. Kemms. According to this invention, clamps are made with serrations or teeth in such form as that when bent on the corner of a frame the direction of the angle of the teeth shall be against the outside of the frame, and all is held together quite securely. 431, Nail-driving Appliance. J. B. De Forest. The subject of this invention consists of a kind of magazine containing a supply of nails, which are driven downwards by every stroke or concussion of the whole machine. When a nail is driven home, the supply is cut off, only to begin further operations in an exactly similar manner. 1,193, Ventilators. W. Eckstein. This invention is claimed to be an improvement on what is known as "Sheringham's Ventilators." Here the ventilators are made right or left handed, as desired, and a weighted flap is hinged to the casing, as is also the box or door of the ventilator. The improvements are in the direction of economy in the cost of manufacture, and in providing an easier method of opening and closing the apertures. 781, Ornamenting Ceilings, Walls, &c. H. McDonald and others. The object of this invention is to provide an unbroken material for walls, &c., by the use of paper or such like material. The paper is softened by moisture, and when applied in this state to the walls it is worked into the figures and patterns by the fingers of the operator or by suitable tools, thus forming one unbroken covering. NEW APPLICATIONS FOR PATENTS. April 1.—4,855, W. and N. Haigh, Flooring Cramp. April 2.—4,909, A. Nicholas, Door-hells, &c.—4,917, W. Hawkins and Others, Axle Pulleys for Window-sashes, &c.—4,927, J. Wilson, Street Paving.—4,937, A. Boulton, Drain Traps. April 4.—4,985, J. Thompson, Combination Range.—4,997, E. Furnifex, Draught Preventer, &c., for Doors and Windows. PROVISIONAL SPECIFICATIONS ACCEPTED. 1,615, A. Edmeades, By-way Cock for connecting House Service-pipes to Water Mains.—2,557, E. Green, Fastening Hooks for Spindles.—2,755, W. Gaultier, Stop Blocks for Doors, Gates, &c.—3,329, T. Arrol, Trough Decking or Flooring for Bridges and Structures.—3,343, S. Proctor, Key-hole Escutcheons.—3,406, F. Cox, Fastenings for Sashes, Casements, &c.—3,470, W. Moore, Preventing Water-pipes from Bursting.—4,327, C. Henderson, Construction of Chimneys Inside Buildings. COMPLETE SPECIFICATIONS ACCEPTED. Open to Opposition for Two Months. 5,969, J. Rainier, Ventilator and Chimney Cowl for Extracting Foul Air and Smoke from Buildings. 7,018, P. Gay, Sawing, Cutting, Dressing, or Polishing Stone, Marble, &c.—7,811, H. Hadden, Lifts.—10,670, E. Edwards, Iron Grids for Buildings.—1,759, C. Ford, Surface Tiles for Walls, Partitions, Ceilings, and Floors.—3,296, J. Taylor, Chimney Pots. RECENT SALES OF PROPERTY. ESTATE EXCHANGE REPORT. APRIL 4. By E. ROBIN & HENR. Hamptonstead-rod—No. 24, freehold..... £1,550 By REXFORD & EASON. Kensington—8, Cairns-road, freehold..... 300 Battersen—37, Pembroke-square, 35 years, ground-rent 9s. 10s..... 550 By G. A. BICKERTON. Kentish Town—18 to 10 even, Castle-road, 48 years, ground-rent 2s..... 925 Elynes Park—A plot of freehold land..... 25 APRIL 5. By WALKER & BUNY. Mile End—51, Bancroft-road, 62 years, ground-rent 4s..... 360

Table listing property sales with columns for location, years, and price. Includes entries like Bromley-8 to 15 odd, Burcham-street, 81 years, ground-rent 10s. (4380); Camden-road-68, Hilldrop-crescent, 52 years, ground-rent 8s. (540); Holloway-555, Caledonian-road, 55 years, ground-rent 5s. (490); Brighton-29A, 30, and 31, Richmond-buildings, freehold (900); Hendon Springs-road-The freehold house, Fairfield (1,400); New Cross-20, Ashmead-road, 89 years, ground-rent 4s. 5s. (255); 1 to 4, Drydale-road, 65 years, ground-rent 12s. 11 and 12, Drydale-road, 65 years, ground-rent 6s. (640); 3 to 8, Glenville-grove, 78 years, ground-rent 1st. 10s. (630); South Kensington-191, Earl's Court-road, freehold Chelsea-5, 6, and 7, Hobury-street, 67 years, ground-rent 15s. (1,500); South Hackney-15 and 17, St. Thomas's-terrace, 54 years, ground-rent 9s. (610); Kentish Town-road-Nos. 112 to 118 even, and three shops in rear, 76 years, ground-rent 160s. (5,000); Balham-98, Fernlea-road, 86 years, ground-rent 8s. 6s. (320); Dutton Green-Grand-rents of 10l. 10s, reversion in 96 years..... 220; Bermondsey-7 and 9, Yalding-road, 47 years, ground-rent 8s. (510); Horeleydown-18 to 36 even, Boss-street, 39 years, ground-rent 90s. (920); 7, 8, and 9, Kinross-street, 28 years, ground-rent 7s. (435); Bermondsey-110 to 118 even, Role-road, 46 years, ground-rent 18l. 10s..... 615; South Norwood-Bickton House, freehold (280); Westminister-24, Maraban street, freehold (750); 36 and 37, New Peter-street, and a cottage, freehold (750); Romney-street-Ground-rent of 50l. reversion in 34 years (1,500); Tufton-street-Ground-rent of 25l, reversion in 78 years (630); 65, Tufton-street, and 1 to 3, Tufton-street, and The Two Brewers public-house, freehold (2,820); 1, 2, and 3, Little Tufton-street, 67 to 79 odd, Tufton-street, 62 and 64, Romney-street, and 1 to 4, Lane's Cottages, freehold (4,290); 4) to 46 even, Horseley-road, 39, Romney-street, and 1 to 5, Carpenter-street, freehold (3,560); 48, 50, and 52, Horseley-road, and 8 to 12, Carpenter-street, freehold (2,690)

MEETINGS.

MONDAY, APRIL 18. Royal Institute of British Architects.—Business meeting to consider Schedule of Professional Practice and Charges of Architects. 8 p.m. Surveyors' Institution.—Adjourned discussion on the paper by Mr. Wheeler, Q.C., on "Dilapidations and the Legal Obligation to Repair," and on the paper by Mr. P. E. Pilditch, entitled "Notes on Dilapidation Practice." 8 p.m. Sanitary Legislation Conference.—2 p.m. Victoria Institute.—8 p.m. TUESDAY, APRIL 19. Institution of Civil Engineers.—Papers by Messrs. Grover, Fox, Stocks, and Others on "Water-Supply from Wells, in the London Basin, at Bushey (Herts), in Leicestershire, and at Southampton." 8 p.m. Society of Arts (Foreign and Colonial Section).—Major-General Sir Charles Warren, G.C.M.G., on "South Africa." 8 p.m. Royal Institution.—Dr. John Hopkinson, F.R.S., on "Electricity." 8 p.m. Parker Museum (Lectures for Sanitary Inspectors).—Captain Douglas Galton, F.R.S., on "Ventilation, Measurement of Cubic Space, &c." 8 p.m. Statistical Society.—Mr. N. A. Humphreys on "Class Mortality Statistics." 7.45 p.m. Birmingham Architectural Association.—Open meeting. 7.30 p.m. WEDNESDAY, APRIL 20. Society of Arts.—Mr. A. Reckmann on "Electric Locomotion." Mr. W. H. Preece, F.R.S., in the chair. 8 p.m. London and Middlesex Archaeological Society.—Mr. F. G. Hilton Price, F.S.A., on "Cornhill and its Vicinity." (Geological Museum, Jernyngham-street, 3 p.m.) British Archaeological Association.—Dr. J. Harker on "The Consecrated Wall on Lancaster Castle Hill." 8 p.m. Royal Meteorological Society.—Four papers. 7 p.m. THURSDAY, APRIL 21. Society for the Encouragement of the Fine Arts.—Dr. Phocas, F.S.A., on "Art in Scandinavia." 8 p.m. Parker Museum of Hygiene.—Mr. Alfred Fryer on "Dust and Ashes, and how to deal with them." 5 p.m. Royal Archaeological Institute.—(1) Mr. J. P. Harrison on "Pre-Norman Remains in England." (2) Mr. J. P. Harrison on "Some Celts of Chinese Jade recently found in America." 8 p.m. FRIDAY, APRIL 22. Architectural Association.—Paper by Mr. George Aitchison, A.R.A., entitled "Stray Thoughts on Architectural Education." 7.30 p.m. Royal Institution.—Sir Frederick Abel, F.R.S., on "The Work of the Imperial Institute." 9 p.m. Parker Museum (Lectures for Sanitary Inspectors).—Dr. Louis Parkes on "Water Supply, Drinking Water, Pollution of Water." 8 p.m. SATURDAY, APRIL 23. Edinburg's Architectural Association.—Visit to Dirleton Castle.

Miscellaneous.

Decay of the South Staffordshire Iron and Coal Trades.—The Staffordshire Advertiser says:—Mr. John W. Sparrow, the well-known ironmaster, of Bilston, has this week published a letter on the subject of the local iron trade, which will excite considerable interest throughout the Black Country, if not, indeed, throughout a much wider area. Mr. Sparrow states that he has known Bilston for nearly seventy years, and for nearly half a century he has been actively engaged in business there. For the greater part of that long period he has been distributing in the shape of wages the large sum of 50,000l. a year. Now, however, his mines are closed and his only remaining blast furnace is about to cease working. Twenty years ago, within a three-mile area of Wolverhampton, there were forty-seven furnaces in blast. Now there is only a solitary furnace blowing, and that is the furnace which Mr. Sparrow finds himself reluctantly compelled to close. This state of affairs is of the most serious import to South Staffordshire, and, indeed, to the country at large. Mr. Sparrow attributes the altered condition of affairs to the "eight hours" system adopted by the miners, but for which he declares that his now drowned-out mines would have enabled him and his successors to have carried on the works for another fifty years, but he adds "short hours and great wages have converted what was a profitable business into a heavily losing one, and I can stand it no longer." Without expressing any opinion as to the conclusions arrived at by Mr. Sparrow respecting the cause of the prevailing deplorable state of the South Staffordshire iron trade, the facts cited in his letter are of the gravest import, and demand the serious attention of those more immediately concerned. It would, we think, be wise for employers and employed in the coal and iron trades to meet in friendly council, and endeavour to find some solution for a condition of affairs which threatens almost ruin to the staple industries of the Black Country, the lurid glare of whose furnaces was once proverbial. Those furnaces have now become, in the majority of cases, relics of a decaying industry, and have the appearance of so many miniature "extinct volcanoes," whose gloom and silence proclaim with thrilling effect the want and misery which must be the inevitable result of so many thousands of work-people being reduced to a state of enforced idleness.

The Strike in the Building Trade at Birmingham.—This strike, mentioned by us last week, still continues, but just as we go to press a meeting of the Birmingham Master Builders' Association is being held to consider a suggestion from the Carpenters and Joiners' Association that Dr. Langford should be joined with the Mayor in selecting a person to officiate as arbitrator in the dispute. On behalf of the masters it is pointed out that although there are several branches of operatives, comprising masons, bricklayers, plumbers, painters, carpenters, &c., the carpenters are the only body who have made any distinct advances towards a settlement by arbitration, and that any agreement to be satisfactory must be common to the whole trade. There does not appear to be any indisposition to accept the suggestion that Dr. Langford and the Mayor should jointly nominate an arbitrator. It is officially stated that there is no truth in the assertion that a number of the members of the Master Builders' Association have left the Association since the commencement of the present dispute, or that they are acting at variance with the Association. Mr. Bigwood, the employers' secretary, writing in defence of the action taken by the master builders, states that "in October last, when trade was very bad, and before there was any talk of improvement or of Jubilee erections, they gave the operatives notice of 1d. per hour reduction. Taking these facts into consideration, in conciliation they offered to accept 3d. per hour reduction, or to go to arbitration on the whole question. Further, before the rules lapsed, on the 1st inst., my committee sent a circular to their members suggesting that efficient hands be paid the existing rate."

The Registration of Plumbers.—We are informed that of nineteen journeymen plumbers examined at the last meeting of the examiners, nine candidates passed, and ten failed to satisfy the examiners.

**Restoration of Shrewsbury Castle.**—The exterior of this historic castle has just been restored, at the cost of the Duke of Cleveland, to whom it now belongs. The castle was founded by Roger Montgomery, who held one of the most important commands at the battle of Hastings, and was created first Earl of Shrewsbury; but the alteration of internal arrangement and external detail renders it impossible to say whether the present building is his work, though the massiveness of the walls and entire absence of buttresses lead to such a supposition; and some jambs and arch stones of the principal doorway, which have been found in a disused staircase, are certainly Early Norman and similar in stone and mode of working to the rest of the present building. One of the towers appears to have been altered circa 1200-1250. It is irregular in plan and was partially groined; the central boss, which has been found, being of pure Early English work. The main building was again altered about the time of Edward VI. or Elizabeth, an upper range of very good windows on the south side and the roof being of that period. Next came alterations in windows on the principal floor by Telford, the engineer, when he was constructing the great Holyhead-road, and they may be called good specimens of "Engineer's Gothic" of that period; being in good repair, and somewhat picturesque, they have not been meddled with. The castle was besieged in the Civil Wars of Charles I's time, but was taken by strategy by the rebels, and quietly given up again on the restoration of Charles II., so that no damage was done, and we are no doubt indebted to such peaceful transfers for its escape from the destruction which overtook so many other famous castles. The parapets, probably fifteenth-century work, and the ancient stonework generally, have been thoroughly repaired, the roof entirely re-covered with nearly 20 tons of lead, and the building, which lately looked as if going to ruin, is now safe for another hundred years, and forms a capital residence. The work has been executed by the following tradesmen: Mason's work, Mr. Dodgson, of Northallerton; Joiner's and painter's works, Mr. Morris; plumbing, Mr. Evans; glazing, Mr. Davies (the latter three all of Shrewsbury). The work has been done under the superintendance of Mr. J. P. Pritchett, architect, Darlington.

**Liverpool Engineering Society.**—The usual fortnightly meeting of the above Society was held at the Royal Institution, Colquhoun-street, on the 6th instant, the President, Mr. John J. Webster, M. Inst. C.E., being in the chair, when a paper was read by Mr. J. J. Campbell, entitled "Compound Engines for Atlantic Navigation." The author, after alluding to the interest that attaches to the question of the best type of engines for large Atlantic steamers, referred to the remark made by Mr. John, of Barrow, in his paper read at the Liverpool meeting of the Institution of Naval Architects last summer, that the large Atlantic lines had been rather behindhand in not having adopted the most recent types of machinery. Having described the principal types of engine hitherto employed in Atlantic steamers, he then spoke of the large consumption of coal in these vessels as compared with others, proceeded to express his opinions on the chief causes of it, especially inefficient expansion from the engines being too small for their power, and pointed out that the increase in pressure and piston speed adopted of late years had been utilised almost exclusively in obtaining more power in proportion to size, and not in producing economy of fuel. Having indicated some of the defects in existing types of engines, the author exhibited several combined diagrams from the engines of Atlantic and other steamers, and described the various methods in use for combining indicator cards, advocating the system recommended by Mr. Schönheyder at Middlesbrough.

**Alleged Pollution of the Dee by the Sewage of Wrexham.**—At the last meeting of the Wrexham Town Council, a letter was read from Mr. S. Smith (Town Clerk of Chester) stating that in consequence of marked pollution of the river Dee, their inspector had been examining into the cause, and he reported, after examining the Wrexham sewage farm, that the disposal of the sewage on the land was not satisfactory, as, at the time of his visit, a large quantity was delivered into the watercourse, which discoloured it for a considerable distance. The Town Clerk of Wrexham said he had communicated this letter to Colonel Jones, consult-

ing engineer for sewage disposal to the Borough of Wrexham, who replied that sewage was never delivered into the watercourse on their farm. It was naturally a matter of great anxiety to him to dispose of half a million gallons of sewage daily, without contamination of the stream by which all its liquid not evaporated must necessarily join the river Dee, from which the city of Chester was supplied with imperfectly-filtered drinking-water, and it was satisfactory to be able to say that that was the first complaint for many years from a corporation so deeply interested as that of Chester in watching his operations. It was resolved to send a copy of this letter to the Town Clerk of Chester.

**The Proposed Birmingham Ship Canal.** The Birmingham Town Council, at its meeting on the 5th inst., discussed the question of the proposed ship canal from that town to the Bristol Channel ports, via Worcester, Gloucester, and Sharpness, on a motion introduced by Ald. White, affirming the desirability of improved water communication between Birmingham and the sea, accepting the proposal which has been set on foot to provide this communication by widening, deepening, and otherwise improving the canal and river connexion between Birmingham and Sharpness, and asking for the appointment of a special committee to consider the subject, and to confer with the Town Council of Gloucester, who have already approved the scheme, and with all persons interested in the matter. A provisional committee of prominent citizens of Birmingham, Worcester, Gloucester, Cardiff, Bristol, and Swansea has at present charge of the scheme. A long and interesting discussion ensued on the motion, and in the result an amendment was approved, affirming the general desirability and necessity of improved water communication between Birmingham and the sea, and appointing a committee to consider the proposed and any other schemes which may be brought forward.

**Eyemouth Harbour Extension.**—According to the Scotsman, the harbour extension at Eyemouth has not proved a boon to the port. A plan showing extended quays and a deepened entrance was submitted and approved by the Board of Trade and the Eyemouth Police Commissioners, and the latter body, being assured that a loan of 25,000l. would be sufficient to carry out these works, granted security for this amount to the Loan Board. The 25,000l. has been spent in providing additional inner accommodation, but no attempt whatever has been made to deepen the entrance, and the port therefore derives no benefit in the shape of additional facilities for entrance and exit—the main objects of the works. The result is a great additional burden on the inhabitants without any increased revenue. The income of the harbour for the past year did not meet the payments due on the loan, and the Public Works Loan Commissioners called upon the Police Commissioners to make good the deficiency, by laying on a rate of 1s. 1d. per lb. on the whole rental of the burgh, which is the amount of assessment available for that purpose. The Police Commissioners demurred to this, seeing that the harbour has not been improved in the manner represented. The Loan Board has refused to listen to the Commissioners, and an action has been raised in the Court of Session to enforce payment of the instalments.

PRICES CURRENT OF MATERIALS.

| TIMBER.                    |           | £. s. d. | £. s. d. |
|----------------------------|-----------|----------|----------|
| Greenheart, B.G.           | ton       | 6 10 0   | 7 10 0   |
| Teak, E.I.                 | load      | 0 0 0    | 0 0 0    |
| Sesquial, U.S.             | foot cube | 0 2 3    | 0 3 0    |
| Ash, Canada                | load      | 3 0 0    | 4 10 0   |
| Sirch                      | "         | 2 0 0    | 3 10 0   |
| Elm                        | "         | 3 15 0   | 4 10 0   |
| Fir, Dantale, &c.          | "         | 1 10 0   | 4 0 0    |
| Oak                        | "         | 2 10 0   | 4 10 0   |
| Canada                     | "         | 3 0 0    | 6 0 0    |
| Pine, Canada red           | "         | 3 0 0    | 6 0 0    |
| " yellow                   | "         | 2 5 0    | 4 0 0    |
| Lath, Dantale              | fathom    | 3 0 0    | 5 0 0    |
| St. Petersburg             | "         | 4 0 0    | 6 10 0   |
| Wainscot, Riggs            | 100       | 2 15 0   | 0 0 0    |
| Odessa, crown              | "         | 2 15 0   | 3 0 0    |
| Deal, Finland, 2nd and 1st | std. 100  | 7 0 0    | 8 0 0    |
| " 4th and 3rd              | "         | 5 10 0   | 6 10 0   |
| Riggs                      | "         | 6 10 0   | 7 0 0    |
| St. Petersburg, 1st yellow | "         | 8 10 0   | 14 0 0   |
| " 2nd "                    | "         | 7 0 0    | 8 0 0    |
| " white                    | "         | 6 0 0    | 15 0 0   |
| Swedish                    | "         | 6 0 0    | 15 0 0   |
| White Sea                  | "         | 7 0 0    | 16 10 0  |
| Canada, Pine, 1st          | "         | 17 0 0   | 25 0 0   |
| " 2nd                      | "         | 11 0 0   | 16 0 0   |
| " 3rd, &c.                 | "         | 8 0 0    | 10 0 0   |
| " Spruce, 1st              | "         | 8 0 0    | 10 0 0   |
| " 3rd and 2nd              | "         | 5 0 0    | 7 0 0    |

| TIMBER (continued).                        |      | £. s. d.  | £. s. d.  |
|--------------------------------------------|------|-----------|-----------|
| Deal—New Brunswick, &c.                    | "    | 5 0 0     | 7 0 0     |
| Battens, all kinds                         | "    | 4 0 0     | 11 0 0    |
| Flooring Boards, sq. 1 in, prepared, First | "    | 0 8 0     | 0 11 8    |
| Second                                     | "    | 0 6 8     | 7 8       |
| Other qualities                            | "    | 0 5 0     | 6 0 0     |
| Cedar, Cuba                                | foot | 0 0 3     | 0 0 3 3/4 |
| Hongkong, &c.                              | "    | 0 0 24    | 0 0 3 3/4 |
| Australian                                 | "    | 0 0 4     | 0 0 6     |
| Mahogany, Cuba                             | "    | 0 0 4     | 0 0 7     |
| St. Domingo, cargo average                 | "    | 0 0 4     | 0 0 6     |
| Madrugay, Mexican, cargo av.               | "    | 0 0 3 3/4 | 0 0 4 1/2 |
| Tobacco                                    | "    | 0 0 4     | 0 0 6     |
| Honduras                                   | "    | 0 0 4     | 0 0 6     |
| Maple, Bird's-eye                          | "    | 0 0 6     | 0 0 8     |
| Rose, Rio                                  | "    | 7 0 0     | 10 0 0    |
| Bahia                                      | "    | 6 0 0     | 10 0 0    |
| Box, Tarley                                | "    | 5 0 0     | 15 0 0    |
| Satin, St. Domingo                         | foot | 0 0 5     | 0 0 10    |
| Porto Rico                                 | "    | 0 0 6     | 0 0 10    |
| Walnut, Italian                            | "    | 0 0 4     | 0 0 5     |

METALS.

|                           |     |          |          |
|---------------------------|-----|----------|----------|
| Iron—Bar, Welsh in London | ton | 4 7 6    | 4 15 0   |
| " " in Wales              | "   | 4 2 6    | 4 7 6    |
| " Staffordshire, Lond.    | "   | 5 0 0    | 7 0 0    |
| Sheet, single, in London  | "   | 6 15 0   | 8 10 0   |
| Hoops                     | "   | 6 0 0    | 7 0 0    |
| Nails—do                  | "   | 8 15 0   | 6 10 0   |
| COPPER—                   |     |          |          |
| British, cake and ingot   | ton | 43 0 0   | 43 10 0  |
| Best selected             | "   | 44 0 0   | 45 0 0   |
| Sheets, strong            | "   | 50 10 0  | 51 0 0   |
| Chili, bars               | "   | 38 10 0  | 35 17 6  |
| YELLOW METAL              | lb. | 0 4 1/2  | 0 4 1/4  |
| LEAD                      |     |          |          |
| Sp. Spanish               | ton | 13 10 0  | 0 0 0    |
| English, common BRANDS    | "   | 12 15 0  | 0 0 0    |
| Sheet, English            | "   | 13 15 0  | 14 0 0   |
| SPRINT                    |     |          |          |
| Silesian, special         | ton | 14 2 6   | 0 0 0    |
| Ordinary brands           | "   | 14 0 0   | 0 0 0    |
| TIN—                      |     |          |          |
| Straits                   | ton | 101 5 0  | 101 15 0 |
| Australian                | "   | 107 6 6  | 112 7 6  |
| English ingots            | "   | 105 10 0 | 107 0 0  |

OILS.

|                        |        |         |         |
|------------------------|--------|---------|---------|
| Lined                  | ton    | 20 0 0  | 20 5 0  |
| Cocoon, Ceylon         | "      | 32 0 0  | 36 0 0  |
| Ceylon                 | "      | 25 10 0 | 0 0 0   |
| Palm, Lagos            | "      | 22 0 0  | 0 0 0   |
| Battered, English pale | "      | 21 15 0 | 22 0 0  |
| do brown               | "      | 20 5 0  | 23 10 0 |
| Cottonseed, refined    | "      | 18 7 6  | 20 0 0  |
| Tallow and Oleine      | "      | 25 0 0  | 45 0 0  |
| Lubricating, U.S.      | "      | 5 0 0   | 8 10 0  |
| do refined             | "      | 5 0 0   | 12 0 0  |
| TURKISH—               |        |         |         |
| American, in casks     | cwt.   | 1 8 6   | 0 0 0   |
| TAR                    |        |         |         |
| Stockholm              | barrel | 0 15 0  | 0 15 6  |
| Archangel              | "      | 0 12 6  | 0 0 0   |

TENDERS.

**ALTON (Hants).**—For additions and alterations to mansion, Broxhead, Alton. Mr. H. T. Keates, architect, Petersfield.—  
J. H. & E. Dyer, Alton (accepted), £21,851 10 0

**ALTON (Hants).**—For alterations to stables, Broxhead, Alton. Mr. H. T. Keates, architect, Petersfield.—  
J. H. & E. Dyer, Alton (accepted), £374 10 0

**ASHFORD (Middlesex).**—For the erection of villa residence. Mr. Ralph Pitt, architect, Staines. No quantities.—  
Bons, Staines ..... £750 0 0  
Hady, Uxbridge ..... 745 0 0  
Rewell, Staines ..... 735 0 0  
Norris, Sunningdale ..... 690 0 0  
Henley & Co., London ..... 598 0 0  
Addis, Hounslow ..... 591 0 0  
Aylott & Bretton, London ..... 591 0 0

**BEDFORD.**—For new provident dispensary. Messrs. Usher & Anthony, architects:—  
Corby & Son ..... £1,754 0 0  
Hayles & Son ..... 1,750 0 0  
W. Freshwater ..... 1,745 0 0  
T. Spencer ..... 1,715 0 0  
Warton & Walker ..... 1,688 0 0  
S. Foster ..... 1,671 0 0  
J. P. White (accepted) ..... 1,628 0 0  
[All of Bedford.]

**BOURNEMOUTH.**—For making roads and laying sewers on the Boscombe Park Estate, for the Boscombe Conservative Land Society (Limited). Mr. Reginald G. Pinder, surveyor:—  
S. Saunders, London ..... £903 11 6  
S. Minty, Bournemouth ..... 870 0 0  
G. Jansz, Bournemouth ..... 715 0 0  
W. H. Saunders & Co., Bournemouth ..... 703 18 4  
G. Troke, Bournemouth ..... 665 0 0  
W. Hoad, Bournemouth ..... 653 0 0  
C. Stickleland, Bournemouth (accepted) ..... 635 6 10

**BOURNEMOUTH.**—For new club-room at the South-Western Hotel, for Messrs. Eldridge, Pope, & Co. Messrs. Kemp-Welch & Pinder, architects:—  
E. Walden ..... £399 0 0  
Hards ..... 389 0 0  
Stroud ..... 360 0 0  
Morse ..... 350 0 0  
Rolls ..... 332 0 0  
[All of Bournemouth.]

**BREEBLEY HILL.**—For new bank buildings, for the Birmingham Banking Company (Limited). Mr. J. T. Meredith, architect, Kidderminster. Quantities by Mr. W. Lunan, Bournemouth.—  
Wm. Willetts, Old Hill (accepted), £2,766 10 0  
[Exclusive of bank fittings.]

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitomes of Advertisements in this Number.

COMPETITIONS.

Table with 5 columns: Nature of Work, By whom required, Premium, Design to be delivered, Page. Includes Town-hall, &c., Demerara (B. Guiano).

CONTRACTS.

Table with 5 columns: Nature of Work, or Materials, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes Erection of Public Baths, Railway Stores, Additions, &c., to "Brookleigh," Esher.

PUBLIC APPOINTMENTS.

Table with 5 columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes City Surveyor, York Corporation.

CARDIFF.—For erecting new art gallery and lodge, Penarth, near Cardiff, for Mr. J. P. Thompson. Messrs. Seward & Thomas, architects.

GRAYS THURBOCK (Essex).—For new schools, Arthur-street, for the Grays Thurbock School Board. Mr. Geo. Waymouth, architect. Quantities by Messrs. Goodchild & Son—

HANWELL (Middlesex).—For rak fencing to be fixed at the Cuckoo Schools, Hanwell, Middlesex:—

CHISWICK.—For the supply of 1,000 yards cube of 2-in. broken Guernsey granite, for the Chiswick Local Board:—

CRICKLEWOOD.—For the drainage of Hill Side, Cricklewood, for Mr. John Parris. Mr. Chas. J. Gladman, architect:—

CRGYDON.—For the erection of additional stabling in Handcroft-road, for Messrs. Carter, Paterson, & Co., under the superintendence of Mr. William Eves, architect. Union-court:—

DUDELEY.—For erecting warehouse for Messrs. Grainger & Smith. Mr. J. T. Meredith, architect, Kidderminster. Quantities by Mr. W. Lynn, Portsmouth:—

FELIXSTOWE (Suffolk).—For residence at Felixstowe, Mr. Horace Cheston, architect, London. No quantities:—

FOREST HILL.—For rebuilding offices and shops at Devonshire-road, Forest Hill, for Mr. Julius Garner. Mr. Frederic J. Ward, architect, Bucklersbury:—

GUILDFORD.—For alterations to 36, High-street. Mr. J. W. Stevens, architect and surveyor, New Bridge-street:—

LONDONG.—For rebuilding 1, 2, and 3, Newman-street, Oxford-street, for Mr. S. Chick. Mr. Edward C. Robins, F.S.A., architect:—

LONDON.—For the erection of St. Saviour's Church, Hatley-road. Messrs. J. E. K. & J. P. Cutts, architects:—

LONGNDGN.—For works at 74, Bishop's-road, Cambridge Heath. Mr. R. A. Lewcock, architect, Bishopsgate-street:—

LONDON.—For decorations and repairs at the Gifford Arms, Caledeon-road. Mr. R. A. Lewcock, architect, Bishopsgate-street:—

LONDONG.—For alterations at the Prince of Wales Tavern, Harrow-road, Paddington. Mr. R. A. Lewcock, architect, Bishopsgate-street:—

LONDONG.—For completion of sundry fittings at 44, Fish-street-hill, for Messrs. Wilkinson & Son. Mr. J. W. Stevens, architect and surveyor, New Bridge-street:—

LONDON.—For restoring premises damaged by fire, 346, Mile End-road. Mr. C. A. Legg, architect and surveyor:—

LONDONG.—For rebuilding 339, Bethnal Green-road, for Mr. W. Urwin. Messrs. Thos. & Wm. Stone, architects, Great Winchester-street:—

LONDON.—For the erection of club buildings and flats, for the Brynston Club, Lisson-grove. Mr. Geo. Hubbard, architect, Finsbury-circus. Quantities by Mr. J. Sargeant, Holden-terrace:—

PETERSFIELD.—For sanitary re-arrangements at the Board Schools. Mr. H. T. Keates, architect:—

PLYMOUTH.—For taking down and re-erecting four shops and dwelling-houses, with one bakery, situated 7, 8, 9, and 10, Exeter-street, Plymouth. Mr. B. H. Petheick, architect:—

SLOUGH.—For proposed new laundry and new plan- room at the British Orphan Asylum, Slough. Messrs. Eginton & Summerbell, architects, Windsor. Quantities by the architects:—

New Piano. Laundry. room. £1,283 .. £502

J. Willis .. 1,24 .. 449

W. Bevell .. 1,14 .. 480

J. Derrill .. 1,80 .. 600

Woodbridge .. 1,12 .. 418

Bradley & Co. .... 1,95 .. 430

Turtis & Appleton .. 1,30 .. 417

W. Watson .. 1,28 .. 433

T. Martin .. 1,010 .. 439

\* Accepted subject to revision.

SOUTHWARK.—For alterations and repairs at the Angel public-house, Newcomen-street, Southwark, for Mr. C. Hoare. Mr. Arthur W. Saville, architect, Strand.

Table with 2 columns: Name and Amount. Includes Ward & Lambie, Trewick, Nye, Waley, Walker, Lawrence, Royal, Spencer & Co., Peabody's Work, T. Heath, T. Moody, W. Helling, G. F. Moody.

STROUD GREEN.—For building the Stroud Green High School for Girls, and residence attached, Oakfield-road, for Miss Emily Mills. Mr. W. Street Wilson, architect. Quantities by Mr. J. W. Stevens, New Bridge-street.—Lansdown & Co., Richmond (accepted) £2,125 0 0

UXBRIDGE.—For erecting a new residence at Denham Fishery, near Uxbridge, for General Goodlake, V.C. Mr. Chas. J. Bentley, architect, Unicorn-court, Old Broad-street.—

Table with 2 columns: Name and Amount. Includes Chappell, Pimlico, Nightingale, Lambeth, Bull & Son, Southampton, Bird, Upper George-street, Turtle & Appleton, Wandswoth, Brown & Sons, Harefield, Parnell & Son, Rugby, Marriage, Croydon, Barnes, Ilford, Barnsley & Sons, Birmingham, Horsley Bros., Birmingham, Kearley, Uxbridge, Hendy, Uxbridge, Fassidge & Son, Uxbridge.

UXBRIDGE.—For erecting a gamekeeper's lodge, pair of labourers' cottages, and a range of garden buildings at Denham Fishery, near Uxbridge, Middlesex, for General Goodlake, V.C. Mr. Chas. J. Bentley, architect.—

Table with 4 columns: Lodge, Cottages, Green-houses, Total. Includes Bird, Turtle & Appleton, Hunt, Brown, Son, & Blomfield, Marriage, Adamson & Son, Hendy, Fassidge & Son, Kearley, Brown & Sons, Harefield (accepted).

\* SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than 12 Noon on THURSDAYS.

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

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We cannot undertake to return rejected communications.

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The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

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Map of London,

SHOWING BOUNDARIES OF SURVEYORS' DISTRICTS.

The four Sheets, into which the Map is divided (issued with the numbers of January 1st, 5th, 15th, and 22nd), if sent to the Office direct, or through any Newsgate, can be

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Box Ground. Winsley Ground. Farleigh Down. West Wood.

PICTOR & SONS, Box, Wilts. [Adv.]

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Doubling Free Stone

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HAM HILL STONE, Quarry Owners, Stone

BLUE LIAS LIME, Stoke - under - Ham,

(Ground or Lump), Ilminster. [Adv.]

Asphalts.—The Seyssel and Metallic Lava

Asphalt Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and mill-rooms, granaries, tun-rooms, and terraces. [Adv.]

Asphalts.

Seyssel, Patent Metallic Lava, and White Asphaltes.

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# The Builder.

Vol. LII. No. 2307.

SATURDAY, APRIL 23, 1887.

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### Water Transit of Heavy Goods.



**S**OMETHING should be done to put the canals of the country into a condition suitable for the present times. Since railways have been made the canals have been neglected. A few

of them have been converted into railways for short distances, but the principal canals in England and Wales remain, to the extent of about 3,000 miles. These form a sort of network of lines of water communication all over the country, and would be very suitable for the conveyance of heavy manufactured goods and raw materials, if they had outlets into main routes which would convey the goods and minerals to the sea-ports; but the main lines of canal are not of such dimensions as are suitable for present requirements,—at least, in some parts of the through routes. They were mostly made in short lengths and of dimensions suitable for the local requirements. Canals began to be made in England about the middle of the last century, and those now existing were nearly all made between that time and the year 1825. The main lines now require to be adapted to the use of steam as the power for propelling the boats, their dimensions require enlargement, and larger boats would be preferable to those which can now pass along any through route, seeing that we are in the presence of foreign competition, which our manufacturers and other traders have to meet. In some respects it is unfortunate that the necessities of trade at the present time demand the use of the greatest force we can apply to the manufacture and transport of articles of commerce, and this is steam, which we cannot produce without smoke or use without noise, and these perhaps do as much harm to one person as good to another; but we have put our hand to the plough and have gone too far in one direction to stand still now, in the presence of nations which follow the same course. We do not know what the pushing and inconsiderate manner in which the trade of this and neighbouring countries is carried on will produce in course of time, but if we must live as a nation amongst nations of like mind, we must beware in time of what they are doing, and that, for one thing, is to render their waterways as useful and as easily accessible as it is possible to make them. This nation cannot afford to leave the canals in the neglected state in which they now are; greater facilities for the transit of goods is required than railways alone supply, under their present

system of management. Railways, instead of being, as it was expected when they were constituted they would be, important helps to traffic for all alike, have become a trading monopoly for the carriage of everything produced, competing for profits with the proper traders of the country; and to enable them to do this they have been allowed by the Legislature to take possession of more than one-third of the canals, under the supposition that the canals would be used as adjuncts to the railways and continue to afford means of transport as before to those who required their use, not only for necessities of transport then existing, but, of course, also for those which might thereafter arise. If the traders of the country had foreseen the effect of giving Parliamentary sanction to the possession of canals by railway companies, the applications to Parliament for these powers would have been resisted, and probably successfully resisted; but, as it is, the arrangement has become most unfortunate for the general interests of the country. It cannot be denied that the railway management has been conducted with great astuteness, and has got the better of the interests of the general traders of the country. Heavy goods, which are particularly suitable for canal traffic, are carried by railways in competition with the canals, and as the bare cost of haulage on railways is very much greater than on canals, these goods are carried at rates which, although they do not remunerate the railway shareholders, are very burdensome to the traders. The legitimate traffic of railways is in the carriage of intrinsically valuable and comparatively light goods and passengers at a quick rate of speed, while the heavy goods and minerals have no need of quick transit. It happens, however, that from the numerous shuntings of heavy goods trains which are necessary to allow the quick trains to be run on the same lines of rail the practical effect is, in many cases, that the railway transit of these heavy goods is no better in point of time between loading and delivery than it is on canals, where these are maintained in good condition. But the grasping disposition of the railway management forces this heavy traffic out of the hands of canal companies and those who carry goods on the canals, where they are independent of the direct control of the railway companies; and where the canals have been acquired by railway companies the case is even worse, because they interpose on these such tolls as prohibit the through traffic of the independent companies. Forty years ago it seemed to the proprietors of some of the canals that the numerous railway projects would ruin them, and they, not fully comprehending what might arise, were only too eager to sell or lease their

property to the railway companies, who, on their part, were willing to take the control of the canals in order, if necessary or desirable, to extinguish a competitive means of transit; and Parliament, being in novice superior to the general mania for railways, fell in with these views, and sanctioned the control of canals by railway companies to the extent of many hundred miles, exactly in the positions where they could do most harm to the general canal traffic,—a point probably seen more clearly by the railway promoters than by the proprietors of adjoining canals. And it is to be observed that when these canals were acquired by the railway companies, which was mostly in the year 1846, the foreign trade of the country, which requires through routes of traffic, was not one-third of what it is now.

It may be well to look at the origin of canals in England in order to understand their position at the present time. Many of the principal canals were originated by the aristocracy and landowners of the country. For instance, the Barnsley Canal, 1793-1808, had 113 subscribers, amongst whom were the Duke of Leeds, Lord Hawke, the Earl of Wigtown, seven baronets, and almost all the landowners in its immediate vicinity. The Basingstoke Canal navigation, 1778-1793, had 33 subscribers, amongst whom were the Earl of Worthington, the Earl of Dartmouth, the Earl of Portsmouth, and Lord Rivers. The Birmingham Canal navigation, 1768-1818, had 102 subscribers, amongst whom were the Earl of Hertford, Earl of Dartmouth, and Sir Lister Holt, Bart. The Birmingham and Liverpool Junction Canal, 1826, had 323 subscribers, including the Earl of Surrey, Earl Gower, Lord Leveson Gower, and Lord Crewe. The Bridgewater Canal, from Manchester to Runcorn, near Liverpool, 1759-1795, was made solely by the Duke of Bridgewater. The Carlisle Canal, 1819, had 304 subscribers, including the Earl of Lonsdale, Viscount Lowther, Sir James Graham, Sir William Musgrave, Sir Hew Dalrymple, and Sir Joseph Gilpin. The Chelmer and Blackwater navigation, 1766-1793, had 147 promoters, of whom were Lord Petre, Sir John Jarvis, K.B., and Sir John Henniker, Bart. The Coventry Canal, 1768-1819, had 113 subscribers, including Lord Archer and Sir Roger Newdigate, Bart. The Cromford Canal, 1789-1790, had 78 subscribers, of whom were the Duke of Newcastle and Sir Richard Arkwright. The Croydon Canal, 1801-1811, had 204 subscribers, including the Duke of Norfolk, Lord Gwydir, Sir Francis Baring, Sir C. W. Blunt, Sir John Bridger, Admiral Pigot, Sir John Turton, and Sir Benjamin Hammett. The Chesterfield Canal, 1771, had 174 subscribers, of whom were the

Duke of Devonshire, the Duke of Newcastle, Lord Scarsdale, the Dean of York, and Sir Cecil Wray, Bart. The Dearne and Dove Canal, 1793-1800, had 211 subscribers, of whom were the Duke of Leeds, Earl Fitzwilliam, Sir L. Copley, Bart., Sir G. Wombwell, Bart., and Sir F. Wood, Bart. The Erewash Canal, 1777, had 74 subscribers, including the Duke of Rutland. The Thames and Severn Canal, 1783-1813, the subscribers to which included the Earl of Radnor, Lord Dudley, Sir Edward Littleton, Bart., and Sir Henry Mackworth, Bart. In the case of the Grand Junction Canal, the beginning was an instruction by the Marquis of Buckingham to Mr. Barnes to survey the country between Braunston, in Northamptonshire, and the Thames near London, which resulted in the canal being made from Braunston to the River Brent, near Brentford, on the Thames; and so we find a general interest taken in canals by the aristocracy, along with the traders of the country, the one being willing to promote the interests of the other by supporting their applications to Parliament for powers to make the canals, and subscribing towards the carrying out of the works. One would suppose the present owners of the estates through which the canals pass would be equally willing to assist in their improvement, where that is needed, on the main lines. The great hindrance to canal traffic at the present time is the variety of widths of the locks. The Leeds and Liverpool Canal is the only through route on which the locks are of equal width from end to end, 128 miles. They are 15 ft. 2 in. wide. A combination of railway companies acquired the control of the merchandise traffic of this canal in 1850, and charged a through rate greater by the canal than by railway. The canal traffic fell off, but in 1874 the canal was released from the control of the railway companies, and the traffic has since much increased. The canal is now paying a large dividend on the shares, notwithstanding that the rates of carriage are less than by any other means of transit between those two places, and it carries raw material to and manufactured goods from a very large number of places along the route, as well as serving the requirements of the country through which it passes in the transport of general merchandise, the through rate of which has been reduced to one half of that formerly charged by the railway companies.

Other canals which join navigable rivers have locks of similar width, from 14 ft. to 16 ft., and for some distance inland they are of the same width, but in the Midlands the width admits of boats only 7 ft. wide. The one is a barge lock, the other a boat lock, and it is necessary for economical traffic that barges should be able to pass all the locks; and for an improved system of water communication it would be desirable that some of them be lengthened as well. Also, on the main lines, the canal itself would require widening, not, perhaps, by taking more land along the side of the canal, but by the smaller and less expensive measure of building dwarf retaining walls along the water's edge. At present most of the canals have earthen slopes and a rather narrow bottom. To improve the useful width the bottom would be widened and the sides upheld by dwarf walling in the upper 3 ft., which would not only give more boat-room, but would prevent the earth being washed away by the commotion of the water caused by the passage of vessels at a higher rate of speed than is now usual with horse haulage. For steam propulsion this walling would be essentially necessary. The present rate of speed is about two miles and a half an hour, and in all cases on canals, in towing or propelling vessels by whatever means, speed is not the thing to be desired; it is an impossibility; three miles an hour is the greatest rate with the present usual system of haulage, but with steam propulsion this may be increased to from  $4\frac{1}{2}$  to 6 miles an hour, as is done now on the Aire and Calder Navigation for merchandise, a less speed being adopted for minerals.

The sort of traffic which it would be most to the advantage of the country to carry on canals is building stone, bricks, sand, timber, grain,

ironstone, limestone, pig-iron, cast-iron pipes, other large castings and forgings, and especially all such goods as may be delivered direct from the boat to the place where they are wanted. In the case of coals it is an objection that few people want a boat-load of coals at once; whereas, by the railway, single truck-loads of eight tons or so can be delivered. But it has been suggested that this objection may be easily got over by fitting the boats with light iron cells or boxes of one or more tons each, which can be lifted out of the boat and taken anywhere without much expense or trouble. A more serious thing to be looked at is the widening of the locks, and in some cases the lengthening also, if locks are to be used at all, to pass the vessels from one level to another, but this is not absolutely necessary. The time occupied in passing a series of locks is a serious hindrance. When the canals were made the only practicable means of passing boats from one level to another was by narrowing the canal at certain points and putting in a pair of gates, which, while holding up the main body of water in the upper reach of the canal, should allow a lockful of water to be let down to the lower reach at every boat-passage, and where there are several locks together, adjoining each other, to enable greater differences of level to be passed than could be accomplished by one or two locks, all these have to be filled and emptied, one after another, before the boat can pass. The time occupied in opening and shutting the sluices and gates of a series of locks is a great drawback to the usefulness of the canal on main lines of communication. A great improvement which can now be made is to substitute an incline for a series of vertical locks. Since the invention of the hydraulic crane and other hydraulic machinery, requiring for economy a storage of the surplus force exerted by the lowering of heavy weights, and the subsequent invention of the hydraulic accumulator to store this force, it has become easy to raise a heavy weight, such as a canal boat floating in a tank, by means of the surplus force stored up in the accumulators by the previously-passing load downwards, with, of course, some addition of force to compensate for the unavoidable loss by the movements of the machinery. The small additional force required for this compensation can be put into the accumulator in various ways, amongst others by the power employed in hauling the boats.

#### PICTURESQUE ARCHITECTURE.



WHAT is "picturesque" architecture? In the short preface to the publication which is before us under the above title,\* the view seems to be taken that the picturesque quality depends on what may be called the accidents rather than the essentials of architectural subjects, since we are told that the artists who have contributed to this collection are "not aiming at the completeness and precision of strict architectural drawings," they are "dwelling with interest on accidental irregularities, such as the effects of decay or admixture of styles, which often add materially to the picturesqueness of a building, although they may, to some extent, obscure its design." Thus it appears that, in the minds of the able artists who have produced this set of plates, or, at all events, in the mind of their anonymous spokesman (for the literary portion of the work is unsigned), the picturesque element in architecture arises mainly from what from the architect's point of view are defects; from illogical admixture of styles, or from decay of material.

This represents a common and popular view, and one which it is easy to understand. The juxtaposition of incongruous styles in a group of buildings suggests to the spectator considerations beyond mere building,—associations with various times and social states, the contrasted character of the buildings suggesting the contrasted character and feelings of the

men who built them. The mind travels beyond the mere designs into the circumstances out of which they grew, and builds up a kind of history for the scene, more varied than that which any building or collection of buildings in a single style can suggest. Difference of material, too, or in the way of treating it, gives the artist the opportunity for contrasts of surface and texture as well as of design. The element of decay, too, adds to the historic interest of the buildings, and, moreover, harmonises them more with the whole scene. Nature has passed her brush over them, and they become a portion of her scenic effect, instead of a separate creation standing out from it, as a new building must be more or less.

All this is true; yet we do not like to pass this use of the term "picturesque architecture" without a kind of note of interrogation. To adopt it, *sans phrase*, with this meaning is assuming too much. It is a kind of assumption that only old architecture can be picturesque. We candidly admit that not much of new architecture is picturesque; but there is no reason why it should not be. We call that architecture picturesque, whether new or old, which exhibits character, contrast, and play of fancy. There may be architectural design, displaying very fine qualities, which could not rightly be called picturesque; for which such expressions as "stately," "dignified," &c., would be more fitly used. But there is certainly a quality of picturesqueness in architectural design which is quite independent of the accidents either of material decay or of juxtaposition of incongruous styles. The same word "picturesque" is, in fact, capable of two slightly different shades of meaning. It is true as applied to most of the subjects in the collection; we only object to its apparent limitation to architecture of mixed date and decaying condition.

To come to the drawings themselves: the majority are etchings, a method of work which, it must be admitted, is more fitted in general to give expression to ancient than to newly-erected architecture. The free line of etching is somewhat fettered and hampered by being constrained to the expression of the clean lines and firm texture which are characteristic of architectural drawing properly so-called. We doubt if the first plate here (the first after the frontispiece), the interior of Westminster Abbey, by M. Toussaint, quite comes under the head of "picturesque" as defined in the preface. A view straight up the centre of the choir, with the arcade and crossing-piers symmetrically disposed on either side of the picture, represents rather architectural grandeur than picturesqueness, and is not one of the subjects best suited for etching, though one cannot but admire the skill with which the artist has preserved the architectural lines with sufficient clearness while avoiding anything like a hard or mechanical effect. The same artist's "Chapel containing the Tomb of Mary Queen of Scots," in the Abbey, is a finer work, and here the contrast between the Gothic fretwork of the enclosing architecture and the Classic sharpness of the tomb in the centre of the aisle, with its hard glancing lights, is very effective and very skilfully brought out in the handling of the plate. The treatment of the vaulted roof is especially fine. This is one of the very examples of "admixture of styles" specified in the preface as an element of the picturesque; but oddly enough, in the letterpress attached to this particular plate it is complained of as an injury to the Abbey. The writer enters a kind of protest against the Westminster Abbey monuments in general,—too large a question to go into *en passant*; but we may quote the remark in regard to the architecture of Henry VII.'s Chapel itself, about which "cultivated people generally pass through three stages. When they are young and ignorant it seems to them infinitely rich; when they have studied architecture a little they soon find out that the apparent richness is obtained by the repetition of a very few elements, and that the building is not nearly so inventive as they at first believed it to be; but when this discovery has had time to become so familiar as not to be thought about any longer, the mind passes into the

\* Picturesque Architecture. Twenty plates by A. Brunet-Debaines, Ernest George, M. Lalanne, L. Lhermitte, J. Pennell, H. Ralton, H. Toussaint, R. Kent Thomas, and other artists. London: Seeley & Co. 1887.



third stage, in which criticism dies out and admiration begins again. . . . Henry the Seventh's Chapel has the greatest of all merits, it is poetical." True, and was it any less poetical when it was a new thing? This question is touched upon in the remarks appended to M. Lalanne's etching of "a Street in Rouen"; "we ought to remember that the signs of age and disorder, which are attractive to an artist like Lalanne, would not exist when these houses were perfectly new, and the shops under them quite neatly kept and fashionable shops." This fact, that all old buildings were once new and were judged as such, is often forgotten by sketchers of the picturesque, who profess to find all modern architecture inferior to ancient. In the case of the Rouen street the age and dilapidation have unquestionably given the artist the kind of effect he wanted; but the street is picturesque in itself, and it may be questioned whether it would not have looked equally (or in the best sense even more) so when new, as in its present pigsty stage. The artist's contemptuous treatment of the modern cast-iron spire of the cathedral is an amusing bit of practical criticism on it, with which we entirely sympathise. We stumble on the same question in regard to Mr. Railton's drawing of "St. Jacques, Dieppe," where it is noted that different styles of architecture differ very much in their capability of bearing a ruinous state of existence. "The very severe styles, when half ruinous, always look as if they were damaged, but the styles which have a picturesque liberty and variety in themselves appear to accept decay without much loss of beauty, and certainly without loss of charm." Most of us feel in accordance with this view, and certainly Mr. Railton's drawing of the rich crumbling church illustrates it well; but whether it is not in reality a form of association peculiar to the present century, and not permanently implanted in the human mind, *quien sabe?*

Of the other plates in this fine collection, "the Rood Screen of St. Etienne du Mont, Paris" by M. Toussaint, is one of the most remarkable for powerful effect, finish of execution, and a most delicate perception of gradation of tone in the shadows; and the same artist's "House of the Chase, Pompeii," is another excellent example of the highly-finished type of architectural etching. Those of "Dort" and "Bruges," by Mr. Ernest George, though showing less minute finish, form, to our thinking, better illustrations of the special function of etching; the latter especially, which is really a drawing with an old mill in the foreground and the town in the distance, has that free character of line, and broad contrast of lights and darks (the sky being a nearly untouched space), which is the kind of artistic language which etching was really created for. Mr. Kent Thomas's etching of "The Altmarket, Cologne," may assist to point this moral; it is a carefully-finished and most satisfactorily executed plate in its own way; but there is none of the poetry of etching in it; it is a well-executed piece of architectural topography, and that is all. Mr. Edridge's "Tour de la Grosse Horloge, Rouen," free enough in style, loses effect from being too uniformly white. A fine perception of the power of contrast of broad masses of light and shadow is shown in Mr. Briand's "Rue de la Poissonnerie, Montivilliers," though the whole is a little stiff and mechanical in execution. One of the most artistic of the freer sketches is Mr. Pennell's "A Water Gate in Venice"; an admirable little bit of work. The whole collection, if not of equal interest throughout, makes a delightful volume, to be valued by all lovers of architectural and artistic effect, whatever their theories as to "picturesque architecture."

**Sturton-le Steeple (near Retford).**—On Easter Monday the memorial-stones of a new Wesleyan chapel were laid at Sturton-le-Steeple. The plans, prepared by Mr. Chapelow, of Osberton, show a small Gothic building of brick, with stone facings, capable of accommodating about 260 people. The estimated cost of the building is about 800l. The contractor is Mr. John Wilson, of Retford.

## NOTES.

**HERE** seems to be a general movement on the part of foreign Governments to furnish up their respective capitals, and to sanction the undertaking of public works, and especially those which tend to improve them commercially. The latest city that appears to be following the fashion is Lisbon, where the authorities have just granted to a Belgian firm a concession to make new docks, wharfs, and all buildings connected with them, the whole estimate being about 2,000,000l. Whether the Belgian firm was also the inventor and promoter of the scheme is not stated, but one thing seems clear, that we in England lose a vast deal of trade from our indifference to the necessity of a thorough acquaintance with foreign languages. The whole tone of the Consular reports is set to this one tune,—that other countries are far before us in "push," and that the agents who do the work are skilled linguists and thoroughly up in the intricacies of the requirements. We, on the other hand, are too much in the habit of sending out men who know just enough of a language to break down at a critical point, and have not the ability to push, even though they had the will. This is not the way to prosper in foreign business nowadays.

**MR. SHAW LEFEVRE** seems to have taken an early opportunity of blowing his own trumpet in regard to the matter of the War and Admiralty Offices site before the Committee (of which, he it observed, he is a member) for considering the question, by giving lengthy evidence in his own favour, as reported in the *Times* of Wednesday. He "has saved the country a million of money" and there is no doubt of the economy of his site; but that is its only merit. It is capable of being made better at the cost of clearing away the banks and other buildings facing Charing Cross, widening the street, and bringing the line of the Mall through; but economy is everything, and architectural effect nothing. It is interesting to have Mr. Shaw Lefevre's assurances that the design which he has taken under his patronage is superior to any existing public building in London; and no doubt there are plenty of people ignorant and careless enough on the subject to take his word for it, and to suppose that any one who is so ready to give the world instruction in architecture must be an authority thereupon; but we hope there may be some members on the Committee who know better than to take Mr. Shaw Lefevre's architectural perceptions at his own valuation, and who will stand out for having a great building carried out in a manner worthy of a great nation, and not on a merely economic basis.

**FLORENCE** is to be *en fête* from May 4th to 19th, mainly in honour of the unveiling of the new façade of the Duomo, which is to take place on the morning of the 12th. We give an illustration of the cathedral with its new front in the *Builder* of October 2nd, 1886. On the 13th the idea of a historical procession, carried out at Heidelberg last year, is to be repeated at Florence, the time taken being the middle of the fourteenth century. This, if well managed, ought to be a very picturesque spectacle, and there is the gratification of feeling that in modern Italy such a procession can take place without the probability of a free fight in the streets, or any peevish complaint that,—

... "Not a drop of blood was spilt  
When Cino Bocchimpano chanced to meet  
Buocio Viriù—God's wafer, and the street  
Is narrow!"

—as we may read in Browning's *Sordello*, the hook which of all modern works gives the most vivid glimpses into mediæval Italy.

**IT** is not in England alone that disputes in regard to the right to light are numerous, for a correspondent informs us that in Bombay, owing to the increase of new buildings, they are considerable in number, and as the natives are somewhat litigious, the courts of law fre-

quently have this easement brought to their attention. It is noteworthy that the easement of light is practically regulated in India by the English Prescription Act; that is to say, the Limitation Act No. XI. of 1877, and the Indian Easement Act, 1882 (Act No. V. of 1882), are, in the sections which regulate the right to light, very analogous to the English Prescription Act. Thus in one sense the English Prescription Act applies to British India. This being so, it is obvious that those who would seek to alter the statutory law of light in this country have to face the fact that it is also the law of India, and that any alteration of the law here would probably be followed by an alteration of or by an attempt to alter the law in India. This fact seems to make any change in the law of light even more improbable than if the Prescription Act applied only to this country.

**THE** current number of the *Lancet* contains an exceedingly practical communication from Mr. Charles Roberts on "Trees from a Sanitary Point of View," especially as regards their effect on habitations. Mr. Roberts, of course, objects to the fallacy of planting or retaining large trees close to a house, laying down the rule that a tree should not stand so near a house that if it were to fall it would fall on the house; in other words, the root should be as far from the house as the height of the tree. Most persons who have exercised any observation or common-sense at all on the subject would, if they did not anticipate this recommendation, be prepared to agree with it. But much fewer persons are aware of the other fact insisted on in Mr. Roberts's paper, that the practice of planting up houses with thick belts of trees, even when not close up to the house, with the object of shutting them out from view, has often a marked and deleterious effect on the sanitary condition of the habitation, interfering with the circulation of air and lowering the temperature around the dwelling. Mr. Roberts gives some facts in illustration of this. "A dry garden on gravel, in Surrey, surrounded by trees, is generally three or four degrees colder than the open common beyond the trees; and a large pond in a pine wood twenty miles from London afforded skating for ninety consecutive days in the winter of 1885-6, while during the greater part of that time the lakes in the London parks were free from ice." Mr. Roberts complains that the speculating builder commences by cutting down the large old trees which from their isolation are not injurious, and ends by raising mounds and sticking into them dense belts of quickly-growing trees to hide the house as speedily as possible. This is "a true bill," we fear, against the builder, whose destructive propensities in regard to large trees are open and palpable; his "line of frontage" is a sacred institution, and he would rather cut down the finest tree than modify his notion of placing the house on the ground. Every one can see and lament over this kind of vandalism; but the mischief of cutting off one's sunshine from houses by too close a fortification of trees is not so generally appreciated, and it is well that attention should be called to it.

**IT** appears that on the occasion of her last visit to Edinburgh, the Queen, when looking at the restored interior of the Cathedral Church of St. Giles, expressed surprise that no memorial existed in the building of James Graham, "the great Marquis" of Montrose, who was executed in 1650, and whose remains were, according to tradition, huddled under the pavement of St. Giles's. This remark of her Majesty has suggested a scheme which has been warmly supported by leading members of the Graham family, as well as by others who are admirers of the hero, and Messrs. Wardrop & Anderson, architects, have been commissioned to prepare a suitable design. The committee have approved of a design, the execution of which is to be entrusted to Messrs. John & W. Birnie Rhind, who executed the Wemyss tomb which was so much admired at the recent International Exhibition in Edinburgh. The design shows a monument, Renaissance in style, having the effigy of the marquis on a richly-carved sarcophagus, with a canopy rising to a height of 16 ft., supported by

pillars. The figure is to be of white marble, and the accessories of coloured marbles and alabaster.

DR. SALOMON REINACH contributes to the *Classical Review* for April some interesting particulars as to the excavations at Delphi shortly to be undertaken by the French School at Athens. The principal difficulties which stood in the way of the work were,—1. The necessity of expropriating the modern village of Castri, which is built on the ruins of the Delphian temple. 2. A certain reluctance of the Greeks, which already expressed itself in 1875, when the Germans asked permission to dig at Olympia." These obstacles, we are glad to learn, are now removed. The French Minister, Count Monthon, and the Greek Prime Minister, M. Tricoupi, have concluded a treaty on a basis similar to the terms granted to the Germans in 1875. The principal stipulations are:—1. All objects discovered are to remain the property of Greece, and are not to be carried out of Greece. 2. The French School at Athens, which bears the cost of the excavations, has the exclusive right for five years of taking casts of discoveries. A law will shortly be passed by the Greek Government to authorise the removal of the village of Castri. M. Foucaut, for many years director of the French School, is to take command of the expedition. M. Haussollier is to be his chief assistant.

IN the same number (a double one, 2 and 3) Mr. Cecil Smith continues his interesting report of the acquisitions of the British Museum. He devotes most space to Mr. Paton's generous gifts, consisting of his discoveries during the excavations he has, at his own expense,—carried on at Assarlik. "The importance of these discoveries," Mr. Smith says, "cannot be over-estimated in their bearing on the early history of the geometric races." As full particulars, with illustrations, are to appear in the *Hellenic Journal*, we reserve our notice. The *Review* continues to perform admirably its function of the registration of news; it is to scholars themselves the greatest possible boon to be able to ventilate their discoveries and their theories some time before they commit them in the *Hellenic Journal* to formal exposition.

THE Committee for erecting the Harrison Memorial having asked Sir William Fettes Douglas to favour them with his opinion as to the form which the memorial should take, Sir William has suggested that a gateway or ornamental archway at the east end of the new approach to Blackford Hill would be suitable and appropriate, the site being associated with the acquisition of the hill as a place of public recreation through the efforts of Sir George during his tenure of the Lord Provostship of Edinburgh. Dr. Rowand Anderson, Mr. Hippolyte J. Blanc, and Mr. Sydney Mitchell have been asked to submit designs.

ONE can hardly mention the Society of Water-Colours' Exhibition of this year without a degree of enthusiasm. In few years have we seen so high an average of work and so much that is exceptionally fine. Mrs. Allingham, unfortunately, is represented by only one work, "The Picture Book" (225), but some of the best landscape-painters in the Society have surpassed themselves. Mr. Eyre Walker, whose works have been regarded with increasing respect for some little time back, has this year surprised us by a really grand work, "The Shadows of the Evening Hours" (151), one of the finest landscapes in colour, and one of the most solemn and poetic in feeling, that we have seen for a long time, and which gives its author a new position among his contemporaries. Mr. Hunt's exquisitely delicate work, which grows upon one in studying it like nature herself, is best represented in "High Tide" (89), and "A Still North-easter" (196); there is also another edition of "Sonning" (19). Mr. Albert Goodwin's "Waiting for Judgment" (126),—"And there came two Angels to Sodom at Even,"

—is another fine example of landscape full of poetic meaning; a lurid scene full of the presage of some catastrophe. Mr. Tom Lloyd has never done anything better than "Responsive to the Sprightly Pipe" (74), an idyll of the richest colour, and full of graceful sentiment, as well as capital painting of sheep and lambs. Mr. Lloyd knows, what some animal painters do not, what an awkward leggy little animal a lamb is, when you come to study him critically. Mr. Herbert Marshall is even better than usual in his London scenes, especially "The Sanctuary, Westminster," and "St. Paul's" (107 and 136). Sir John Gilbert exhibits a large work representing Wolsey at "the highest point of all his greatness" (117) not only a very effectively grouped and painted work, which we are accustomed to from him, but showing a high power of realisation of historic character in the face and figure of Wolsey, expressive at once of power, determination, and a substratum of vulgarity: a real piece of "historical painting," a phrase so often misused. Mr. Colin B. Phillip, who is one of the later lights of the Society, shows two or three large and powerful studies of bare barren granite scenery in the Highlands, somewhat heated in colour, but which are well worth attention. Mr. George Frigg, in "Lynton, North Devon" (32), and some other drawings, shows as finely as ever as one of the best representatives of the older contemporary school of English landscape-painters. Mr. North, emphatically a representative of a younger school, leaves a little too much detail to the imagination in "The Monks' Fish Pond" (16), nor is the prevailing tone that of early spring,—it is far too warm and rich, except in the meadow in the centre of the scene. Mr. North has made a style of his own, but there seems some little danger of his style running away with him. Mr. Arthur H. Marsh has struck a note of true pathos in his "Men must work and Women must weep" (144). The exhibition is notable for a work by Mr. Holman Hunt, another version of Jesus disputing with the Doctors (67), a study for a mosaic to be placed in Clifton College Chapel. The arrangement of the work is well suited to mosaic, and will look heter in that medium than in water-colour; it exhibits the artist's extraordinary powers and painful perversities in more than the usual degree of contrast. The perspective of the picture is wrong, so that the child Christ in front of the group is larger in scale than the rest of the figures. It is vexatious that a work with such a technical falsity as this, however earnest in purpose, should be placed in a school chapel to give boys wrong ideas of perspective. "Maxima debetur," &c.; boys should be reared on correct drawing. Among other works we have only space to mention Mr. T. J. Watson's fine and rather sombre drawings, with a kind of old-master look about them, of which the "Old Draw-well" (112) is the most original; Mr. Naftel's beautiful little works, especially certain Capel Curig studies, and Miss Naftel's flower-pieces, excellent of their kind; Mr. Walter Field's "Wargrave" (109), a most faithful likeness of a particular bit of the Thames; Mr. Otto Weber's sea-side pieces with figures; Mr. Robertson's "Carpet Bazaar, Cairo" (165); Mr. A. Goodwin's "Durham" (138); and to note that there is a fair proportion of purely architectural subjects in the exhibition, by Mr. Riviere, Mr. Arthur Glennie, Mr. Robertson (his painting of the gateway and mosaic decoration in No. 201 is very good), Miss Montalbo, and others.

IN the last number of the *Bulletino della Commissione Archeologica Comunale* (xv. 3) Signor Visconti publishes, in a phototype plate, an interesting relief representing the adoration of the Dioscuri. Monuments relating to the worship of the twin-gods are, it is known, rare, and such as exist belong for the most part to Greco-Roman date. Special interest attaches to the present relief because it is obviously a piece of Attic work belonging to about the early half of the fourth century B.C. The marble is Pentelic, the style plainly under the influence of the Parthenon

sculptures. The brothers are seated on a rock; they are clearly meant to be side by side, but the exigencies of relief oblige them to be represented one behind the other. Their attitudes are precisely similar; each holds a lance in the left hand, and is accompanied by his horse. A family of five worshippers approaches from the right. The foremost worshipper is of matronly figure, strongly recalling the Eirene of Cephissodoti. It is interesting to note that the Dioscuri do not wear the pilos. It appears that this form of head covering did not become a distinguishing attribute till the third century B.C.

MR. BOEHM'S statue of the late Duke of Buccleuch, to be erected in Edinburgh, has been completed, and the stonework and bronze reliefs, entrusted to Messrs. Clark Stanton, Burnet, and Stephenson, are nearly completed. It is proposed to proceed with the erection of the monument in June, and it is expected to be finished within five or six weeks.

THE publication entitled "The Century Guild Hobby Horse," which is now issued quarterly, seems to have subsided into a somewhat more tempered strain of thought and writing than was foreshadowed in the extraordinary mixture of ambitious sentiments and impossible English in which its advent was heralded some time ago. The number for April commences with an *in memoriam* sketch by Mr. Ruskin of the late Mr. Arthur Burgess; a paper sad enough in tone in more ways than one. Burgess was one of Mr. Ruskin's elect, who were found worthy to work for him. He introduced himself by a wood engraving and a letter, touching in its simplicity. "I can cut wood like this, and an overworked and cannot make my living,—can you help me?" One may admire the simplicity of the one man, and the chivalrous generosity with which the other at once responded to his appeal, without concluding that in reality Arthur Burgess was gifted beyond all other engravers; though the small engravings from flowers that are given show great fidelity, and a desire to get at the actuality of his subject. Mr. Macknurd's article on "Arbitrary Conditions of Art" contains some thought and a good deal of truth, most of which, however, is only new in regard to the phraseology employed. We cordially sympathise with him in his scorn for "the repetition after repetition of the Acanthus, Mask, Mermaid, Cherub, or other hackneyed and long-since ineloquent imagery, carved alike on bank school-house, music-hall, mansion, Salvation hall and beer-house"; but it saves trouble to people who have no ideas, and their name is legion. The worst of the publication is the sense of affectation and posing which conveys; the effort to represent art as the peculiar property of a certain set, whose way alone are right: "we know that we are God, and the whole world lieth in wickedness." The style of the title-page and tailpieces is a mere affectation of Blake's manner. We have a profound veneration for Blake; but we do not care, we confess, for Blakism at second hand. It is to be noted, by the way, that the only quotation from Blake in this rather Blakian periodical (p. 78) is given incorrectly.

THE drawings by Sir James Linton and Mr. Orrock, exhibited at Messrs. Dowdeswell's, and illustrating the writings of Scott form a very pleasant collection, and Mr. Orrock's landscapes show that faculty for rendering atmospheric effects in misty and rainy weather for which his drawings are notable; though the effect is repeated little too often. Bewcastle Moss, when Dandie Dimont and Bertram had their famous encounter with highwaymen, is the subject of more than one fine broad water colour drawing, as also "Dandie Dimont hunting country"; and one or two small studies of Criffel are particularly good. Sir James Linton, of course, contributes figures, which among his best work in regard to execution and rich colour, and in the knowledge of and taste for costume displayed; and in one or two

the rougher characters, such as "William of Deloraine" (an admirable work artistically) and "Nanty Ewart," he gives us some of the character of Scott's personages; but in the higher characters he fails woefully. Marmion was a scoundrel, it is true, but he was a great soldier; something very different in style, we may be sure, from the mild personage here represented. Julia Mannerling, with all her liveliness, was emphatically a lady, and is described as of a haughty and commanding type of beauty; Sir James paints a red-haired and red-cheeked young person with no manner, whom Julia would not have called on; and the figures of "Guy Mannerling" and "Bertram" are absurd as ideals of the personages; they are mere pegs to hang costume upon. In short, our impression is that Sir James Linton is not acquainted with the works he has been illustrating; an impression confirmed by the fact that one drawing is inscribed by the artist, "Alan Fairford, from Waverley"! Scott is not as much read as he used to be, but some of us know our Waverley Novels better than that, at all events.

MORE than one correspondent has drawn our attention to a curious discrepancy in Mr. Binyon's plans and elevations for the Edinburgh Municipal Buildings published in our last issue. The plan on High-street level shows a carriage drive into the courtyard; whereas the elevation to High-street shows a flight of steps in the same entrance. Perhaps Mr. Binyon will explain.

AT the Walker Art Gallery in Liverpool an exhibition is open of reproductions from the works of Raffaele. Mr. W. M. Conway, Roscoe Professor of Art at University College, Liverpool, has compiled a chronological catalogue of the known works of Raffaele, to accompany the exhibition, which will be open till the end of July.

WE have received from a firm of London architects a letter addressed "to the managing clerk" at their office, and by him very properly handed to his principals, from a person undertaking to copy drawings, and which concludes, "I should be glad to allow you 25 per cent. on all work done, which would be paid on receipt of account." We will not give the person making this offer the benefit of an advertisement by citing his name, and we may hope that he is perhaps not fully aware of the gross impropriety of this kind of backstairs business, which is practically offering the managing clerk or head draughtsman a bribe to neglect his own duty and his employer's interests. Probably in most cases such an offer would only be regarded with contempt; but it is none the less reprehensible.

WE are sorry to confess that Mr. Harry Furniss's "Mock Academy" at the Gainsborough Gallery is somewhat of a disappointment. Some of the imitations show real humour and a very clever hitting-off of the leading characteristics of the style of certain well-known painters, but a large proportion of the works are farcical caricature, and, though this may do very well on a small scale in the pages of *Punch*, to execute them on a large scale and hang them in a gallery seems a little more elaboration than the joke is worth. Among those which we noted as conveying something beyond mere caricature are the translation of Mr. Paed (No. 8), the "Three Little Maids" after Mr. Leslie (17), "Discord from Dicksee's Land" (44), the "pretty pretty" school of landscape (5), and the "Three Switches" (48), "Elbow-room" (73), an immense room with one small figure in the corner of it, a humorous exaggeration of Mr. Orchardson's extensive floors; "A Message from the Sea" (50), a really clever and successful rendering of Mr. H. Moore; "Britannia ruling the Waves" (39), in commemoration of Mr. Brett, is also good, but the picture which we find by the catalogue is meant for a compliment to Mr. Colin Hunter (6), most *habitués* of exhibitions would connect rather with the name of

Mr. Hamilton Maellum. "An Effect of Coal on the River" (74), is a very poor pun on the name of a well-known Thames landscapist, attached to a sketch which has no relation whatever to his style. We must complain also of another pun about "fresh *Fildes* and pastures new," inasmuch as the line is "fresh *woods* and pastures new," as Mr. Furniss will find if he looks up his Milton; but it is fair to add that the mistake is one constantly made. The best joke, in what may be termed the farcical portion of the collection, is that which shows how Mr. Horsley translated—

"The city's ancient legend into *this*,"—

a lay-model Godiva draped in a night-dress and seated on a pantomime horse formed by two men; the horse's eyes are modestly blindfolded: the painter just shows his face from behind a curtain. We thank Mr. Furniss for that.

#### ASKE'S HOSPITAL, HOXTON.

A LITTLE-KNOWN relic of an important London charity is about to disappear. By direction of the Charity Commissioners, the Governors of Aske's Charity have resolved to grant building leases in respect of two contiguous properties at Hoxton for the erection thereon of artisans' dwellings. On the one plot, in Pitfield-street, now stands the George and Vulture tavern (No. 63), with four other premises. The other, containing about 21,108 ft. superficial, forms the site of a decayed and detached tenement known as "Haberdashers' House," being No. 55 in that same street. This is none other than the northern wing, once occupied by the master or chaplain, of Aske's Hospital. That charity was originally established under the will (1688) of Robert Aske, citizen and haberdasher. The founder bequeathed to his Company 20,000*l.*, to be laid out in purchasing ground within one mile of London for an almshouse to receive twenty poor freemen, and in buying enough land to yield each pensioner 20*l.* a year. The rest of the money was to be invested in lands for the benefit of as many boys as the same would provide for at the rate of 20*l.* each for schooling and maintenance. Property was bought accordingly in Hoxton and in Kent. The trust, as lately remodelled by the Charity Commissioners, produces about 9,000*l.* per annum. In 1691 the Hospital was built, from the designs of Robert Hooke, the celebrated mathematician. His building was remarkable for a colonnade, which fronted all of the ground-floor between the two residential wings. That feature was partially reproduced in the later building. Proving to be too costly a structure, the old Hospital (with the exception of the portion under review, was pulled down in 1824 and replaced by the existing premises upon a more limited plan, D. R. Roper, architect. Aske's statue stands in the front court. Along with other improvements of the Haberdashers' property in this locality Buttesland-street was made through the left-hand portion of the earlier hospital's central block. The surviving northern wing, of red brick, and in three stories, is readily distinguishable by its high-pitched roof and lofty attic dormers having angle pediments. A model of Hooke's building is preserved at Haberdashers' Hall, whilst it forms the subject of two prints by Cole (1739) and Bowles. Pitfield-street is so named after one Charles Pitfield, who had a country seat with estate in Hoxton. His property here passed on his daughter Mary's marriage to Humphrey Sturt, M.P. for County Dorset, ancestor of the present Lord Arlington, who, we learn, is largely interested in the fortunes of the adjacent Mohhs's estate.

**Tenement Dwellings.**—The Mansion House Council for the Improvement of the Dwellings of the People, in addition to other methods employed for the attainment of their object, have now established a register of tenement properties for sale in the metropolis, and also a list of persons willing to purchase this class of property. These registers are kept at the Central Offices of the Council, 31, Imperial-buildings, Ludgate-circus, E.C., and it is hoped that the facilities thus provided may lead to the transfer of insanitary properties to the hands of those who, whilst expecting a moderate return for their capital, will seek first to insure the sanitary conditions of the dwellings.

#### CONFERENCE OF ARCHITECTS IN LONDON, 1887.

The following is the skeleton programme of the eighth General Conference of Architects:—

MONDAY, MAY 2ND, 1887.

- 3.45 p.m.—Visit to the new Stock Exchange, Throgmorton-street, E.C.  
7.30 p.m.—Opening meeting: reception by the President and Council. Exhibition of drawings by deceased architects.  
8 p.m.—The Fifty-first Annual Meeting, R.I.B.A., open to all architects attending the Conference.

TUESDAY, MAY 3RD.

- 11 a.m.—Visit to the National Liberal Club and Whitehall Court, on the Embankment; also to the Victoria Hotel, Northumberland Avenue.  
2 p.m.—Visit to the Royal Holloway College (by train to Egham).  
8 p.m.—Conference Second Meeting: Paper by Mr. J. D. Sedding, Fellow, on "Architecture and the Handicrafts."

WEDNESDAY, MAY 4TH.

- 11 a.m.—Visit to Harrington Gardens and other domestic buildings at South Kensington.  
12.30 p.m.—Visit to Kensington Court, &c.  
3 p.m.—Conference Third Meeting: Short papers on Education.  
8 p.m.—Conference Fourth Meeting: Paper by Mr. John Slater, B.A., Member of Council, on "New Materials and Inventions."

THURSDAY, MAY 5TH.

- 11 a.m.—Visit to the City and Guilds Institute, South Kensington.  
3 p.m.—Conference Fifth Meeting: Report of the Special Federation Committee.  
9 p.m.—*Conversazione* of the President and Members, R.I.B.A., at the South Kensington Museum (by invitation).

FRIDAY, MAY 6TH.

- 11 a.m.—Visit to the Drainage Works, &c., at the Houses of Parliament.  
3 p.m.—Conference Sixth Meeting: Short papers on the "Registration of Architects."  
8 p.m.—Ordinary Meeting, R.I.B.A.: Presentation of the Royal Gold Medal, and of Students' Prizes.

SATURDAY, MAY 7TH.

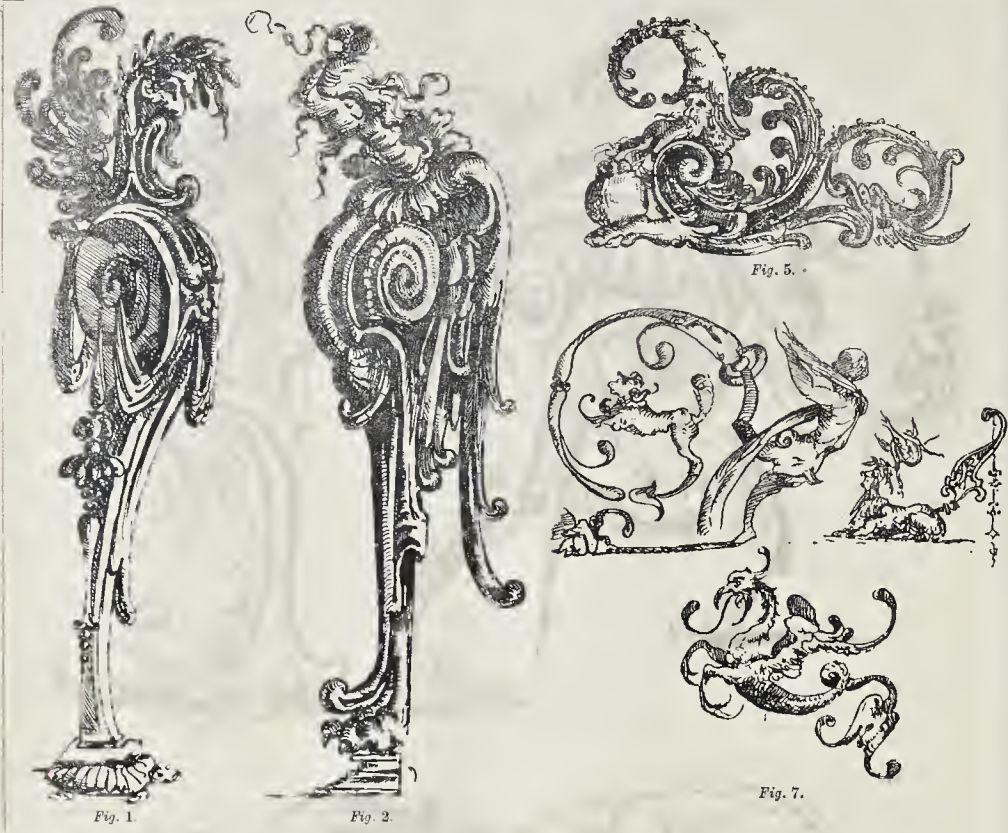
- 11 a.m.—Visit to the Diploma Gallery of the Royal Academy, &c.  
7 p.m.—Members' dinner at the Freemasons' Tavern (by ticket).

#### THE EXAMINATION IN ARCHITECTURE.

The following gentlemen have passed the Examination held during the week commencing the 21st of March last, and are qualified to become candidates for the Associateship of the Royal Institute of British Architects, namely:—

- Edmund John Bennett, Gravesend.  
William Henry Bidlake, M.A., Birmingham.  
James William Brooker, London.  
Richard Matthew Dudley Fell, London.  
Henry Hoyle Fox, London.  
Charles Gonray, Glasgow.  
Henry Thomas Gradon, Durham.  
Hubert Alfred Gregg, London.  
Francis Edward Lodge Harris, London.  
Pawlis Houli, Dublin.  
Joseph Lawender, Wolverhampton.  
Herbert Richard Lloyd, Birmingham.  
Frederick William Marks, London.  
Charles John Marshall, London.  
Theodore Moore, Walthamstow.  
Henry Leslie Paterson, London.  
Edgar Harry Selby, London.  
George Cade Smith, Newcastle-on-Tyne.  
James William Stonohill, London.  
Robert Watson, Edinburgh.  
William Henry White, London.  
Robert Williams, Haslemere, Surrey.  
Herbert Winkler Wills, London.  
Arthur Henry Worsley, London.  
Thomas Locke Worthington, London.

**The College of Preceptors.**—It should have been mentioned, in the short account of this building which appeared in our last, that the furniture was made and supplied by Messrs. W. Walker & Sons, of Bunhill-row.



## ON SOME DESIGNERS OF GROTESQUES.

We suppose that no one will deny that there may be both good and bad even in humorous art, and that even grotesques may be classified according to merit; but the classification depends not only on the humour of them, but on their observance, or failure to observe, the ordinary rules of the art. "Consecutive fifth's" are as intolerable in "Humoresken" as in sonatas. He is but a poor punster whose jokes have no point save in their bad grammar. And so it is with the playful side of decorative art: its charm is to be found first in the observance of the fundamental principles of ornamentation; and, secondly, in the touch of wit and humour which is superadded. But we must put our principles to the test by considering some of the examples which we have to lay before our readers.

First and foremost, and prince of artistic humorists of his day, we must place Christopher Jamitzer, born at Nuremberg in 1560, from whose "*Neues Grotteskenbuch*" we have selected some half-dozen examples (figs. 1 to 5). In boldness of conception, in the vigour and dash of the lines, in the way in which every detail is made to subserve the general idea, while endowed with a little playful fancy on its own account, these designs are excellent. Look, for example, at the pig-fish-man (fig. 3); incongruous as it is, a perfect symmetry of design is preserved: there is a feeling that the monster is quite well balanced on its one leg and crutch, notwithstanding the exertions it must have gone through to catch a fish with its disabled claw; so too we feel sure that the little dog will not slip off, nor the candle fall, for the tail scroll which comes off the lobster-like body is in perfect proportion with it. Again, the strident horn-blowing monster in fig. 4 is equally remarkable for the vigour of its main idea, and the perfect way in which the purely ornamental lines flow away from each other. It is a monstrous nightmare figure, no doubt, but even nightmares are not necessarily altogether devoid of good points.



From Jamitzer we pass to another very prolific designer of grotesques, Lucas Kilian, of Augsburg, who was born in 1579, the first of a large family who all attained more or less renown as engravers. Lucas Kilian designed, among other things, a large alphabet, nearly all the letters of which have been reproduced in Reynard's Album. The human figures which he introduces into them are weakly drawn, but the letters themselves and the ornamented back-

grounds are by no means devoid of merit, although they do not possess any very great originality. His grotesques (published about 1607, in a book entitled "*Neues Grotteskenbuch* durch Lucas Kilian, Burger in Augsburg und Kupferstecher, gradiert und an tag geben") are, however, original, and full of interest. They are, as a rule, elaborate compositions, rather than homogenous designs, each filling an ordinary octavo page, and drawn in



Fig. 3.



Fig. 4.

a rather loose and sketchy manner. The artist's chief characteristic is a great knowledge of the essential attributes of graceful curves. The fragment which we have sketched (fig. 6) forms the bottom of one of the pages, and it is typical of all of them. The animals are drawn with a good deal of power, but their extremities are invariably twisted off into a thin decorative scroll. These scrolls are, however, always drawn in a certain symmetrical relation to the rest of the body. The legs and tails of the lion and bull in the sketch are specially noticeable. In fig. 7 we give two other extracts from the plates in this book, in which the human and animal extremities are treated in a still more *outré* manner. The little sphinx, with the excrescence on its tail, sketched in the same figure, will probably strike our readers at once as not coming from the same hand. We have introduced it in close proximity to Kilian's work, to show more by example than by precept, the difference between bad and good work of this class. It is a fragment from a series of plates by Jacques Androuet du Cerceau, published in 1562, in feeble imitation of Kilian. The compositions are merely odd fragments of designs pitched together without definite purpose, and the fragments themselves, of which the sphinx is the best of a bad lot, are without any spirit or humour. The apparent simplicity indeed, of Kilian's designs brought him a great number of followers, Matthew Merian, also a burger of Augsburg (born 1616), and who afterwards taught Kilian's nephew Bartholomew (born at Augsburg, 1630; died, 1696), being foremost among them; but none of them approached their master, Lucas, either in originality of design or grace of treatment.\*

#### OBITUARY.

*Mr. George Reavell*, late Clerk to H.M. Office of Works for the Birmingham District, recently died, at the early age of 48. Mr. Reavell in his official capacity had superintended the erection of the County Court and Post Office in Birmingham, also the Post Offices and other Government buildings in Leamington, Leicester, Derby, Wolverhampton, and in several other Midland towns. He is spoken of as a man of exceptional ability in his profession, and of most estimable character, and his death has caused a deep feeling of regret amongst a large circle of friends and the numerous public officials with whom he had been brought into contact. He was ill only five days. His funeral took place on the 15th inst. at King's Heath Chapel, and was attended by, among others, Mr. J. Williams, of London, late Surveyor to the Office of Works, under whom Mr. Reavell had served for many years.

*Mr. John Sang, C.E.*—The *Scotsman* says that Mr. John Sang, C.E., died at his residence, Whyte's Causeway, Kirkcaldy, on the 14th inst. Mr. Sang had a reputation as an eminent engineer throughout the greater part of Scotland and the North of England. He was in his seventy-eighth year.

#### Manchester Architectural Association.

—On Saturday last the members of this Association paid their second visit to the Royal Jubilee Exhibition, Old Trafford, Manchester, and were conducted over the building by Mr. Take, of the firm of Maxwell & Tuke, the architects, and Mr. Compton. Much interest was shown in the admirable arrangements and in the striking effects produced, and more especially in the dome. The exhibits appear to be in a very forward state, and will no doubt be all complete by the opening day, which has been arranged for the 3rd of May. Leaving the main building, the members proceeded to "Old Manchester and Salford," and were met by Messrs. Darbyshire & Smith, the architects for this portion. After an examination of the model, this epitome of local history was carefully inspected, and a most enjoyable afternoon was concluded with a visit to the Botanical Gardens, which are connected with the Exhibition.

**Re-Building of Christiansborg Castle.**—The Danish Parliament has just decided, by 69 votes against 14, to accept the Government proposal for the re-building of Christiansborg Castle, at Copenhagen, which was almost totally destroyed by fire a couple of years ago. This will of course include the repair of the famous frieze by Thorwaldsen, in the Hall of the Knights. The cost of the restoration is estimated at about 75,000*l.*

\* To be continued.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE Ninth Ordinary Meeting (Business) of this Institute for the Session was held on Monday evening last.

The following gentlemen were balloted for and declared elected, viz., *As Fellows*: Mr. Thomas Tillman (Associate), Sunderland; Mr. Frederick Dudley, Queen Anne's Gate; Mr. Zephaniah King (Associate), Victoria-street, Westminster; and Mr. Robert Fabian Russell, Moorgate-street. *As Associates*: Mr. Norman Michael Brown, Leicester; Mr. Thomas Ridley Milburn, Sunderland; Mr. Frederick William Kite, Rochester; Mr. Archibald Duncan Watson, Stamford; Mr. Arthur Ernest Barsley, Bromley (Kent); Mr. Arthur Colpoys Wood, St. John's Wood; and Mr. John Coulson Nicol, Acocks Green, near Birmingham. *As Hon. Associate*: Lieut.-Col. John Davis, F.S.A., M. Inst. C.E., Farnborough, Hants.

On the motion of Professor Kerr it was unanimously resolved "That members of the Institute are expected to support the authority of the Schedule of Charges published by the Institute, as the recognised custom of the profession."

#### Federation.

The following is the Report of the Special Federation Committee, which will be submitted to the fifth meeting of the coming General Conference of Architects for discussion, prior to being considered by the Council of the Institute:—

Gentlemen,—The Committee appointed by you on March 1st, 1886, as the Special Federation Committee, consists of the following members of the Royal Institute, with the President, Vice-Presidents, and Secretaries:—

Messrs. C. A. Adams, Fellow.

C. Aldridge, Fellow (Liverpool).

C. Barry, F.S.A., Past President.

\* A. N. Bromley, Fellow (Nottingham).

\* J. W. Cannon, Fellow (Leeds).

\* R. J. Goodacre, Fellow (Leicester).

H. R. Gough, Fellow.

E. T. Hall, Fellow.

G. T. Hine, Fellow (Nottingham).

J. Holden, Fellow (Manchester).

\* J. Honeyman, Fellow (Glasgow).

\* G. G. Hoskins, Fellow (Darlington).

J. D. Mathews, Fellow.

\* J. C. Moncrieff, Fellow (Bristol).

R. Nevill, F.S.A., Fellow.

\* W. Parslow, Fellow (Liverpool).

\* C. R. Pink, Member of Council (Winchester).

\* G. T. Bodmayne, Fellow (Manchester).

T. H. Rickman, F.S.A., Associate.

The References to the Committee were—(1) To report upon the existing relations of the Royal Institute with other Architectural Bodies in the United Kingdom, and its colonies and dependencies; and (2) To consider the question of Federation generally. The Committee have held seven meetings, at which opinions, both oral and written, have been received from most, if not all, of their members, and they now beg leave to report:—

(1) With reference to the existing relations with other Architectural Bodies,—the Royal Institute has for a considerable period been in regular communication with the following Institutes, Societies, and Associations, viz.:—

The Architectural Association of London.  
The Birmingham Architectural Association.  
The Leeds and Yorkshire Architectural Society.  
The Leicester and Leicestershire Society of Architects.

The Liverpool Architectural Society.  
The Manchester Society of Architects.  
The Manchester Architectural Association.  
The Northern Architectural Association.  
The Nottingham Architectural Association.  
The York Architectural Association.  
The Edinburgh Architectural Association.  
The Glasgow Institute of Architects.  
The Glasgow Architectural Association.  
The Royal Institute of Architects of Ireland.  
The Auckland Institute of Architects (N.Z.).  
The Sydney Institute of Architects (N.S.W.).  
Besides the foregoing, the Royal Institute is in communication with other Bodies, not exclusively architectural, viz.:—  
The Berkshire Archeological and Architectural Society.  
The Essex Archeological Society.  
The Exeter Diocesan Architectural Society.  
The Lincoln Diocesan Society, &c.  
The Surrey Archeological Society.

\* We have been requested to make it clearly understood that this Report has not as yet received the sanction of the Council of the Institute; it is, so far, merely a Report for their consideration.—Ed.

\* Marked with an asterisk are the names of members who were nominated by societies as their representatives respectively.

The Sussex Archeological Society.  
The Yorkshire Archeological and Topographical Society.

The Glasgow Philosophical Society (Architectural Section).  
The Historical and Archeological Association of Ireland.

The "Journal of Proceedings" and the "Transactions" of the Royal Institute are furnished periodically, free of any cost, to each of the above-mentioned bodies, and its reports or other papers of general interest which may be forwarded by them to the Royal Institute are printed in the "Journal of Proceedings."

Examinations of candidates desiring to qualify for the Associateship of the Royal Institute have been held by the Glasgow Institute of Architects in 1884, the Manchester Society of Architects in 1885, and the Leeds and Yorkshire Architectural Society in 1886; and the Board of Examiners at each of these Examinations has been composed of members of the respective societies, who were also Fellows of the Royal Institute. All candidates who successfully passed those Examinations were thereby qualified to apply for the Associateship of the Royal Institute.

As a more recent instance of united effort may be cited the fact that the Conference (1887) General Committee, now sitting, is composed of the President and other representatives of twelve non-metropolitan Societies, some of whom are not members of the Royal Institute, with eighteen other members, six of whom were nominated by the Council, and twelve by the four Standing Committees, respectively, of the Royal Institute.

(2) With reference to the *Consideration of the question of Federation generally*—the Committee received a large amount of information and discussion on the proposition, made from all quarters, that the Royal Institute should be, as the best fitted for the purpose, the centre of any federation of the members of the profession within the British Empire; and the object of federation being to establish a closer connexion than now exists between architects generally throughout the British Empire, with a view to promoting the advancement of their art, harmony of practice, and intercommunication, the Committee recommend:—

1. That this object may be best attained by connecting the various local Societies which exist, or which may hereafter be formed, with the Royal Institute of British Architects.

2. That as the Royal Institute is the recognised representative body of the profession throughout the Empire, its prestige and advantages of membership of the Royal Institute shall not be obtainable by any person in any way short of actual membership.

3. That for the purpose of making known in country districts the advantages of professional union, and in order that Societies may be formed where they do not now exist, with a view to federation, the Council of the Royal Institute shall organise visits to such localities as may be deemed expedient.

4. That, with the object of bringing provincial architects more in direct association with the Royal Institute, the Council be requested to arrange that, in future, Conferences be held sometimes in London and sometimes in the provinces.

5. That, in the case of any candidate for membership of the Royal Institute not being personally acquainted with the number of Fellows required by the By-laws to propose him, power shall be given to the Council, if satisfied with his qualifications, to nominate him by special resolution.

6. That the subscription for provincial or colonial members in each class of the Royal Institute shall be the same as that for metropolitan members, less the amount paid by the former to any local Society federated with the Royal Institute, but in no event less than three-fourths of that paid by metropolitan members.

7. That, in any arrangement to be made, the federated societies may retain their identity and name, and shall still, as now, form local centres; and that they may style themselves the "..... Society, federated with the Royal Institute of British Architects."

8. That the constitutional rules or by-laws of federated Societies shall be subject to the approval of the Royal Institute.

9. That the Royal Institute shall not interfere in the management of any federated Society, and *vice versa*.

10. That the Royal Institute shall not be responsible for any acts, expenses, or other liabilities, which may be done or incurred by any federated Society, and *vice versa*.

11. That each federated Society shall adopt the "Schedule of Professional Practice and Charges of Architects" sanctioned by the Royal Institute as the custom of the profession, and may, so far as may not be inconsistent with the spirit of such Schedule, arrange specific terms for the guidance of its own members.

12. That the President of any federated Society which numbers twenty-five members in independent practice (provided that such President be a Fellow of the Royal Institute) shall, during his term of office, be *ex officio* a Member of Council of the Royal Institute.

13. That the Architectural Association of London



Edinburgh Municipal Buildings: Design by Messrs. Hay & Henderson.—Plan at High-street Level.

shall be always represented on the Council of the Royal Institute.

14. That the federated Societies be encouraged by the Royal Institute to afford every practicable assistance to students in their preparation for the Examination in Architecture, and with that view to form libraries of books of reference in accordance with the list issued by the Royal Institute.

15. That local Examinations in Architecture, to qualify for candidature as Associate of the Royal Institute, shall be held, under the control of the Royal Institute, at the instance of any federated Society, or group of such Societies, which shall bring together a minimum of . . . applicants for such examination.

16. That professional members of all federated Societies, although not members of the Royal Institute, and residing not less than twenty-five miles from London, shall, on showing their cards, have the privilege of attending meetings and using the library of the Royal Institute during a stay in London for a period not exceeding one month.

17. That the federated Societies shall transmit to the Royal Institute information affecting the profession generally, together with short reports of the proceedings of such Societies, which may, if considered desirable, be published in the "Journal of Proceedings."

18. That, as a means of intercommunication, professional notes and remarks shall be published (referring to papers read at the Royal Institute, or to other subjects of interest) in the "Journal of Proceedings," which may be communicated by members and others.

The Committee also recommend, as a means of furthering the interests of the Royal Institute in particular and of the profession generally:—

19. That the Royal Institute shall give its opinion publicly, to the effect:—

(a) That the taking out of "quantities" is no part of an architect's duty to his client as an architect.

(b) That there is no reason which should debar an architect from practising as a quantity-

surveyor, should he think proper to do so, and from receiving payment for such services.

(c) That when an architect acts both as architect and as quantity-surveyor for the same building, he should act in the latter capacity only with the previously-expressed concurrence of his client, who should also be informed in what way the charges for the "quantities" are to be paid.

20. That the foregoing paragraphs, (a), (b), and (c), shall be incorporated in the "Schedule of Professional Practice and Charges of Architects," sanctioned by the Royal Institute; and that the Royal Institute shall draft rules for the guidance of those of its members who practise as quantity-surveyors.

They further invite the consideration of the following:—

A. That the Royal Institute shall issue certificates under its seal to all and every of its members who are in practice, which certificates the Royal Institute suggests shall be exhibited by the members in their offices as evidence to the public of the holder's efficiency and assumed responsibility, and that the certificates shall be the property of the Royal Institute, liable to be revoked, and to be recalled, if considered advisable, by the Council.

B. That the use in the Royal Institute, for certain purposes, of voting-papers transmissible by post, and the extension of the Associates' privileges provided for in the Supplemental Charter, will tend largely to the expansion of the Royal Institute itself, and greatly aid the objects of federation.

The large question of compulsory registration is not within the scope of the Reference to the Committee, but they desire to point out that, should the proposals they have made be adopted, there will have been established a better organisation than now exists for eliciting the opinions of the profession generally on that important subject.

The Committee also feel that the following suggestion, made by Mr. Hickman, does not come within the scope of the Reference to the Committee: "That the employment of an architect to prepare

quantities for works under his own superintendence, or the concurrence of the client in the appointment by the architect of a quantity-surveyor, will give the quantities so prepared the same position in the contract as that of the drawings and specification."

|                       |                       |
|-----------------------|-----------------------|
| EDWARD L'ANSON.       | ARTHUR V. BLONFIELD.  |
| ALFRED WATERHOUSE.    | J. MACVICAR ANDERSON. |
| THOS. WORTHINGTON.    | WILLIAM H. WHITE.     |
| COLE A. ADAMS.        | JOHN HONEYMAN.        |
| CHAS. ALDRIDGE.       | G. G. HOSKINS.        |
| CHARLES BARRY.        | J. DOUGLASS MATHEWS.  |
| ALBERT N. BROMLEY.    | JOHN C. MONGRIEFF.    |
| JOHN WREGHITT CONNOR. | RALEIGH NEVILL.       |
| R. J. GOODAIRE.       | WILHELM PARSLOW.      |
| HUGH ROUMIGU GOUGH.   | CH. RICHD. PINE.      |
| EDWIN T. HALL.        | GEO. T. REDMAYNE.     |
| GEORGE T. HINE.       | THOS. M. RICKMAN.     |
| JNO. HOLDEN.          |                       |

**Illustrations.**

**EDINBURGH MUNICIPAL BUILDING COMPETITION.**

**W**E give this week the Cockburn-street front of the design submitted by Messrs. Hay & Henderson in this competition. The authors have realised that the main effect of the building would be attainable on the Cockburn-street side, owing to the great height available there from the fall of the ground; and they may be congratulated on having made a fine and impressive treatment of this front. A plan of one of the floors is added.

**MEMORIAL CHAPEL, EPWORTH.**

THESE buildings are intended as a Methodist memorial to John and Charles Wesley at their birthplace, Epworth, Lincolnshire; and the committee is a representative one from various



Courtyard of the Castle  
Limburg on the Lahn

towns in the North. The scheme altogether is to cost about 5,000*l*.

The plans were selected in a competition limited to ten architects experienced in chapel-building, and those of Mr. James Hicks, of Redruth, were adopted. The contractor is Mr. Kelsey, of Epworth.

#### STATUE OF ROUSSEAU, TO BE ERECTED IN PARIS.

This statue, of which we give an illustration, and which has recently been completed, is the work of a conscientious artist, M. Berthet, from whom it had been commissioned in 1855, after a public competition, in which his design was selected.

The competition was organised by a committee, which intended to offer the work to the City of Paris, after having it cast in bronze; but where the bronze will ultimately be placed has not been decided. The general idea is that it should be placed on the Quai Conti, near the left wing of the Palais de l'Institut, in such a position as to form a pendant to the statue of Voltaire, erected two years ago on the Quai Malaquais.

#### ESTATE BUILDINGS AND STABLES AT CLIPSHAM HALL, RUTLAND.

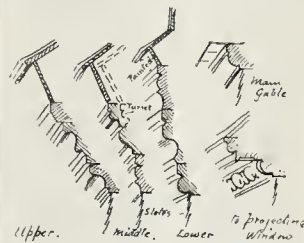
The buildings illustrated this week were erected some little time since upon the estate of Mr. Davenport-Handley, at Clipsham. The stone used for the walling and dressings was quarried on the estate. The roofs are covered with Collyweston slates, a local stone slating. The plans require no detailed explanation. Messrs. Halliday, of Greetham, carried out the work in a substantial manner; Messrs. Mnsgrave, of Bond-street, and Messrs. Wilkinson, of Great George-street, taking subsidiary contracts. The total cost, including fittings, was 14,370*l*. Mr. Arthur Young was the architect.

The ground plan is given on page 619.

#### TWO GERMAN CASTLES.

Two views given in this number of the castles at Elz and at Limburg-on-the-Lahn, are reproduced from water-colour sketches by Mr. Millard, to whom we are also indebted for the accompanying view of the courtyard of the

Limburg Castle, and of some of the details. They form examples of the kind of "picturesque architecture" referred to in another column. Schloss Elz is one of the few feudal castles remaining much as it existed in the Middle Ages: a group of gables and turrets irregularly piled together, and inclosing an interior as devoid of



Details from Castle, Limburg-on-the-Lahn.

rule or regularity as the exterior. To us of the present day it is a bit of "the picturesque"; to those who built and lived in it, it was no doubt a convenient abode full of the latest improvements, and suited to their way of living. So the world changes, and domestic architecture with it: not for the better in every sense, perhaps.

#### STAINED GLASS DESIGN: THE TRANSFIGURATION.

This window was made for, and fixed in, the east window of St. Mary's Church, Lucan, co. Dublin, by Mr. Wm. Moran, in memory of his first wife. It represents the Transfiguration, and was designed and executed at the Royal Stained Glass Works, Windsor.

**Church Lighting and Fittings.**—The church at Sawrey Infra, Sawrey, Windermere, has just been lighted up by five coronas, fitted with the Hesperus lamp, the patentees and manufacturers of which are Messrs. Jones & Willis, of Birmingham. A brass eagle lectern has also been manufactured by the same firm for Fakenham Church, Norfolk.

#### THE FOUNDATIONS OF THE FORTH BRIDGE.\*

I HAVE undertaken to read before you a paper on the Forth Bridge. It is a work with which I was intimately connected for upwards of three years; otherwise, considering that papers on this subject by Mr. Baker, Membr. of Council Inst. C.E., by Mr. A. Biggard, and by Messrs. Fitzmaurice and Moir, Students Inst. C.E., have already been read, I should not have dared to approach it, and, as it is, it is scarcely possible for me to avoid touching matter which has been admirably dealt with by others; therefore, if I should repeat what has appeared in the pages of the Proceedings of the Institution of Civil Engineers, or in one or another of the engineering newspapers, I must trust to your indulgence.

You are no doubt aware that the position of the Forth Bridge is a singular one. The Forth of Forth, which is some three miles wide above and below, narrows at the site of the bridge to a width of about 5,800 ft., or rather more than a mile, and at a distance of some 1,700 ft. from the north shore is situated the island of Inch Garvie, an upheaval of whinstone rock, about 1,000 ft. long by 200 ft. wide at the widest part, and having sides sloping steeply in all directions. The piers of the bridge rest on the extreme western point of the island, and the foundations of the northern piers are covered even at low water, while those of the southern piers are situated in from 46 ft. to 62 ft. of water at low tide.

On each side of the island, that is to say, in the northern and southern channels, the depth of water is some 200 ft., and the slopes are very steep; but from the southern shore the ground falls gradually, there being only 8 ft. of water 1,300 ft. from the shore, and 36 ft. at 2,000 ft. from the same place, at low tide.

This being the case, it would be next to impossible to build a bridge at any other point, but in this situation equal spans of 1,700 ft. can be obtained bridging the two deep channels, while by the use of the cantilever the remaining portion of comparatively deep water, varying as above mentioned from 36 ft. to 8 ft. in depth

\* A paper read by Mr. R. E. Middleton, M. Inst. C.E., M.I.M.E., on the 13th inst., before the Civil and Mechanical Engineers' Society.



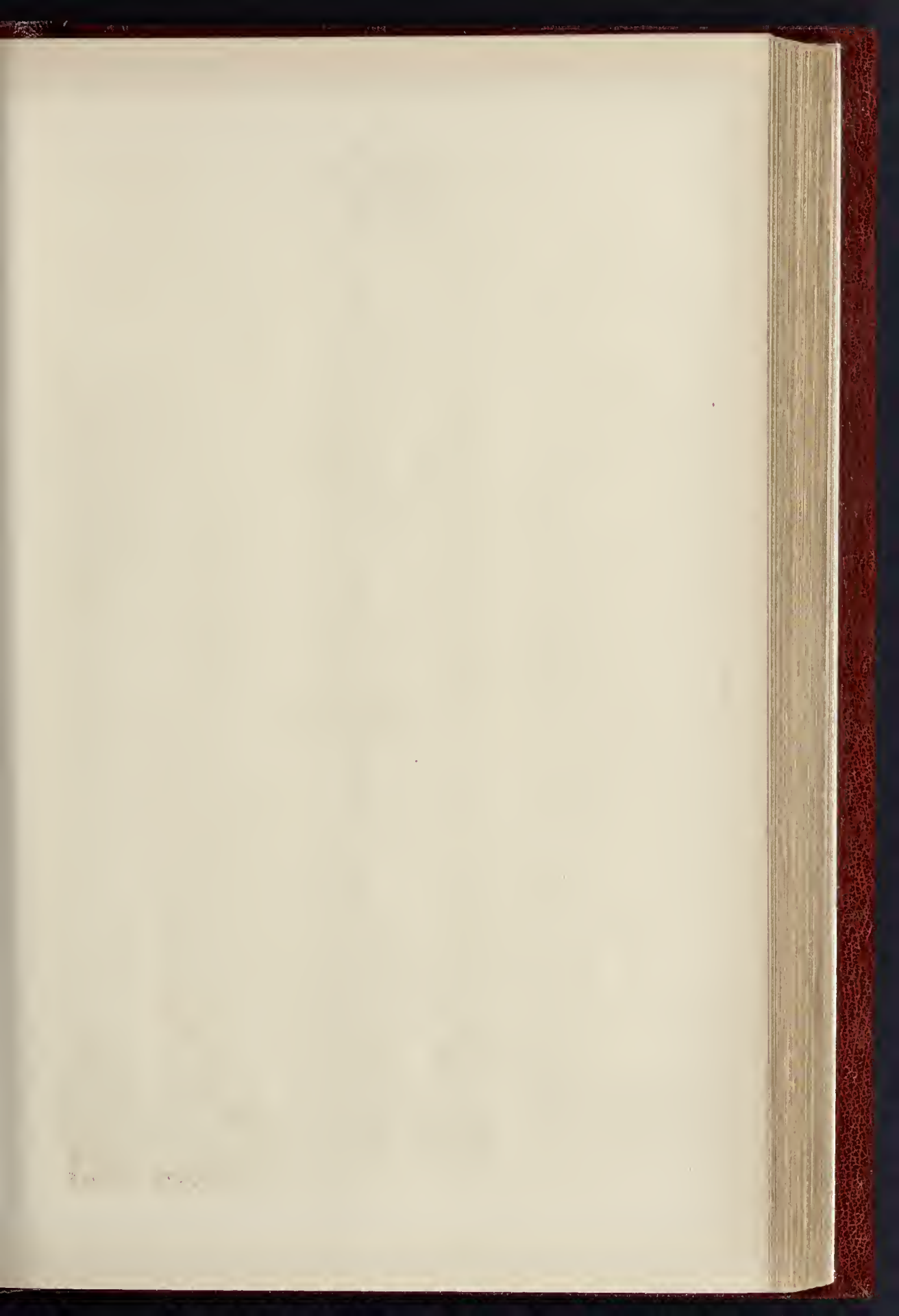


[The text in this section is extremely faint and illegible. It appears to be several paragraphs of text, but the characters are too light to be read accurately.]

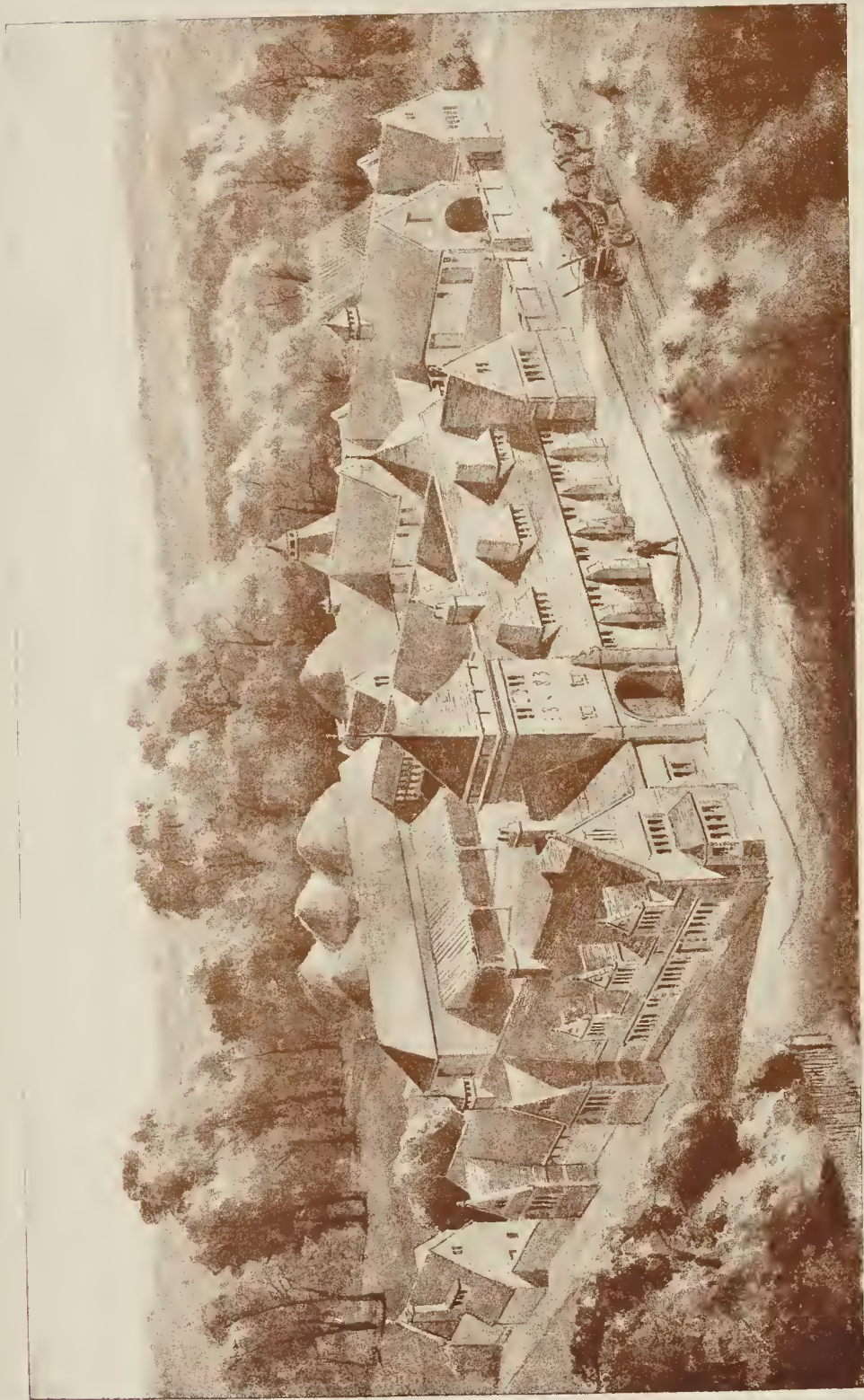


WYMAN & CO. PHOTO LITHO. 27, BUSEN ST. LONDON W.C.

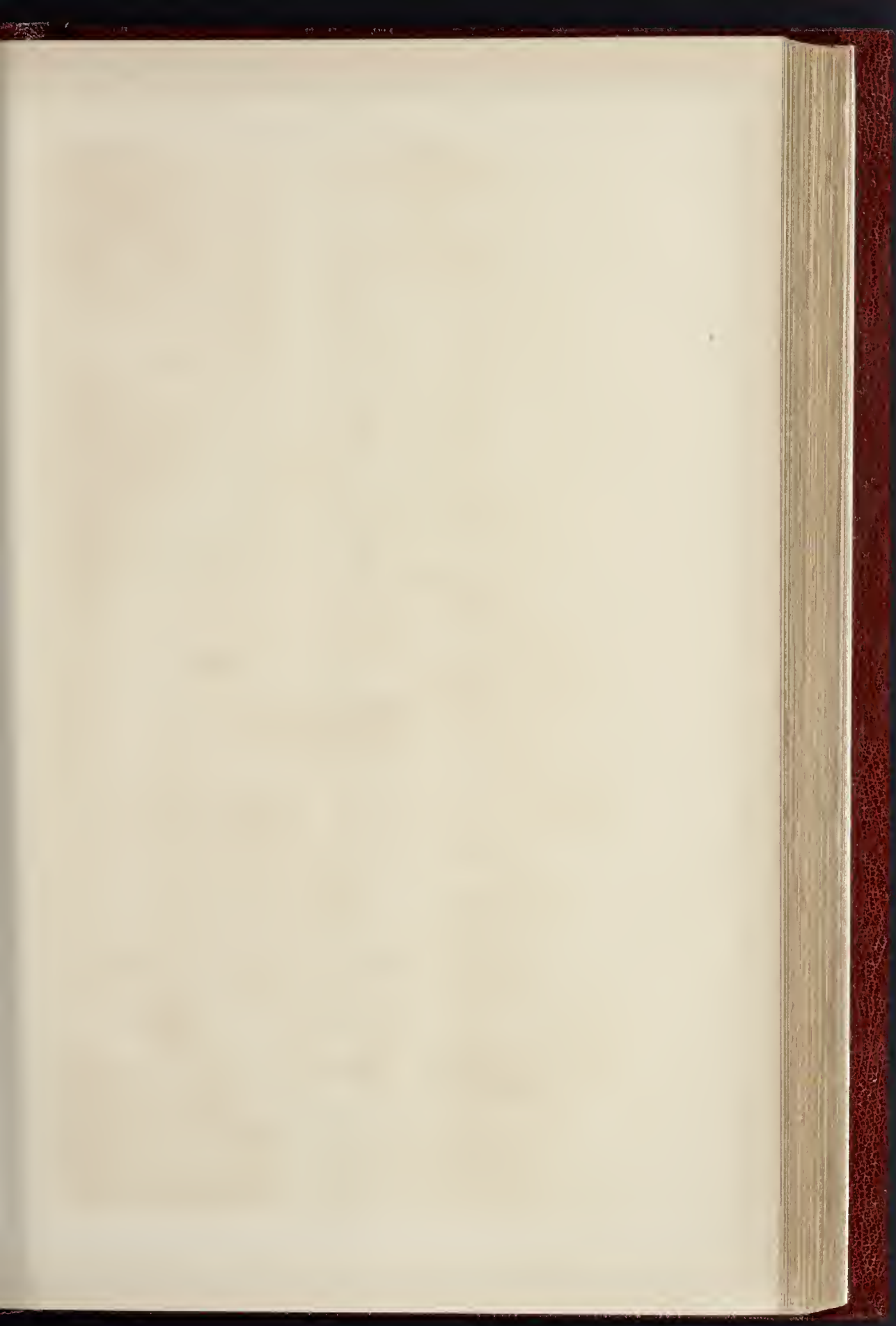
EAST WINDOW, ST. MARY'S, LUCAN, DUBLIN. —DESIGNED AND EXECUTED AT THE ROYAL STAINED-GLASS WORKS, OLD WINDSOR.  
SUBJECT: "THE TRANSFIGURATION."



THE BUILDER. APRIL 23, 1887



ESTATE BUILDINGS AND STABLES, CLIPSHAM, RUTLAND.—MR. ARTHUR YOUNG, ARCHITECT.



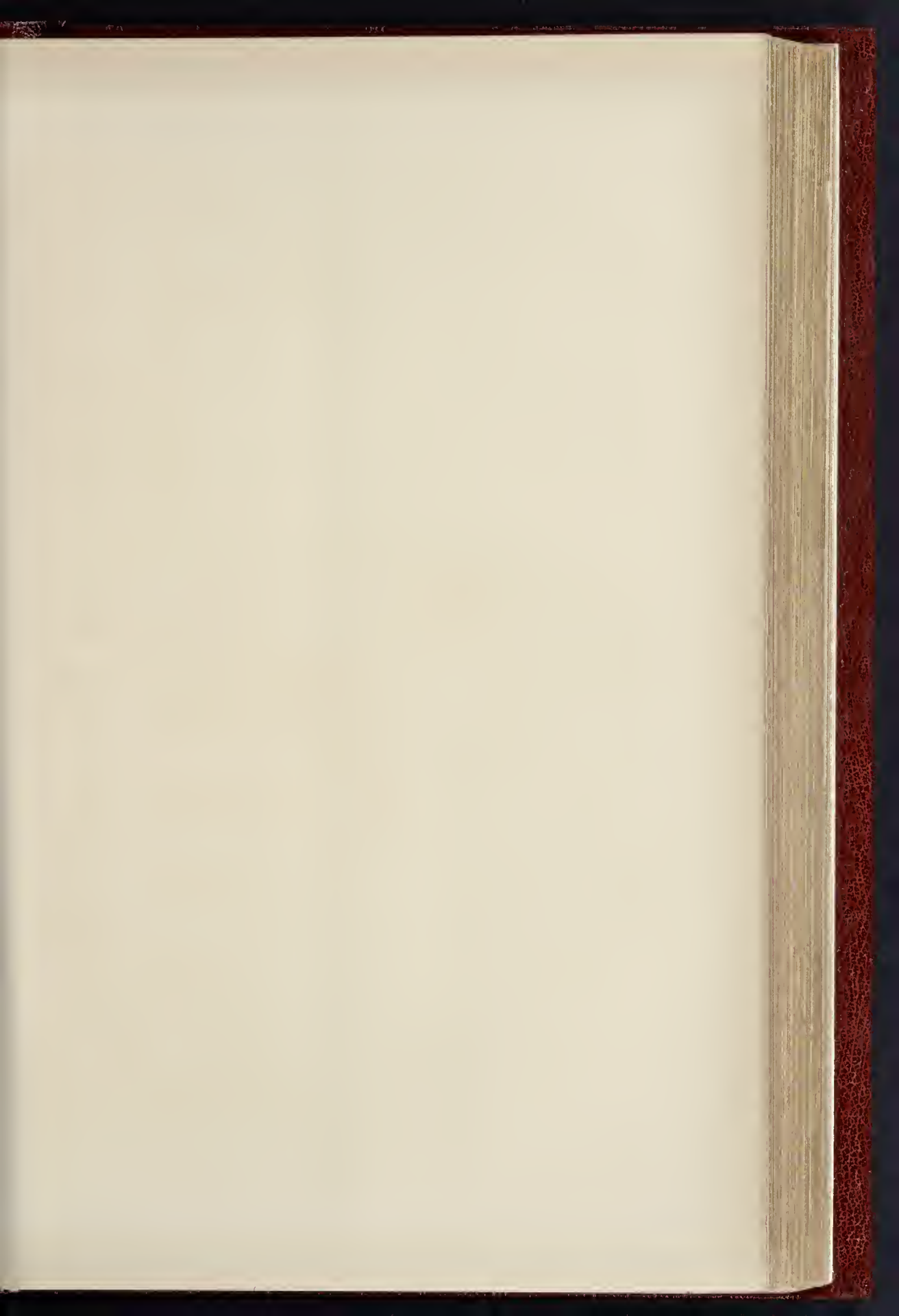
**PROPOSED MEMORIAL CHAPEL,  
TO JOHN AND CHARLES WESLEY,  
AT THEIR BIRTHPLACE, EPWORTH,  
LINCOLNSHIRE.**

TO BE ERECTED IN THE JUBILEE YEAR  
OF HER MAJESTY, QUEEN VICTORIA  
— 1887 —

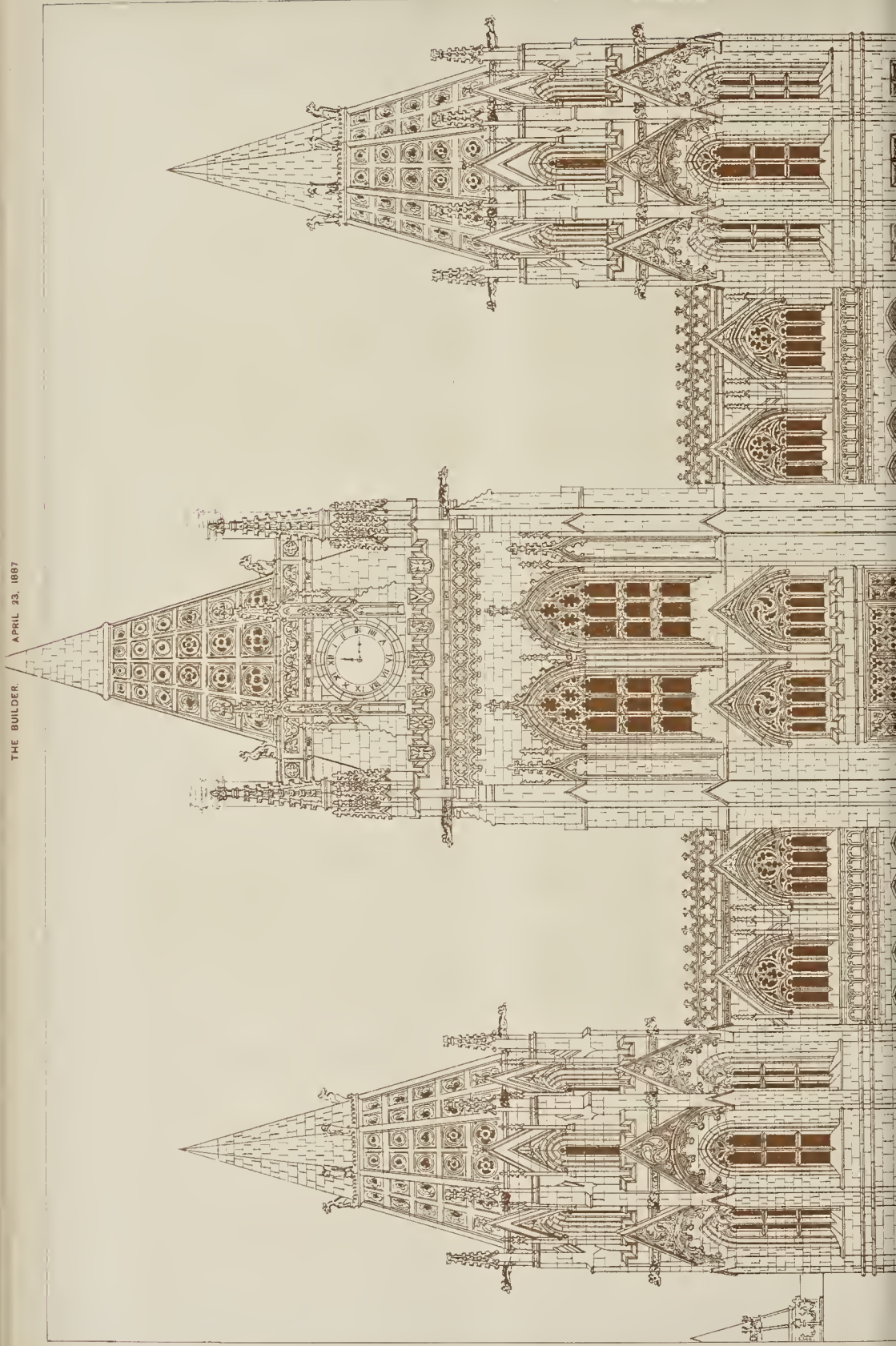
JAMES HICKS,  
ARCHITECT.

THE BUILDER, APRIL 23, 1887

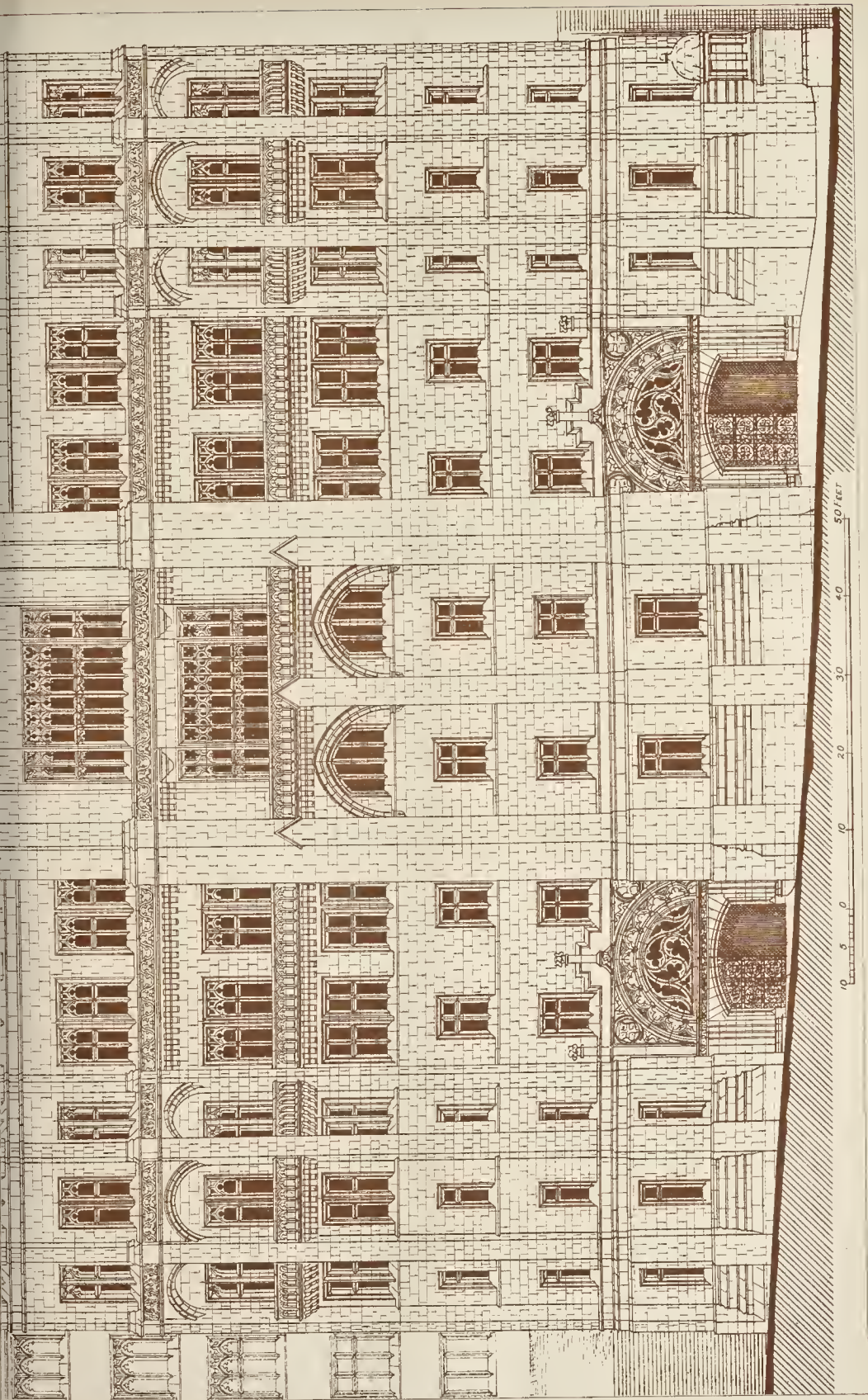




APRIL 23, 1887







EDINBURGH MUNICIPAL BUILDINGS.—DESIGN BY MESSRS. HAY & HENDERSON.  
ELEVATION TO COCKBURN STREET.

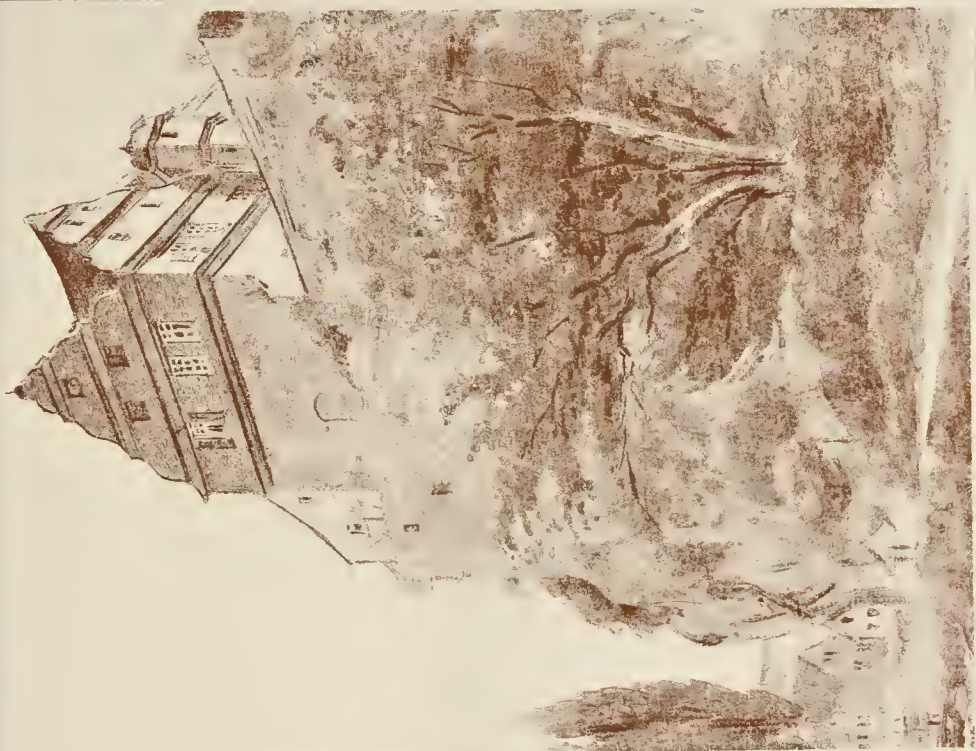




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STATUE OF ROUSSEAU TO BE ERICED IN PARIS.—M. BERTHET, SCULPTOR.

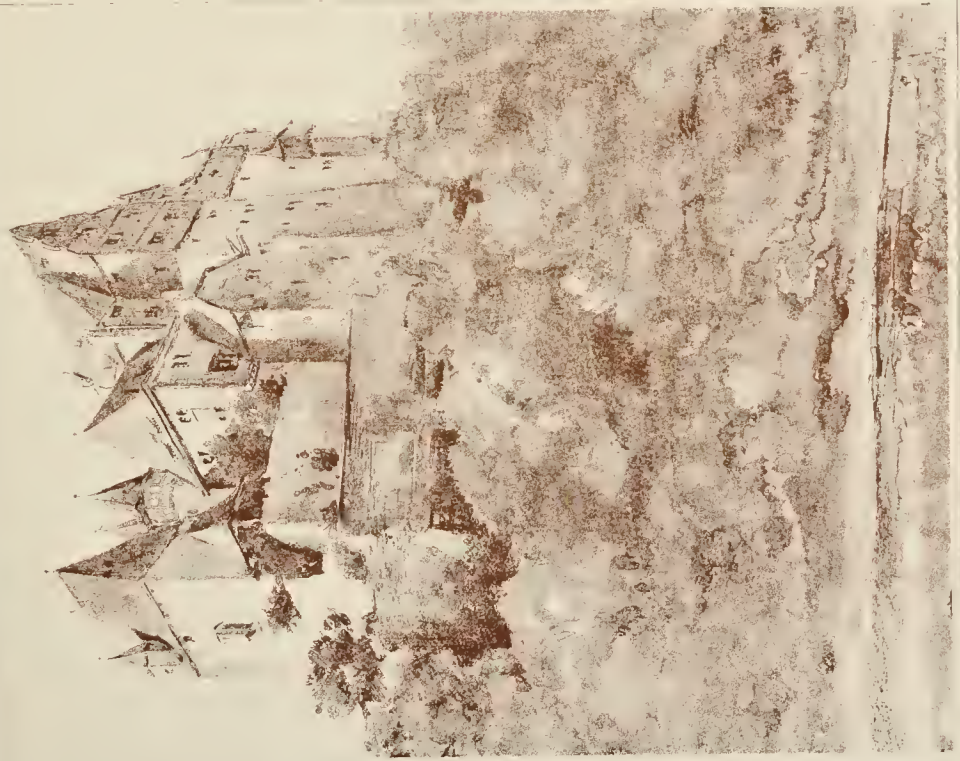
THE UNIVERSITY OF CHICAGO



W. J. MILLARD, A.R.C.B.

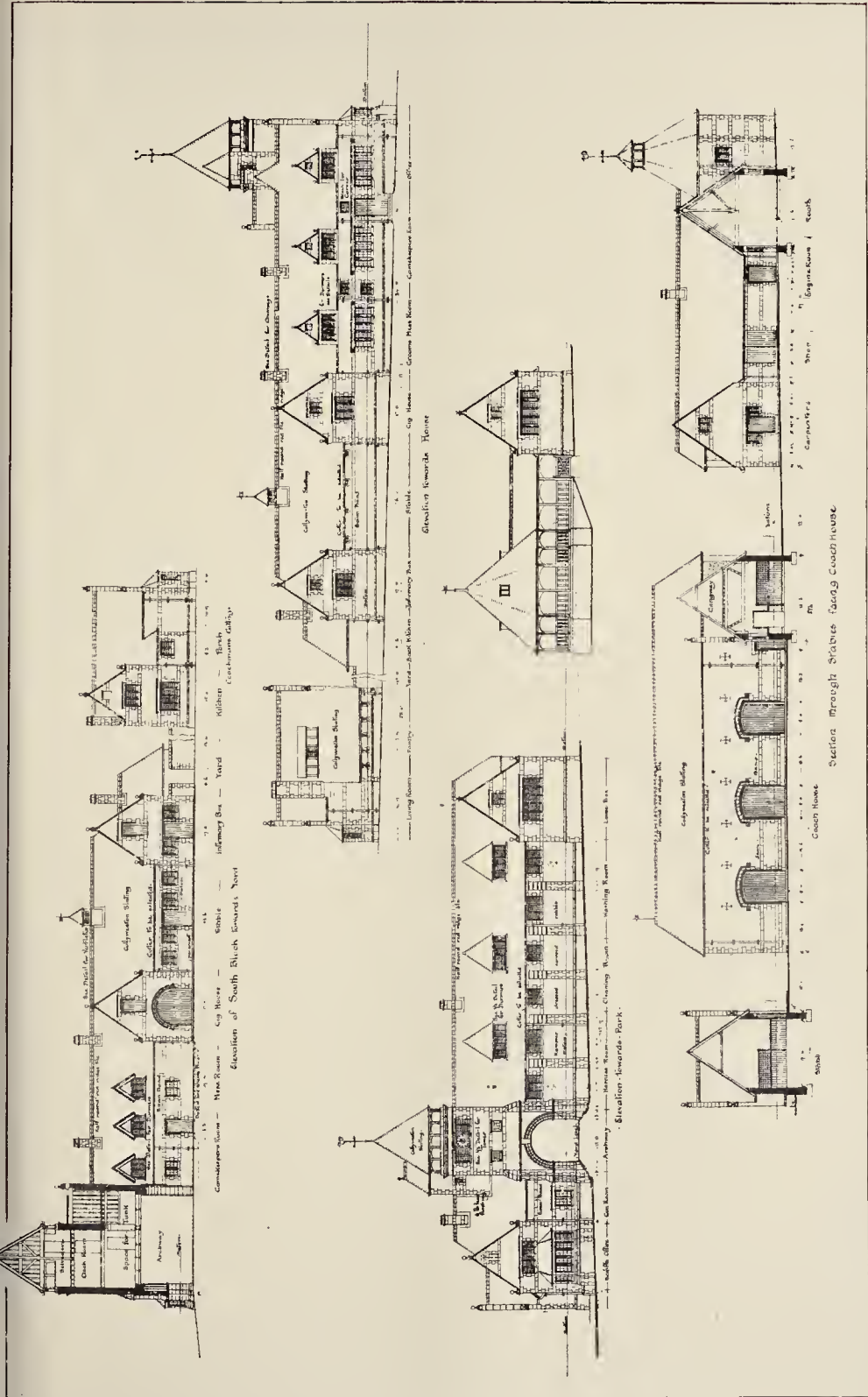
THE SCHLOSS, LIMBURG ON THE LAHN.

FROM SKETCHES BY MR. W. J. N. MILLARD, A.R.C.B.



THE SCHLOSS ELZ

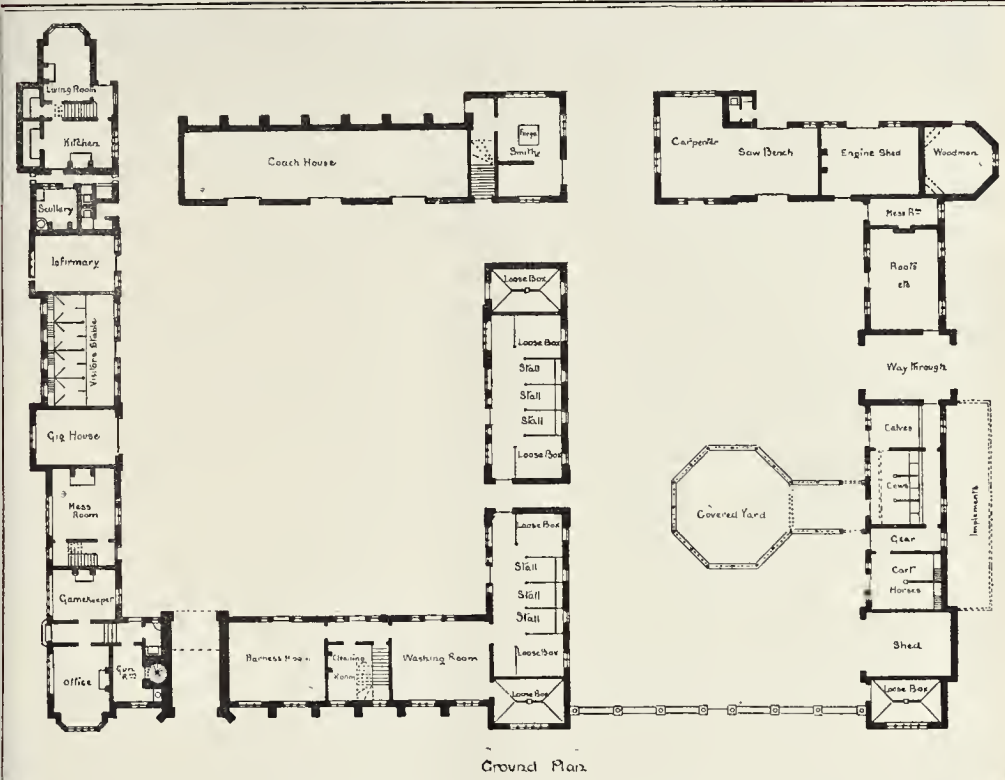




ESTATE BUILDINGS AND STABLES, CLIPSHAM HALL, RUTLAND.—MR. ARTHUR YOUNG, ARCHITECT.







Ground Plan.  
Estate Buildings and Stables, Oliphant Hall, Rutland. (See p. 602.)

at low water, is compassed, and short spans of 168 ft. each can be used for the rest of the distance.

The level of the ground on each side of the Firth is high, and the level of the rails, although this is 167 ft. 9 in. above O. D. in order to allow full-rigged vessels to pass under the bridge, runs into cutting on both sides of the Firth almost immediately on leaving the viaduct.

The dimensions of the cutwater piers for the viaduct spans are, at a level of 21'66 ft. above O. D., 46 ft. 6 in. by 17 ft. In plan they have parallel sides with semicircular ends, and in section the sides and ends have a batter at the rate of 1 in 10.

The construction is an average thickness of rock-faced Aberdeen granite of 1 ft. 10 in., built in some cases header and stretcher alternately in the same course, and in others the coursing is header and stretcher in alternate courses. The interior is filled in with Portland cement concrete made in the proportion of about 8 to 1 on the average. At about every 9 ft. vertically is a bond course of two thicknesses of through stones, whinstone or freestone, each thickness being 1 ft. 6 in.

Above the level of 21'66 there is a necking of dressed granite 1 ft. 8 in. deep, and above this a heavy capping, also of dressed granite, from which the above water piers start at a level of 27 ft. above O. D. The dimensions of these piers are at this level 36 ft. by 15 ft., at a level of 67 ft. above O. D. 29 ft. 6 in. by 12 ft. 6 in., and at 139 ft. above O. D. 25 ft. by 8 ft., the ends having a batter of 1 in 32 throughout, while the sides between the levels of 27 ft. and 67 ft. have a radius of 320 ft., the portion above 67 ft. hattering at the rate of 1 in 32.

Above the level of 139 ft. is a necking and capping of dressed granite, and just free of this the viaduct girders are placed, the road being carried on the tops of the girders and cross girders.

The cantilever piers which carry the ends of the main cantilevers, and by their weight help to support the load of the central girders of 350 ft. span, are of very much larger dimensions than the viaduct piers, being 77 ft. 10 in. long by

45 ft. wide at a level of 21'66 ft. above O. D., but in other respects they are similar, the cutwater pier having a batter of 1 in 10, the sides between 27 ft. and 67 ft. above O. D. having a radius of 320 ft., and the ends and all the portion above 67 ft. up to rail level having a batter of one in thirty-two. These piers are, however, built hollow, with cross walls 6 ft. thick, and the hearing is of rubble, not concrete.

The form of the piers which support the main cantilevers is circular in plan, 49 ft. in diameter at a level of 21'66 above O. D., with the exception of the two northern piers, which are 45 ft. in diameter at the same level, the sides hatter 1 in 10, the rock-faced granite has an average thickness of 1 ft. 10 in., and the hearing is of rubble, the upper portion being filled in with rubble of Arbroath stone, which is a very flat-headed, hard freestone, or with strong brickwork.

The top level in the most northerly and most southerly piers is 27 ft. in the others it is 26'80 ft. above O. D., the difference being made up by extra thickness in the bed-plates of the piers built to the lower level.

There are forty-eight bolts of steel 2½ in. in diameter and 24 ft. long anchored at their lower ends with cast-iron anchor plates and built into the masonry, which are intended to secure the hauses of the cantilevers, and round each bolt, with its top level with the top of the pier, is placed a cast-iron washer about 14 in. square by 4 in. thick; these washers are set dead level and a bed of neat cement is laid 1 in. thick to the level of the tops of the washers, and on this bed and on the washers the lower bed-plate rests.

In each washer is a vertical slot, and into this is inserted a small segment of a nut fitting into the thread of the bolt, and this prevents any possibility of the bolt turning round.

The placing of the bolts and washers in their true position was a troublesome and delicate piece of work, and was done by setting a templatia representing the lower bed-plate, at or near the height which the bed-plate would occupy, supported on timber runners which

were carried by whole timbers, fixed sometimes to the staging, sometimes to the caisson which surrounded the pier. This templatia was set in place to 1-16th in. with the theodolite, and its position repeatedly checked.

Unfortunately when the pier was within about 6 ft. of completion it was necessary to remove the templatia so that the masons might get at their work, and consequently large stones constantly came in contact with the bolts and knocked them out of place, and this caused considerable trouble in bringing the bolts into their true position to fit the bed-plate, in which there was only 1-8th in. play round the bolts and which it was necessary to set with great exactitude.

The foundation of pier No. 1 is situated in hard boulder clay, that of No. 2 in sandstone rock, both above high-water mark; those of piers Nos. 3 to 6 are made in sandstone rock, below the level of high water; those of piers Nos. 7 to 9 and the south cantilever pier in boulder clay—all the foundations from No. 6 northwards being below low-water level.

The foundations of piers Nos. 3 and 4 were laid between tides without any dams, of Nos. 5 and 6 with half-tide dams, and of Nos. 7, 8, and 9 with whole-tide dams. The foundation of the south cantilever pier was also protected by a whole tide dam during construction.

The viaduct piers on the north side of the Firth, Nos. 10, 11, and 12, are all founded on the whinstone rock, as is also the north cantilever pier; pier No. 13 is founded on sandstone. All these piers, with the exception of Nos. 12 and 13, are founded above high-water level.

The piers which support the main cantilevers are four in number for each cantilever, and are circular in plan, 49 ft. in diameter at 21'66 ft. above, and 54 ft. 11 in. in diameter at 8 ft. below O. D. Beginning with the four southern or Queensferry piers, the foundations of which are in the boulder clay, the caissons on which they rest are 60 ft. in diameter at the top, 68 ft. in diameter 18 ft. lower, and 70 ft. in diameter at the bottom or cutting edge. The caissons are constructed of iron, 3-8ths in. and 5-16ths in. thick. There is an inner skin of iron, about 55 ft. in diameter, which is braced to the

outer skin by plate and angle iron vertical bracing. The floor is placed 7 ft. above the cutting edge, and is carried right through to the outer skin, holes being left in the annular portion through which concrete can be filled into the shoe. The inner skin is at this level produced outwards to meet the outer skin at the cutting edge. The floor is supported by four main lattice girders, 13 ft. deep, and by plate cross girders, 3 ft. deep.

The upper edge of the caisson is fitted with a horizontal plate attached to it, and to the vertical bracing by means of angle irons, and to this plate are attached the segments of the temporary caisson, numbering fourteen for each lift of 10 ft., this caisson being used to protect the portion of the pier above low water during construction, and is further attached to the permanent caisson by means of outside bolts and shackles hooked into angle-iron lugs, riveted to the latter, so that the whole of the inside bolts might be removed without endangering the lightness of the caisson.

The whole of the permanent caissons were built to within about 12 ft. of the top on ways constructed for the purpose on the south side of the Forth, and were launched in the ordinary manner from these ways. When launched, the draught of water was about 10 ft., the weight of the caisson being about 400 tons.

Within the circumference of the caisson, in positions triangular in plan, were placed three tubes of boiler plate, built in lengths of about 10 ft., with flange joints, and 3 ft. 6 in. in diameter; these tubes were connected firmly to the floor-plates, in which were provided holes of similar diameter, each closed in the under side by means of a balanced flap-door.

These tubes were provided for the entrance and exit of the men employed to excavate the foundations, and for the tubs to remove the material so excavated; and in the tube used for the ingress and egress of the men were placed vertical wrought-iron ladders, one on each side of the tube.

On the top of each tube was placed an air-lock, the top of the air-lock being about level with the top of the temporary caisson, or 3 ft. above high water, when the caisson was at its lowest level.

Two of the air-locks were arranged for the ingress and egress of the tubs used for the removal of the material excavated, and one was made for the use of the workmen.

The shape of each air-lock was circular in plan, and the doors of the tub-locks were horizontal, sliding in grooves and fitted with a packing of india-rubber on one face, and actuated by a ram. The diameter of these locks was 3 ft. 6 in., and the total height, 6 ft.

The man-locks were 7 ft. in diameter outside, and were annular in plan, and had four doors working vertically on hinges and fitted with india-rubber packing. The annular space was divided into two, so that one pair of doors could be used for ingress and the other for exit at the same time. The area of one-half of the annular space would be about 15 ft., and this space has contained eleven men.

The handles actuating the machinery for opening and closing the doors of the tub-locks were interlocked, so that only one door could be opened at a time, but owing to faulty construction the locking was not always effectual, as unless pressure was maintained on the ram which closed the upper door, when the pressure of air in the locks was low this door fell from the upper face, there was a great leakage of air and the door could be easily moved outwards, and this was only prevented by a small locking bolt, which was designed to engage with the ram actuating the door and prevent it from moving. Should this bolt get worn or it be possible to force it up, then a comparatively small force would open the door, and this small force was found in the arrangement of the lifting gear for the tubs. The winding drum being on the same side of the lock as the opening and closing gear, and the rope being led through a pulley attached to the centre of the top door, exerted a considerable pull on this door whenever the rope was loaded.

The door was forced open in this manner on one occasion, the lock was very seriously damaged, and the air escaped from the caisson, which then became filled with vapour, the lights were extinguished, and the men had great difficulty in finding their way to the ladders; fortunately the excavation was in very hard clay, therefore the caisson only sank very slightly when the pressure of air was

removed, and no injury was done to the men or to anything but to the lock itself.

The air was admitted to or expelled from the tub-locks by means of a large valve, manipulated by the man in charge of the machinery for opening and closing the doors and lifting and lowering the tubs, and only a fractional part of a minute was occupied in the admission of the air to the lock or its expulsion from it. Such an arrangement could not be applicable to the man-lock, where very rapid increase or decrease of pressure would certainly be very injurious, and might be fatal to the occupants, and a small valve was, therefore, provided which could be regulated from the interior of the lock. The time occupied in the lock was usually from ten to twenty minutes, according to the working pressure at the time.

It was most important that the pressure should be increased or diminished as gradually as possible, and the longer the time occupied in the lock the less danger there was of any unpleasant consequences resulting from having been under pressure, as it was necessary on entering that the whole body should be permeated by the increased pressure of air and on leaving that the air at high pressure should be removed from the body, and in some cases the unpleasant effects did not come into action until one or two hours after leaving the lock, at others they were non-existent, while again cases of partial paralysis occurred immediately on leaving the lock, accompanied by violent pains in the limbs, such pains being generally removed after a time by the use of the electric current, and the paralysis reduced in the same way. Although the depth of the cutting edge of one of these caissons was 91 ft. below high water, representing a pressure due to head of about 30 lb. per square inch, the maximum pressure used in the sinking of the Queensferry caissons was 25 lb. per square inch, as the clay through which the caissons were sunk prevented the passage of air and also afforded sufficient frictional resistance to prevent the caisson sinking until the air pressure was lowered to a very considerable extent; the highest pressures were used while the caissons were passing through soft mud, and were often reduced in ordinary working to 10 lb. at the lowest depths, and to 2½ lb. when the caisson was lowered, which was done when sufficient material had been excavated.

With 25 lb. per square inch of pressure in the caisson the lifting force would be 6,239 tons; it was, therefore, necessary to have a greater weight of concrete and iron in the caisson to counterbalance this, and to enable the caisson to overcome the frictional resistance when the pressure was reduced.

While passing through soft mud it was necessary that the weight of and in the caisson should be decidedly in preponderance; when the hard clay was entered the surface friction tended greatly to resist rising, and the excess of downward pressure was not so essential.

The greatest pressure of air used was about 35 lb. per square inch.

The means employed for removing the soft mud, in many places 10 ft. deep, which overlaid the hard clay was pneumatic, the mud being forced out of the caisson by the pressure of the air inside it.

Cast-iron pipes about 5 in. in diameter were introduced between the two skins of the caisson, having openings to the external atmosphere at different levels and connecting with the working-chamber of the caisson. To the lower ends of these pipes were attached flexible tubes fitted with valves. The end of one of these tubes was introduced into the portion of mud to be removed which had previously been mixed with water, supplied either from an accumulator or a stand-pipe, and rendered as soft as possible. The valve was opened and the pressure of the air in the caisson immediately forced the soft mud through the pipes to the nearest opening and into the external atmosphere, and this continued so long as there was mud of a consistency thin enough to pass through the tubes.

Soon after the soft mud was passed through bands of sand, shells, and, lastly, boulders were found, before the hard compact black clay which formed the final foundation was reached. This clay was so solid that the pick made little impression on it, and the work of excavation promised to be long and tedious; an hydraulic spade was, however, designed by Mr. William Arrol, one of the contractors, which expedited the work amazingly, and which was most simple

in construction and use. It consisted simply of a brass cylinder in which worked a piston and rod, fitted with a spade end; the cylinder was, of course, provided with suitable valves for admitting and discharging the water, and which were worked by hand. The spade was placed in a suitable position, the end of the cylinder abutting against the roof of the working-chamber, and water being admitted, forced the spade into the clay; the water being exhausted and the cylinder lowered, the latter could be used as a handle or lever, and a portion of the clay removed.

Hydraulic pipes were required in the caisson in any case to provide water for mixing up the soft mud, so that no extra expense was required on this account.

The power of compressing the air was supplied by direct-acting air-compressors, fitted, however, with rotative motion and fly-wheels, in order to maintain an even rate of pumping and a regular pressure on the gauges, and provided with spray-pumps for supplying the necessary amount of moisture to the air. The boilers used were of the locomotive type, and the whole plant was supplied by Messrs. Fawcett & Preston, of Liverpool.

In case of a caisson getting somewhat out of place, the course pursued was to lower the side to which the cylinder tended, thus bringing the caisson out of the vertical, and then to excavate well under the other side, and bring the cutting-edge into a horizontal position again, and so repeat this operation until the desired effect had been produced, or until the caisson was at its final level.

This plan was effectual so long as there was a good depth of hard material on the side to which the caisson tended to move, and not a much greater depth of hard material on the other side; but if that was not the case, what was gained when the caisson was canted was lost again when it was brought back to a vertical position.

When the caisson reached the final level, that is to say, when the top of the permanent caisson was 8 ft. below O. D., the space between the floor of the caisson, or roof of the working chamber, and the clay excavated,—a space generally about 5 ft. in height, but of irregular section,—had to be filled in with concrete before the air-pressure could be removed. This was effected by filling three small wrought-iron tubes, 18 in. in diameter, and provided with doors top and bottom, with concrete; the top door then being closed, and air under pressure admitted to the tube, the bottom door could be opened and the concrete discharged into the working chamber. The concrete when delivered was first placed round the cutting-edge and up the slope of the roof, those parts where the ground was least hard, or towards which the caisson tended to cant being secured first, and well rammed with wooden rammers. If it was desired to regulate the level of the caisson at all, these places were secured as described, and the pressure lowered where the weight of the caisson cut into the ground not concreted. The whole of the circumference having been concreted, the work proceeded towards the centre, concluding at the main tube, the whole being well rammed against the roof; the openings were sealed and the tubes of all sorts above the floor were removed, then the air-pressure being withdrawn, after the concrete had had a sufficient time for setting, the weight of the caisson and its contents rested on its final foundation. The concrete was allowed a further short time to solidify, and then the work of filling such part of the caisson as was not already full of concrete was proceeded with up to a level of 9 ft. below O. D., where the granite pier commenced.

The southern Inchgarvie piers were similarly founded in caissons of wrought-iron, filled with concrete, but as the foundations were rock, the full pressure due to the head of water had to be maintained; this was at the greatest 82 ft., equal to a pressure of 35.5 lb. per square inch.

As the rock was very sloping, there being a difference of level of 20 ft. in a distance of 23 yards in the steepest part, and the general slope did not vary much from this rate of inclination, it was necessary to make provision for the maintenance of the caisson in a vertical position during such time as it took to excavate and remove the rock. For this purpose a large raft 70 ft. in diameter, which was originally made for the purpose of taking accurate soundings from which the contour of the rock might be plotted, was moored in the position to be occupied by the caisson, and from it were

lowered bags of sand to form a breakwater and resting place, and in two positions in the circumference of the raft bags of concrete were laid, which, with a resting-place of rock, formed three points of support for the caisson. As the rock was excavated so were the pillars of concrete reduced until a level surface was secured over the greater part of the area, the remaining portion being slipped and an iron apron provided fitting closely to the contour of the rock and attached to the cutting-edge of the caisson.

It will, of course, be understood that the concrete pillars would not have withstood the weight of the caisson and its contents without the counterbalancing effect of the air pressure under the floor.

The level of the rock at the site of the northern Inchgarvie caissons was in no case lower than 10 ft. below O. D.; therefore, it was possible to excavate, by blasting at low water of spring tides, a trench sufficiently large to receive a caisson 3 ft. deep, to which, when the annular space had been packed with clay and concrete bags and rendered fairly water-tight, the temporary caisson could be bolted; the rest of the rock was then slipped off and the pier constructed.

The two northern Fife piers were founded altogether above low-water mark, and in the case of the eastern pier above high-water mark.

The southern Fife piers were situated on very sidelong ground, and it was necessary to remove a large quantity of rock before the foundation could be laid, and it was decided to do this by blasting, the holes being bored by means of the diamond drill. For this purpose, over the site of each pier were erected three girders laid parallel to the centre line of the bridge and about 35 ft. between the centres, the length of each girder being about 30 ft., sufficient to span the whole diameter of the caisson and a space of some 3 ft. all round it, say 68 ft. diameter. On the girders were laid rails and a traversing platform carrying a gallow constructed of angle irons, from which were suspended four diamond drills, placed about 4 ft. between the centres and driven direct by Willans' three-cylinder engines, one to each drill. Each drill worked inside a tube extending from above the platform to the rock, and down this tube the explosive cartridge, charged as a rule with tonite, was introduced. The charges were fired with a good head of water over them.

The shots were drilled from the front of the sloping rock and fired in batches of four until the whole space to be levelled had been gone over, the intention being to reduce the interior to one level with a trench some 2 ft. or 3 ft. deeper and about 5 ft. wide running round the central portion.

The blasting was not very successful. The stone is at best much fissured, and the force of the explosion was often dissipated through the cracks, and as the drilling and firing was continued without intermission the debris was not removed. It, therefore, became firmly cemented with sand and mud, and its amount prevented the shots fired behind it from taking full effect; thus when the time came for the removal of the material it was exceedingly difficult of detachment, and the uniform level required could not be obtained without further blasting.

Another difficulty met with was that, though it was believed that a fairly accurate contour of the rock had been taken, this was not the case, the portion below low water being filled in with large boulders, which had been accepted as rock, and the solid rock was met with on the seaward side at a considerably lower level than was expected, extending in the eastern pier to 10 ft. below the contour taken. This, of course, necessitated a large amount of extra labour, and whereas it had been expected that a small caisson not much deeper than those used for the northern Inchgarvie piers would be sufficient for the purpose, it was found necessary to construct a dam for each pier, and as there was little or no mud for the piles to be driven into, and they were really secured to a large extent between boulders, great difficulty was experienced in making the dams sufficiently strong and tight. Indeed, in the eastern pier, where a timber exterior with iron interior dam was used this desideratum was never secured, and in order to be able to get in the foundations a sump was cut in the rock to a depth of about 10 ft., reaching below the lowest level of the rock touched by the dam; pipes were laid from the strongest leaks to the sump, from which

two centrifugal pumps of 12-in. and 9-in. diameter drew the water. The laying of the foundation was then proceeded with up to a somewhat higher level than the top of the sump, the pipes were plugged and the sump built up so far as practicable, vertical pipes were led up from the sump and the position of the strongest leak to above high water level, and when the masonry was somewhat further advanced cisterns were constructed at the heads of these pipes, and were filled with grout of neat cement, which when mixed was allowed to pass down the pipes to fill any spaces which might exist. About 35 tons of cement were used for this purpose.

As many of you may be aware, an unfortunate accident happened to the north-west Queensferry caisson, which delayed the completion of the pier by twelve months.

The caisson had been floated into its place, and additional plates were being added to it in position in the usual way, while concrete was also added internally to weight the caisson down, so that it should sink sufficiently to touch the ground, it being very desirable that this should be done as soon as possible, as if heavy weather came on while it was fully afloat it might do serious damage to the stage. At this time the New Year's holidays intervened, and the works were idle for three days; the caisson had been left with a rather small margin of flotation at the internal tubes, and the weather becoming somewhat stormy, a certain amount of leakage took place into the caisson, which set it down still further in the water, and finally caused the caisson to sink at its moorings. This would have been of no great consequence if the slits had been of large size and had been immediately opened, but this not being the case, when the tide fell the great weight of water in the caisson added to the weight of the caisson itself, and some 3,000 tons of concrete in it, in all about 4,700 tons, forced the caisson into the mud, and the ground, having at this part a slope of 1 in 6, it at the same time slid down the incline for a distance of 30 ft., until about half of it was submerged at low water, and it lay perpendicularly to the slope of the ground, or at a slope of 1 in 6.

Probably, if it had been possible to turn the caisson over into deep water and sacrifice it altogether, this would have been the course pursued, but the difficulty was to do it: the caisson was so situated that without its removal another caisson could not be placed in the required position, therefore it was decided to lift it, and immediate steps were taken to effect this purpose, and to bring it back into its proper place.

Thick plates were built up on the lower side to raise the skin above the level of high-water, and at the same time the interior was strutted with timber to prevent the skin collapsing. It may naturally be supposed that, as the caisson would, in the ordinary course of erection, have to withstand an even greater head of water than would press on it if pumped out under present conditions, it ought to do the same under existing circumstances, but many reasons combined to render this view fallacious. In the first place, the interior skin had not been built up to its full height, and this greatly reduced the power of resistance of the outer skin; secondly, as concrete was constantly being added to the caissons as they sank, to counterbalance the increased upward pressure of the air, and this was added to the annular space between the skins at a greater rate than to the interior, it helped to support the outer skin; lastly, as the caisson was canted over with a slope of 1 in 6, the line of pressure of the water exerted its force, not on a cylindrical, but on an elliptical body.

As the greater portion of the strutting had necessarily to be done under water, and very muddy water, by divers, and as the shape of the caisson was constantly altering with the set of the water produced by the rise and fall of the tide, it was most difficult to obtain a firm bearing for the struts; indeed, it may safely be said that this requirement was never thoroughly secured throughout, as when the caisson was pumped out rather lower than usual and the tide rose rapidly, a portion of the seaward side, some 50 ft. by 18 ft., collapsed, and the whole work had to be commenced *de novo*, and on an entirely different plan, as the plates were rent to such an extent that it was quite impossible to make any new attachments to them.

The new plan was to enclose the caisson in a dam, the piles being whole timbers with a V-

shaped groove on one side and a corresponding projection on the other; packings of felt or cloth were nailed into the lower extremities of the timbers, where they would rest against the caisson, and tarred felt was placed between each pair of timbers, and in some places pieces of canvas were nailed on outside, and this was continued until a barrel of timber was formed round the caisson. This when completed was hooped round with iron about 6 in. by 1 in. in three places.

Internally, two wrought-iron circular plate girders were inserted to support the skin at different levels, and these were again strutted from each other and from the concrete in the caisson. Timber strutting was also inserted between the heads of the piles and at other levels in the caisson. When the whole was considered to be secure, so much as possible of the mud having been removed from the southern side by means of a grab, air was admitted under the floor of the caisson, and the water lowered somewhat inside the caisson by the use of centrifugal pumps; leaks were made good, and the water was further lowered, and so on. The position of the caisson was in the meantime carefully measured and observed, and any movement noticed. The movement was for several days very slight and uncertain, amounting at the most to a few inches; then there was a movement towards righting of a couple of feet or so; and finally, one Sunday morning, the caisson suddenly lifted considerably, and floated, and within two days it was back in its place, and secured by chains and hawsers provided for the purpose. So large a portion of the caisson having been damaged or destroyed, it was found necessary to build a brick caisson inside the outer skin, reaching from the concrete already deposited in the annular space to the top of the permanent caisson; the brickwork varied in thickness from about 6 ft. 6 in. at the bottom, and the weakest portion of the caisson, to 2 ft. 2 in. at the top. This wall having been completed, and the large amount of mud and dirt collected in the caisson removed, concreting was proceeded with, the caisson sunk, and the pier built. With the completion of this pier the construction of the foundations ended.

In dealing with this subject, I have been obliged to restrict my remarks solely to foundations, or I should have altogether overstepped the limits of your patience, and as it is I have found it necessary to enter very little into the details of the work, on which a considerable volume might easily be written.

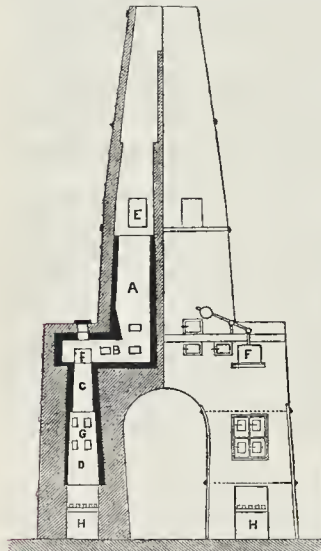
**A Railway Building Feat.**—If everything goes well, the Manitoba Railway Company will accomplish the greatest feat in railway construction in 1887 ever attained, even in the United States, the electric light being called in to enable the contractors to push on the work without interruption. It is proposed to build 580 miles from the western end of the Manitoba road to Great Falls, Montana, and 90 miles from Great Falls to Helena. This extraordinary step, it appears, is rendered necessary because of the delay caused by negotiations with the Northern Pacific Railroad. This latter road, which was the only one that could transport the steel rails to the other end of the proposed route, so as to enable the Manitoba Company to build from both ends at the same time, placed such a heavy freight-rate upon the carriage of the rails that it amounted to a prohibition. The contract has now been let for the whole work, which stipulates that it shall be completed on or before November 23rd next. In order that this may be accomplished, the services of more than 5,000 graders will be required, and in laying the rails the contractors propose to use a steam track-laying machine, and to employ three separate gangs of men, who will work eight hours each day, using electric lights at night, which, it is expected, will enable them to complete five miles per day. In this way the vast work will be done, and the Manitoba Company will have advanced its western terminus to within 750 miles of the Pacific coast. In addition to graders and track-layers, large gangs of men will be required to build bridges, culverts, water-tanks, stations, telegraph lines, &c.—Iron.\*

\* Perhaps the carrying out of this kind of "feat" in the construction of railways against time, explains why we hear of so many bad accidents on American railways.

## THE DIETZSCH KILN.

We take the following section and description from a paper recently read by Mr. C. O. Trechmann before the North of England Cement Manufacturers' Association:—

"In this kiln it has been sought to combine the principle of the cone kiln with the advantages of the circular kiln, and instead of allowing the heat to circulate through the mass, to pass the material with the aid of gravitation through a canal kept at a constant high temperature. This is achieved by dividing the vertical shaft of the former horizontally into two parts and connecting the upper with the lower by a horizontal channel, thus reproducing in a manner several chambers of the circular kiln; not in a horizontal plane, but vertically superimposed. The upper part of the lower shaft is retained at a clinkering temperature by the addition of fuel, and all superincumbent weight on the clinkering cement is obviated, thus permitting it to descend by its own weight, so soon as the decrease in volume, due to the completion of the calcining process, takes place. With this movement a disturbance of the mass ensues, and a partial cooling, together with a slightly conical form of the shaft, tends to prevent adhesion.



The Dietzsch Kiln for Cement Burning.

The annexed figure represents a double kiln, produced by simply building two kilns back to back. The individual kiln consists of three essential parts, of which the two lower ones C and D lie in a different vertical plane from the upper one A. A may be called the warming or pre-heating chamber, C the calcining chamber, and D a continuation of it, the cooling chamber. At E are doors or openings for charging A with dried slurry. The covered calcining-chamber C is connected with A by means of the arched horizontal channel B, and the cooling chamber D terminates with ordinary firebricks H through which the air to supply the whole system enters.

The finished clinker is drawn at H, and the calcining chamber C, as the central point of the system, is the one where the main operation of burning is carried out, where the cement becomes soft and plastic, alters its form, and eventually welds into larger or smaller blocks, and inclines to adhere to the walls of the furnace. This part is therefore arranged in such a manner that it is accessible from all directions, by means of small openings G, for the removal when necessary of adhering lumps.

In order to put the kiln into operation A is filled with dried slurry, D with clinker, and C with alternate layers of dried stuff and coal or coke. After the fuel is fired, the heat escaping from C strikes through the dried slurry lying on B, and in A, and is almost totally absorbed, only sufficient passing through to keep up the

requisite draught in the chimney-like continuation of A. As soon as the cement is sufficiently calcined in C, a quantity of clinker is drawn at the bars, causing the whole mass in C and D to sink; thereupon fuel is introduced through the furnace doors F, and preheated slurry is, with the aid of flat shovels, turned over from B into C, the fuel and dried mass being placed in layers until C is filled again. This operation is repeated at intervals of a half or three quarters of an hour, and the burning proceeds continuously without further interruption than may be caused by the adhesion of clinker to the sides of the furnace.

It is apparent from this description that the fuel is utilised to its utmost extent, for the cold air entering at the firebars, coming into contact with the hot descending clinker, becomes gradually heated to a white heat before reaching the fuel, thus producing a combustion akin in intensity to that of the regenerative furnace. It is, however, not completed at this point, but the mixed products of combustion, which entail such an enormous loss of available heat in the ordinary kilns, here strike the dried mass lying at B, and which at this point is in a state of bright cherry redness and incipient fusion, and are completely burned.

This system of burning cement, lime, &c., therefore offers a double advantage over most previous systems: firstly, in the complete utilisation of the fuel, combined with a minimum loss of heat, since the unavoidable radiation is restricted to one part of the kiln; secondly, because the mass to be burned remains for the shortest possible time at the point of greatest heat, the critical period where over or under calcination so easily takes place."

## INFRINGEMENT OF BUILDING BY-LAWS.

## DAMP-COURSES.

MR. HENRY POTTER, contractor, of Clapton, appeared at the Berks Sessions, held at Windsor a few days ago, to answer an adjourned summons issued by the Windsor Sanitary Authority charging him with omitting to insert a proper damp course in a dwarf concrete wall supporting a brick dwelling-house, and also with failing to give notice of completion to the Surveyor to the Sanitary Authority.

The defendant pleaded guilty, but Mr. Blelock, who appeared for the defence, asked the Magistrates to have regard to the exceptional position of the defendant. The building was in the midst of a forest, and he was not aware of the existence of the Sanitary Authority. The building was now finished and handed over to the owner, who had let it on a twenty-one years' lease, and he was unable to amend the work. The damp-course was omitted by the deliberate intention of the architect, who contended that it was unnecessary.

Mr. Christopher Shiner, a London architect, was called, and gave evidence as to the state of the house, and the depth and nature of the concrete.

Mr. Tyler, the architect to the building, was called, and stated that in his opinion a damp-course was in this case unnecessary, but that the responsibility of satisfying the Surveyor to the Sanitary Authority rested with the contractor.

The owner having intimated his intention to amend the work, the Magistrates remarked that they could not consider concrete as a damp-course impervious to moisture, and fined the defendant 10*l.* and costs.

## THEORY OF ANCIENT LIGHTS.

Sir,—In the two last numbers of the *Builder* a barrister, uncramped by scientific theory, has exceedingly well pointed out the true equivalent of an ancient light when placed in a wall rebuilt either behind, or in advance of, the original wall. In Fig. 3 (see p. 559 *ante*) he shows that the light claimed for a window at *a b* would be obtained really at *c d*, and not at *e f*, and the establishment of this principle ought unquestionably to be made available for protective purposes. Its importance and value, however, are as nothing when a further factor is taken into account; a factor which has been completely lost sight of and ignored, whether by the law, or by expert evidence of alleged damage. This factor is the interception of diffused light by the nearness of the obstruction upon the line which limits the measurement of sky area. The geometric measurement, or other computation, of the obstruction of "sky area" has become the scientific principle upon which alone all such claims are based, and the almost sole basis of expert evidence, as apart from the evidence of practical inconvenience in the use of a room. And this evidence has been necessarily conflicting

in proportion as the obstruction of diffused light also has, or has not, had any real influence on the result. The ignoring of this element is a fallacy underlying the whole structure of "sky measurements." The "sky" is the great dispenser of diffused light, even when the sun is not shining. Without this we should be left in total darkness when the sun is out of sight; and it is not unnatural, therefore, to claim for the "sky area" its full significance in the measurement of such obstruction. And it will no doubt hold its own so long as the scientific facts of the origin and cause of the light which emanates from the sky area are not duly and fully recognised.

But before discussing this it is useful to say a word as to the nature and value of reflected light in our own more immediate neighbourhood. When any claim in respect of reflecting surfaces has been put forward, it has been scouted as ludicrous, impracticable, and impossible to deal with. It has been set aside on the ground that no one can control the colour which a neighbor shall please to paint or construct his reflecting surfaces. This, however, has nothing on earth to do with the question of the amount and measurement of the area of such reflecting surfaces. Unless such surfaces be made absolutely black, or absolutely white, by way of malice or of goodwill, or mutual arrangement, the colour which such surfaces may naturally assume is of very small consequence as compared with their amount. So when Mr. Powell (fig. 4) makes the line *g b* to be the sole measure as affecting the light of the window, *a b*; when he assumes that, having only the wall at *g*, no obstruction to the light of *a b* will be caused by building an intermediate wall at *n*, because it happens to come below this line, he puts out of sight altogether one of the most important elements of the case. He is quite justified in doing so under the present state of intelligence and legal ruling; but it is this which requires readjustment, and it is to be hoped that the facts here stated will receive a larger amount of study and attention than they have as yet obtained. Surely it must be evident that the space between the wall *n* and the window *a b* becomes a dark hole as compared with the space between the wall at *g* and the same window. The angles of light falling from the sky surface upon the walls themselves are reduced enormously in amount, and the walls as well as the ground are thrown into deep shadow. Take the instance of a large van when standing opposite one's window. Even if its roof comes very far below the roof-line of the opposite houses to the very bottom of the window, it casts its shadow on the ceiling and causes a very considerable obstruction of light.

A very large proportion of the light we have within our dwellings comes not directly from the sky area but from the surface of the ground, or floor, reflected on the ceiling. This may be seen from the fact that the patch of light upon the ceiling over a window is the lightest part of a room after the floor itself, and it is by reflection from the floor within and the ground without that the ceiling, and indeed the room itself, is mainly lighted. This is a fact which ought to be faced if there is to be even a semblance of legal redress in such disputed cases. Either the whole of existing expert evidence and legal rulings must be thrown to the winds, or they must be readjusted in accordance with the scientific facts.

And now as to the light emanating from the sky area. It was supposed formerly that the blue sky derived its colour from the direct rays of the sun diffusing the atmosphere with light, through which we looked at the infinite darkness beyond. This has now been found to be quite otherwise. The rays pass to the earth without interception, and it is solely the reflection from the earth itself which lights up the atmosphere, and, in fact, produces the diffused light. Diffused light results from reflection alone, reflection from the earth; and if it were not so we should be left in darkness not only when the sun is out of sight, but when he shines in his full strength. He would be to us merely a ball of fire shining through the blackest night. As it is we enjoy a very large amount of light even when he is not shining. The earth derives from the sky an enormous amount of that light which she has already contributed to the sky by reflection from her surface. So far, perhaps, this all goes to confirm the value of "sky area" as the measure of available lighting power. But equally so does it confirm the value of the measured area of the reflecting

surface upon which that light falls. And as the proportion of reflecting surface (*cæteris paribus*) varies in direct ratio with the distance of the object of observation, so it will be seen that the obstruction at *n* is so much greater than an obstruction at *p* would be, as to make all the difference between a very serious damage, and none at all.

One must be quite prepared for such a contention to be scouted as ludicrous; but so one may fairly be still more prepared to find it eventually acted upon when it shall have received due consideration from those who aim at arriving at true and practical conclusions upon this very difficult subject.

WILLIAM WHITE, F.S.A.

#### KITCHEN BOILER EXPLOSIONS AND SAFETY VALVES.

SIR.—Mr. Wiston's letter on p. 520 is a very able one, and his reply on p. 536 shows he understands the subject fully. I do not think his arguments prove that it is better to want a safety-valve than to have it, but rather that precautions should be used in fixing it. I have a safety-valve on the hot pipe from the kitchen boiler in my own house, fixed above the kitchen mantelpiece, and I think there is less danger from it to a man in the kitchen than from the boiler. This valve should only be opened occasionally by some adult person in the house, and the children could be warned it was dangerous.

As Mr. Wiston stated, no fire should be on when the water stops running at hot draw-off cock of the kitchen sink.

I think that not having a rise up in every part of the rising hot and blow-off pipe is a great cause of danger to boilers, owing to allowing freezing more easily.

W. P. BUCHAN.

#### BRISTOL v. EXETER.

SIR.—In your interesting article in the *Builder* for the 16th inst., reviewing Messrs. Freeman & Hunt's new book upon Bristol, passing reference is made to a preceding volume, by the same authors, upon Exeter, and when the early British and Saxon churches of the two cities are touched upon, we read: "another of the churches (at Bristol) as at Exeter, is called after the Early Saxon Mercian, St. Werburgh." This is a mistake: St. Werburgh's name does not occur in the Exeter volume of "Historic Towns."

In Exeter, old churches are dedicated to St. Petrock and St. David (the latter rebuilt), both British saints,—whilst the dedications to SS. Pancras, Keryans (now destroyed), Cuthbert, and Sidwell are, I presume, Saxon. But no record of a church to the honour of St. Werburgh exists.

The nearest church to Exeter dedicated to St. Werburgh is the quaint old fifteenth-century edifice perched upon the rock, in solitary stoneliness, at the mouth of the picturesque river Yealm, upon the eastern side of Plymouth Sound. This is, as the cross flies, fully six-and-thirty miles from Exeter.

Now, St. Werburgh, or Werberga, or Werburghie (as she is variously called) was the daughter of Wulfhere, king of Mercia. She was born at Stone, in Strathshire; her mother was Ermgilda, and she was a niece of the famous St. Etheldreda. Ultimately, of course, she became abbess of Bepandum and patron saint of Chester, and died A.D. 699.

At first glance, with such a pedigree, one wonders how this north-country saint came to get her name perpetuated in the far west; and this is not at all clear until it is recollected that her father, the Saxon king, Wulfhere, conquered the west country, and, being himself converted from Paganism to Christianity, turned every beathen temple he came across into a Christian church. Not many miles from Wensbury is the village of Ermington, which rather suggests some affinity to St. Werburgh's queen-mother's name, Ermingilde.

In speaking of the Bristol churches, mention is made of John Shipward, who built the superb tower of St. Stephen's. Another merchant, whose name must for ever remain historical, is buried in St. Stephen's Church, and that is no less a personage than Edward Blanket, an enterprising Bristol woollen merchant, who first invented and made a certain well-known item of comfort which, from that day to this, has been called a "blanket." Mr. Blanket died A.D. 1340.

HARRY HEMS.

Exeter, April 18, 1887.

#### DIMENSIONS OF SEWERS.

SIR.—I shall feel obliged if you will kindly insert the following question in your next issue:—

"What are the rules for ascertaining the size of a sewer for a town of a certain population,—for instance, given a town of 20,000 population, with gradient of outfall sewer 1 in 500?"

SANITAS.

#### THE MAINTENANCE OF ROADS.

SIR.—Will you allow me to reply to your remarks on my small pamphlet (p. 561, *ante*) on the maintenance of roads, particularly with reference to the practice of loosening the surface with a pick before spreading new material on? I may first remind you that the book was written for the use of Surveyors of Highways in an agricultural district, and where even the Local Boards of Health cannot indulge in the luxury of a steam roller. When the Highway Authority of a large city or borough has a steam roller, then I admit that to loosen the surface and spread a coating of granite, 3 in. or 4 in. in thickness, with binding material and water in duo proportion, ready for rolling, is the best course to adopt, and one which will result in a good even surface in a few hours, but in a country parish, or in a town where there are no means for heavy rolling, I find from practical experience that to loosen the surface before coating the road is an injurious, an expensive, and unsatisfactory method. The first coating or spreading of material should be done, one stone in thickness, in November, when the roads are moist or wet, and consequently yielding, the granite will soon become embedded, especially if the ends of the coating be tapered to facilitate the traffic to run over the edges in both directions, and thus the many vehicles in time will do the work which could be accomplished by a steam-roller in a few hours.

It is found that a coating of stone assists in keeping the road moist, and so prepares the old metalling to receive the new; old metalling, when screened, consists of very small stones indeed, and mere dust.

It is a fact that many of the late distripricked roads in Lincolnshire have only 3 in. or 4 in. of metalling on them; you will, therefore, understand how serious the result would be to pick the surface of them over before coating, it would indeed be, as some surveyors of highways expressively say, "all alive." My note on this subject was necessary, as I have had to contest this point with members of Local Boards of Health, where the old roads in their towns have had no better foundations than those outside.

JAMES THROPP.

County Surveyor's Office, Lincoln.

April 19.

\*\* We only contested Mr. Thropp's general statement that loosening the old surface of a road before putting on new metalling "was productive of no good whatever." His letter amounts to an admission that we are right, and that it is only under special circumstances that his recommendation can hold good.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

5,843, Cement or Plaster. C. J. Howe.

This invention relates to a more rapid process of manufacturing plaster or cement, and consists essentially in saturating the gypsum in vacuo or under pressure, and subsequently exposing it to a forced draught of air.

6,100, Improvements in Water-closets. W. Macfarlane.

According to this invention, a shallow trough or receptacle is fixed at the part beneath the seat where solid matter falls, and channels are deepened in the basin with the view of carrying off the deposit, and preventing the splashing of water when the basin is flushed.

9,560, Improvements in Drain Traps. Henry Dean.

The improvements which are the subject of this invention are in the direction of making the traps self-cleansing. The trap is so constructed that from the surface it diminishes to a small circular section at or near the water-line. From thence the pipe forms an inverted syphon, and on such easy curves and lines as to render it practically self-cleansing. In a modified form of the trap a grid is used, and a grease trap is fitted to this grid or cover. Instead of the outlet being in a line with the syphon, it can be at right angles or any other angle to the same.

6,155, Lavatories. J. G. Stidder.

A strong and convenient lavatory, in places where the same is likely to be roughly handled,—as in schools, &c.—is the object of this invention. The parts are claimed to be extra strong, and of the most durable materials, and all pipes, &c., are so arranged that they are easy of access in case of stoppage or of repairs being needed. Strong brackets and fittings specially shaped and arranged are claimed in the patent.

6,926, Improvements in Sawing Machines. A. M. Clark.

The object of this invention is to economise the cutting of mouldings by circular cutters. This is effected by a combination of a tubular saw and a hollow saw mandrel, and further improvements are made by using a cover to protect the sawed stock from the belt, and by the special arrangement of fixed and movable journal boxes.

16,928, Safety Ladders. J. F. Haskins.

This invention consists in supplying a folding ladder or step apparatus for use in residences, factories, &c. It is applicable to the exterior or

interior of the building, and when not in use can be folded within its own case, protected from the weather and from accident, and be also out of the way. The steps as they fold over can be locked in that position, and they also form a peculiar hinged combination when opened out, part being quite rigid, and acting as a buttress or stay while the ladder is in use. The appliance would be chiefly useful as a fixture to lofty buildings for use in case of fire.

##### NEW APPLICATIONS FOR PATENTS.

April 5.—5,307, Asher & Buttress, Door Locks and Latches.—5,048, C. Emsen, Brick Machines.—5,071, H. Livesey, Holding Sliding Sashes at various Heights.—5,087, Townend & Ullathorne, Sash Fasteners for Windows.

April 6.—5,100, T. Robinson, Wood-planing Machine.—5,115, D. Cowan, Stoves or Detached Fireplaces.—5,138, H. Hutcheson, Chain Fasteners for Doors, Windows, &c.—5,153, G. & R. Clark, Flooring, and Lining Iron and other Buildings.—5,155, J. Hoodon, Portland Cement.

April 7.—5,164, F. Butterfield, Cutting or Shaping Stone.—5,171, N. Helme and Others, Paper-hangings.—5,188, M. Syer, Water-waste Preventer.—5,201, C. Heaton, Ornamental Cloacianic Mosaic Work.—5,204, G. Price, Water-closets, &c.

April 9.—5,211, N. & L. Skelsoy, Disinfecting Apparatus for Water-closets.—5,229, H. Waddington, Ventilators.—5,234, J. Bousfield, Smoke Ventilators for Chimneys.—5,253, J. Killey, Regulating the Discharge of Rain-water from Roofs.

April 12.—5,280, C. Latter, Fixing Sheets and Roll Caps of Copper, &c., for Roofing.—5,288, G. Woolliscroft, Attaching the Knobs of Door-handles to Spindles.—5,331, R. Haddan, Saw-setting Apparatus.

April 13.—5,346, G. Gregory, Window Fastener.—5,349, W. Macrattie, Window Fastenings.—5,351, G. Williamson, Window-sash Fastener.—5,374, J. Shephard, Water-tight Doors.—5,392, W. Bailey, Locks and Latches.

April 14.—5,426, W. Maloney, Ornamenting Buildings, &c.—5,429, F. Wallbrecht, Manufacture of Bricks, Tiles, &c.

##### PROVISIONAL SPECIFICATIONS ACCEPTED.

2,015, W. Gwynnett, Eaves Plates for use with Corrugated Roof and Wall Coverings.—2,799, P. Stringer, Rim Latches.—3,538, E. Dummer, Window Fasteners.—3,630, T. Jones, Ladders.—3,817, J. Wright, Fire Grates.—3,949, G. Quin, Ventilator or Cowl.—4,262, E. Summerfield, Fixing Door and other Knobs to Spindles.—4,468, J. Morris, Chimney Top or Cowl.—4,479, R. Shaw, Ventilating Apparatus.—1,943, H. Peach, Roof Glazing.—5,286, W. Pross, Cistern Valves and Water Taps.—3,331, T. Rymer-Jones, Refractory and Non-conducting Bricks, Tiles, Blocks, Slabs, &c.—3,349, J. Ebner, Parquet Flooring, &c.—3,351, R. Spence, Fireproof Floors.—3,383, R. Pickwell, Water Waste Preventer.—3,488, S. Hill, Door Spring.—3,789, H. Hunt, Register and Other Fire Grates.—3,918, T. Williamson, Saw Sets.

##### COMPLETE SPECIFICATIONS ACCEPTED.

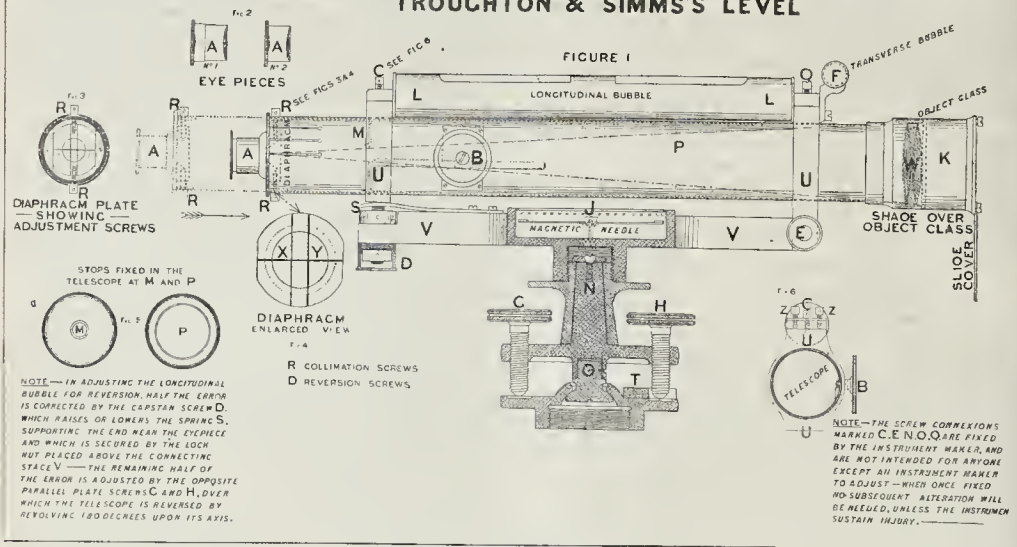
###### Open to Opposition for Two Months.

7,630, J. Betteley, Construction of Sliding Window Sashes and Retaining Same in any Position.—9,252, F. Dove, Cramp for Flooring, Joinery, &c.—13,355, R. Garland, Domestic Fire Grates.—1,083, B. Fryer, Fire Grates.—7,884, Normanton and Major, Outlets for Ventilators, Smoke, and Other Flues.—5,173, E. Wilson, Screw Fasteners for Windows.—9,436, J. Parker, Composition for Floors, Paving, &c.—13,159, H. Price, Sanitary Dust Bin.—3,596, R. Ash, Ventilating Apparatus.

**The Messina Straits Tunnel.**—Among the plans submitted to the Italian Government for a railway tunnel under the Straits of Messina, connecting Sicily with the mainland, is one framed by an Italian engineer, Signor Fredrico Gabelli. He suggests constructing the tunnel between the towns of Pezzo and Santa Agata, and that its length under water should be 13,200 metres, the maximum depth of water over it 110 metres, the thickness of the roof being in this spot 35 metres. The cost is estimated at 65 million lire, and the time of execution six years. The engineer is of opinion that the greatest obstacles to the undertaking would be encountered at the outset, so that the risk attending it would not be very great should these prove to be insurmountable.

**A Substitute for Cement.**—A new material, which is to take the place of cement in the laying of floors, has been introduced in Germany. The new compound, which is stated to be a kind of asphaltic mixture, is reported to possess the peculiar properties of being proof against both oils and acids, and of being unaffected by damp. The material, which has been named "factice," is quite elastic, and possesses this advantage over cement that it has not the dangerous smoothness of the latter. Amongst other places, factice has been used for the flooring of a new cotton mill at Plagwitz, near Leipzig.

TRUGHTON & SIMMS'S LEVEL



The Student's Column.

FIELD WORK AND INSTRUMENTS.—XVII.  
Levelling Instruments.

I.—TROUGHTON AND SIMMS'S LEVEL.

THE chief use of levelling instruments is to compare the heights of different stations with reference to a fixed datum or horizontal line. Fig. 1 shows the fixed telescope of a dumpy level, consisting of an outer tube carrying the object-glass and an inner tube carrying the diaphragm and the eye-piece. The milled head marked B turns a small pinion wheel which works in a rack fixed inside the inner tube, as shown in fig. 6. By this means the inner tube is drawn backwards and forwards in a horizontal line when the longitudinal bubble is in the centre of its run. This bubble is fastened to the telescope at the supports marked U, its fixed position being determined by the instrument-makers, primarily by filing the underside of the pieces attached to each end, through which the connecting screws marked C and Q pass, and finally by adjusting, if necessary, the side screws marked Z Z. In the case of a new bubble tube being inserted, the screws Z Z are called into use, and serve to accurately fix the new longitudinal glass tube, so that the bubble will run level in a transverse direction. A short transverse bubble marked F is usually attached to the telescope to indicate the horizontality of the run of the longitudinal bubble in a direction at right angles to its length. The screws by which the longitudinal bubble is attached to the telescope have capstan heads at C and slot heads at Q. The capstan heads are preferred by the makers, but the position of the transverse bubble necessitates the substitution of slot-head screws at Q. The cross hairs upon the diaphragm are arranged as shown in fig. 4, and the diaphragm plate is attached to the internal tube of the telescope by the vertical collimation adjustment screws marked R R. No horizontal adjustment screws being required for the collimation adjustment of a level, the diaphragm plate is held in the side frames shown in fig. 3, between which it can be moved up and down. The external tube of the telescope is sprung at the eye-piece end, between the eye-piece and the support marked U, by slots in the top surface as shown in fig. 1. A steady and even motion can thus be imparted to the inner tube when drawing it in and out for the purpose of adjusting the focus of objects at different distances from the instrument. The inner tube is nearly conical in length to the outer tube, and carries the stop-pieces marked M and P for limiting the rays of light to the cone of rays formed between the circumference of the object-glass and its principal focus in the diaphragm plate. The effect of drawing the inner tube out, is to lengthen the focus of the object-glass. When

the object viewed is at a short distance from the observer, the operator is compelled to bring the wires of the instrument under adjustment for focal distance, further away from the object-glass, and to move them nearer the object-glass when the object is at a greater distance. Two Ramsden's eye-pieces marked A are supplied with the instrument; the long eye-piece gives more power than the short eye-piece, but the gain in power is attended with a comparative loss of light. The supports to the telescope marked U U are fixed to a horizontal rigid bar marked V by a binged joint at E, and by an adjusting screw connexion at D (fig. 1). Between the supports U U sufficient room is provided in the horizontal connexion for a compass-box, marked J, to be inserted if desired. In some instruments this space is occupied with a small circular level, by means of which the instrument can be approximately set up at once, with the vertical axis at right angles to the horizon. The upper portion of the instrument containing the stage or horizontal bar which carries the telescope revolves upon the body of the instrument marked N. The upper parallel plate forms a portion of this body-piece, and is supported by the elevating screws marked G and H, its centre being connected to the lower parallel plate at O by the half ball-and-socket joint as shown in fig. 1. The stop-block marked I prevents the upper parallel plate revolving upon the lower parallel plate. Sometimes the telescope is constructed to be detached from the parallel plates when not in use for convenience of packing, but some makers prefer to permanently fix it to the bearing-piece which surrounds the body of the instrument marked N.

**The Future of Gaslighting.**—The *Gas Engineer* says:—"Gaslighting will have made a distinct advance on the day when architects are recognised as being responsible for these appointments. For their own sake they will see that the fittings are well supplied with gas, are of proper dimensions, and harmonise with the rest of the room. Then, indeed, we may hope for novelties in gas-illumination, boudoirs coolly lighted, harsh colours tinted, to the great comfort of the tenant. From a hygienic point of view this matter is important. In houses of the poorer class fatal results would follow from impure air were it not for badly-fitting doors and windows, which, urged by the accidental circumstances of a chimney-draught, supply a continual change of air. That this exists in better-class houses is not to our credit, but we must plead guilty to the charge, and admit that perhaps not one house in five is 'ventilated.' And yet gas, in intelligent hands, can be made to do a great deal in this direction. By regenerative lamps the air of a room may be warmed and changed, and more light is given per cubic foot of gas consumed."

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

| APRIL 4.                                                        |       |
|-----------------------------------------------------------------|-------|
| By WATT & SON.                                                  |       |
| Chichester North-street—Freehold house                          | £750  |
| Tower-street—The Grange, with grounds and stabling              | 830   |
| Nine freehold cottages                                          | 395   |
| North Wall—Freehold cottage                                     | 100   |
| Westhampstead—Two houses and a plot of land, long leasehold     | 750   |
| APRIL 14.                                                       |       |
| By DALZ & SON.                                                  |       |
| Plumstead—102, Maray-road, 35 years, ground-rent 2l. 6s.        | 170   |
| 19, Butt-street, 20 years, ground-rent 2l.                      | 100   |
| 48, St. James's-place, 34 years, ground-rent 2l. 7s. 6d.        | 230   |
| Mile End—78, Portland-street, 21 years, ground-rent 2l.         | 240   |
| By T. H. MAY.                                                   |       |
| Aberley—23 and 25, Beverley-road, 77 years, ground-rent 33l.    | 1,000 |
| Beckenham, Avenue-road—Three freehold plots of land             | 135   |
| By NEWBON & HARDING.                                            |       |
| Canonbury—31, St. Paul's-road, 59 years, ground-rent 5l.        | 510   |
| Camden Town—10, Mornington-road, 62 years, ground-rent 20l.     | 350   |
| Hampstead-road—223, Stanhope-street, 53 years, ground-rent 6l.  | 685   |
| Islington—109, Barnsbury-road, 17 years, ground-rent 7l.        | 215   |
| 276, Essex-road, 31 years, no ground-rent                       | 350   |
| By E. SIMMONS.                                                  |       |
| Kennington-road—43, Walcott-road, 29 years, ground-rent 6l. 6s. | 240   |
| Brixton—136, Ferndale-road, freehold                            | 320   |
| 78, Milkwood-road, 79 years, ground-rent 3l. 10s.               | 170   |
| 43, Lorn-road, 39 years, ground-rent 12l.                       | 200   |
| 87, Britton-road, 14 years, ground-rent 9l.                     | 310   |
| Walworth—34, East-street, freehold                              | 700   |
| Bermondsey—45 and 47, Alice-street, 27 years, ground-rent 6l.   | 270   |
| APRIL 15.                                                       |       |
| By W. A. BLEAKMORE.                                             |       |
| Rotherhithe—7, Ainsty-street, freehold                          | 158   |

MEETINGS.

| SATURDAY, APRIL 23.                                                                                                                                |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <i>Architectural Association.</i> —Visit to Messrs. Dent & Belliver's Works, and to the Church of St. Bartholomew-the-Great, Smithfield. 2.31 p.m. |  |
| <i>Crystal Palace School of Engineering.</i> —Award of Certificates (Sir Robert Rawlinson, C.B., in the chair). 1 p.m.                             |  |
| <i>Edinburgh Architectural Association.</i> —Visit to Dirlston Castle.                                                                             |  |
| TUESDAY, APRIL 26.                                                                                                                                 |  |
| <i>Society of Arts (Applied Art Section).</i> —Mr. J. Hungerford Pollen on "Ornamental Glass." 8 p.m.                                              |  |
| <i>Institution of Civil Engineers.</i> —Discussion on the papers by Messrs. Croxer, Fox, Stooke, and Mathews on "Water-Supply from Wells." 8 p.m.  |  |
| <i>Royal Institution.</i> —Professor W. E. Ayrton, F.R.S., on "Electricity." 8 p.m.                                                                |  |
| <i>Parkes Museum (Lectures for Sanitary Inspectors).</i> —Professor H. Robinson, on "Drainage Construction." 8 p.m.                                |  |
| WEDNESDAY, APRIL 27.                                                                                                                               |  |
| <i>Society of Arts.</i> —Mr. Arthur W. C. Shean on "Appliances for Saving Life from Fire." 8 p.m.                                                  |  |
| <i>Civil and Mechanical Engineers' Society.</i> —Mr. Henry Adams on "The Use and Care of Chains for Lifting and Hauling." 7 p.m.                   |  |
| <i>Sanitary Assurance Association.</i> —Dr. Joseph Ewart on "The Progress of Sanitation at Brighton." Polytechnic Institution, 8 p.m.              |  |

THURSDAY, APRIL 23.

*Society of Telegraph-Engineers and Electricians.*—(1) Professor A. Ryton, F.R.S., on "Measuring the Co-efficients of Induction." (2) Professor John Perry on "Driving a Dynamo with a very Short Belt." 8 p.m.

*National Society for Preserving the Memorials of the Dead.*—Mansion House, 3 p.m.

*Edinburgh Architectural Association.*—Mr. William Bruce will give a "Historical Sketch of Drainage and Sanitary Fittings." 8 p.m.

FRIDAY, APRIL 23.

*Royal Institution.*—Professor H. S. Hele Shaw on "The Rolling Contact of Bodies." 8 p.m.

*Society of Arts (Indian Section).*—Mr. J. F. Hewitt on "Village Communities in India." 8 p.m.

*Parker Museum (Lectures for Sanitary Inspectors).*—Professor W. H. Corfield, M.A., M.D., on "Sanitary Appliances." 8 p.m.

*Institution of Civil Engineers (Students' Meetings).*—Mr. Alfred Chatterton, B.Sc., on "Flour Mills and their Machinery." 7:30 p.m.

### Miscellaneous.

**The Turners' Company's Prize Competition, 1887.**—As will be seen by an advertisement in this week's *Builder*, the Master, Wardens, and Court of Assistants of the Worshipful Company of Turners, according to their custom, propose to offer this year their Silver Medal, the Freedom of the Company to, and (subject to the consent of the Court of Aldermen) will also obtain the Freedom of the City of London for, any workman, whether master, journeyman, or apprentice in the trade, in the United Kingdom, who may send in the best specimen in each of the following, viz. of hand turning in wood, in glass, and in precious stones. Prizes will be awarded. Amateurs will be allowed to compete as a separate class. The competition in wood includes turning in both hard and soft wood. The qualities which will be considered in awarding the prizes are the following, viz.—1. Beauty of design, symmetry of shape, utility, and general excellence of workmanship. 2. Exact copying, so that two objects produced (such as two cups, vases, boxes, or other articles) may be facsimiles in every part, or exact measures of capacity. 3. Fitness of the work and design for the purpose proposed (for instance, turned work for portions of domestic or church furniture). 4. Ability to turn, whether circular or oval, in both classes of wood. 5. Novelty in application of turning, or in design. 6. Carving and polishing are admissible, and if skilfully done, any additional effect produced will be considered, but it must be subsidiary to the turning.

**A Rural Appointment.**—The following instructive paragraph is cut from the *Western Morning News* of Tuesday last:—"Okehampton Board of Guardians, sitting as the Rural Sanitary Authority, on Saturday elected Mr. Samuel Hooper, jun., of Hatherleigh, as nuisance inspector and surveyor, at an annual salary of 50*l.* for the joint offices. Messrs. Isaac Yeo (Okehampton), S. G. A. Petherick, Abell (Hatherleigh), and Copp (Ashbury), were also candidates for the offices. Mr. Hooper received twenty-one votes, and Yeo and Petherick ten and nine respectively, the support given to the other two being very trifling. The successful candidate, who has displaced Mr. Yeo, a servant of old standing, is a sergeant in the local company of rifle volunteers, and is a mason, competent to prepare plans of sewerage works when required,—a fact that influenced the Guardians in their choice. A reduction of 10*l.* has been made in the amount of salary previously paid."

**A Dust Excluder.**—A permanent matrix excluder of draught and dust has been sent to us by Mr. T. J. Porter, the inventor. The excluder is made of a special composition, enclosed in long, narrow strips of warm-coloured cloth, and moulded into a suitable form. The application of hot water enables the excluder to be formed into a long, narrow, solid, and permanent matrix round doors and windows. Mr. Porter says that it makes a practically airtight joint, and entirely precludes the passage of draught and dust between doors and their casings, and windows and their casings.—*Nature*.

**The German Houses of Parliament.**—Since the break-up of wintry weather, great activity has prevailed on the site of the new Houses of the German Parliament at Berlin. The main walls have now risen to a height of 11 metres over the level of the Königsplatz, leaving 12½ metres still to be constructed before the upper ledge of the main entablature is reached. It is expected that the building will be completed in its crude state by the end of 1888.

### Steam Fire-Engine Competition in Australia.

—Details have just been received in England of the United Fire Brigades Jubilee Tournament held at the Friendly Society's Gardens, Melbourne, on February 24th, 25th, and 26th, when fire brigades and superintendents were present from the whole of the Australasian colonies. The prizes were thirty-four in number, and were awarded for every conceivable variety of fire-brigade practice. The Melbourne *Argus* of February 28th gives an account of the steam fire-engine competition. The *Argus* says:—"The Ballarat City and the Ballarat were the only two brigades entered. A good deal of interest was taken in the contest, as the two teams used engines of different makers. The Ballarat City used a Merryweather engine, which looked far more imposing than the smaller Shand & Mason engine belonging to their opponents and townsmen. The City were the first to go, and getting under weigh quickly, galloped round the track to the plug in 90 sec. The fire, fed by coal saturated with kerosene, was meanwhile blazing, and steam was got up very promptly, but 13 min. 22.4-5 sec. elapsed before 100 lb. was registered. The water several times failed to reach as high as the disc, and steam had to be turned off to enable the firemen to throw the jet higher. It was 15 min. 40 sec. from the beginning of the work before the disc was struck with the 1-in. jet. On attaching the 2½-in. jets there was again a deficient pressure to throw the water on to the mark, and this was not accomplished in less than 20 min. 20 sec. Ballarat, on getting the word to go, were a trifle slower than their opponents in harnessing up and starting, but the driver whipped up his team when once they began to move, and brought them to the plug at a fully extended gallop. The little engine, to the surprise of most of the spectators, began very soon to throb with steam, and as soon as the water appeared it shot like a rocket high above the height of the disc. The victory was easily gained by Ballarat without appealing to the time-keepers, whose record was as follows:—Ballarat (Shand, Mason, & Co.'s smallest or A size Volunteer)—From the start to the plug, 1 min. 50 sec.; getting up 100 lb. of steam, 9 min. 57 sec.; striking the disc with 1-in. jet, 10 min. 30 sec.; striking discs with 2½-in. jets, 14 min. 55 sec. Ballarat City (Merryweather's medium size)—From the start to the plug, 90 sec.; getting up steam, 13 min. 22.4-5 sec.; striking the disc with 1-in. jet, 15 min. 40 sec.; striking the discs with two ½-in. jets, 20 min. 29 sec. Ballarat thus won by nearly six minutes in the total time required to do the work, and were quicker at all points except getting to the plug."

**Building at Hornsey.**—The progress of building at Hornsey came before the Hornsey Local Board at a recent meeting. It appears that during the year ending on the 25th of March last, 321 new houses and other buildings had been erected within the district over which the Board have control, whilst 275 are now in course of erection. These returns show a falling off, as compared with the previous year, of 55 houses built and of 79 in course of erection. It further appeared that the total number of houses in the Board's district at the present time is 6,539, of which 770, or about 11 per cent., are now unoccupied. The chairman observed that these figures showed that the district of Hornsey, like many others both in the metropolis and Greater London, was suffering from over-building. Adverting to jerry-building, he said that the erection of this disreputable class of property had been less prevalent in the locality during the year, only thirteen buildings, or portions of buildings, having been condemned by the Board's Surveyor and demolished, as compared with thirty-eight during the previous year. He added that inferior mortar, bad bricks, and walls of insufficient thickness, were features which most predominated in this class of insanitary dwellings. The streets for a time might hide the multitude of hideous deformities in these miserable tenements, in which the poor were to a great extent forced to live. The Board were, however, determined to show the builders of such dwellings no mercy, and the Surveyor had instructions to act accordingly.

**The Nineteenth-Century Art Society.** Thursday, the 28th inst., has been appointed for the reception of works of art intended for the Summer Exhibition of this society, at the Conduit-street Galleries.

### Building Land Sales at Oxted and Wimbledon.

—On Monday last the first portion of the Barrow Green Estate, at Oxted, comprising about twenty acres, was offered for sale at the Hoskins Arms Hotel, by Messrs. Baker & Sons. The estate immediately adjoins the recently-opened Oxted station of the South Eastern and London and Brighton Companies' railway from London to East Grinstead, and has been brought into the market by the opening of that station, which has led to the laying out of the estate for building purposes. The railway passes through the centre of the estate. Several new roads have been formed, both on the east and west sides, and building has already been commenced. Portions of the estate are being planted by the owner, who is also about to lay out a recreation-ground on the south side, containing an area of between four and five acres. The lots offered for sale on Monday were fifty-seven in number, containing frontages varying from 25 ft. to 35 ft., and depths of from 140 ft. to 190 ft., and they were announced to be sold absolutely without reserve. There was a very spirited competition for the property, and all the lots were sold, at prices ranging from 35*l.* to 60*l.* each. A corner shop plot, having a frontage of 40 ft., and a return frontage of 140 ft., was sold for 102*l.* The total proceeds of the sale amounted to upwards of 3,000*l.* As showing the greatly increased value which the opening of the Oxted Station has given to the property [Oxted was hitherto four miles distant from any station] it may be stated that the prices realised at Monday's sale averaged from 1*l.* 10*s.* to 2*l.* per frontage, whereas formerly not more than 5*s.* per foot could be obtained.—On Tuesday evening Mr. W. N. Norris submitted for sale, at the Prince of Wales Hotel, Wimbledon, forty plots of building land, forming part of the Wimbledon Park Estate of the Birkbeck Freehold Land Society. The estate is situated between the Wimbledon and Hayden's-lane railway stations, on the north and south sides of Queen's-road, and Tuesday evening's sale was the first public sale of the property. The lots at the west or Wimbledon end of the estate have frontages of 35 ft. and depths of 280 ft., and those at the east or Hayden's-lane end 25 ft. frontage and about 240 ft. depth. The prices offered for the first-named lots were from 270 to 280 guineas each, and for the last-named lots 150 to 180 guineas each, at which they were withdrawn. The reserves for the largest lots were stated to be about 300 and 200 guineas respectively.

**New Poor-Law Infirmary, Champion-hill, Dulwich.**—The opening of the new infirmary at Champion-hill, which has recently been erected by Messrs. Kirk & Randall from the designs of Messrs. Henry Jarvis & Son, for the Guardians of St. Saviour's Union, took place on the 13th inst. At 3:30 p.m. the Guardians and visitors assembled in the chapel, where a dedication service was held, and an address was delivered by the Bishop of Rochester. The company afterwards proceeded to the main entrance, where the building was declared open by Mr. William Wright Flood, the Chairman of the Board, in the presence of the Bishop, the Vice-Chairman, and the Guardians; the architects, Messrs. H. Jarvis & Son; and the contractors, Messrs. Kirk & Randall. We so recently (viz., in the *Builder*, for Feb. 26th last) gave a view, plans, and detailed description of the building that it is unnecessary to say much about it now; but it may be interesting to supplement the particulars which we have already given by stating that in the erection of this large block of buildings five millions of bricks, about 30,000 ft. cube of stone, 100,000 slates, 70,000 ft. cube of timber, 500 tons of ironwork, 110 tons of sheet lead, 22,000 ft. of lead pipe, 40,000 ft. super. of glass, 13,000 ft. run of rain-water pipes and gutters, 750 squares of roof boarding, and 1,000 squares of flooring have been used. The whole of the works have been carried out by Messrs. Kirk & Randall within two years, including the building, the engineering works, the laying-out of the grounds, and forming and making the roads and pathways.—Mr. Charles Randall acting as their agent, and superintending the work.

**The Phoenix Fire Office.**—At the half-yearly meeting of the Phoenix Fire Office, just held, the ordinary dividend of 3*l.* per share, together with an extra dividend of 6*l.* per share, was declared.

**The Strike in the Building Trade at Birmingham.**

At the meeting of master builders held on the 14th inst. to take into consideration this dispute, Mr. John Bowen (Chairman of the Master Builders' Association) presided, and the representatives of twenty-five firms were present, as follows:—Messrs. Surman & Son, D. & J. Webb, Sapote & Sons, Samuel Taylor, W. J. Whittall, Barnsley & Sons, Smith & Sons, J. Dibble, Gowing & Ingram, Woodward & Smith, R. Folland, Thomas Rowbotham, T. Hallgarth, Bellamy, E. Giles, E. Gill, George Twigg, Archer, William Bennett, and Baby & Sillito. Mr. E. J. Bigwood, the secretary, laid before the meeting the replies of the various branches of operatives to the masters' suggestion that it be left to the Mayor to nominate a person to act as arbitrator in the dispute. According to the *Birmingham Gazette*, the Carpenters' Association replied that they could not accept the offer of the employers in its entirety, but were prepared to nominate Dr. Langford, in conjunction with the Mayor, to appoint an arbitrator, provided that the employers reinstated the workmen late in their employ under the present rules, pending the decision of the umpire. The bricklayers' reply stated that they were surprised that the employers asked them to leave it in the hands of the Mayor to nominate an umpire after they had declined to accept his nomination as arbitrator, and, therefore, they could not accept the offer, with all due respect to the Mayor. The stonemasons stated that they could not recognize arbitration, as always on previous occasions they had settled their differences separately from the other branches of the building trade,—with the masters themselves. They were prepared to meet a committee of the masters at their convenience. The plasterers failed to agree to the proposal, but were willing to meet representatives again, and asked for an appointment at their earliest convenience. The plumbers made no acknowledgment of the masters' proposal, but sent another suggestion to the effect that, with a view to a settlement of the dispute, they were prepared to sign the rules that were in force up to the 1st of April in their entirety with the exception of rule eight, which has reference to arbitration. They would in the event of that being agreed to withdraw their counter notice for advance of 1d. per hour. After a lengthened discussion, carried on with a view to the best and most speedy means of conciliating the men and ending the dispute, the president (Mr. Bowen) moved "That, seeing with regret that all efforts to agree upon an umpire have failed, this association now invites all the operatives to send two representatives of each trade to meet an equal number of masters, with the hope of adopting such measures as may settle the existing dispute in the building trade." This was seconded by Mr. J. Barnsley, and agreed to.

**Short Delivery of Wood Cargoes.**—The Courts of Law are so frequently called upon to settle differences between shipowners and merchants with respect to input and output of cargoes that, in our opinion, more attention should be paid than is done at present to quantities shipped and delivered. Since steam was introduced into the timber-carrying trade there have been more disputes than formerly, and this arises from the working of two, three, or four holds at one time. A mate cannot attend to each hatch and count the pieces of wood as they are taken in, and, consequently, the tallying is delegated to apprentices or seamen, or no check is instituted. The shippers present bills of lading, which the master signs in a perfunctory manner, and when a vessel arrives at her destination the tallying is left to servants of dock companies. According to the practice of the timber trade at Liverpool, all deals, ends, battens, boards, and scantlings are counted daily, and when struck on the end with a hammer the delivery is considered completed, and, when required, a receipt is given for numbers. This is a fair way of settling affairs; but at other ports the counting does not take place till the entire cargo is piled and stacked. Delivery and payment of freight should be concurrent acts, as defined in *Paynter v. James*, Court of Exchequer, May 19, 1868; and *Black v. Rose*, Judicial Committee of the Privy Council, June 30, 1864.—*Liverpool Journal of Commerce*.

**Newvenders' Benevolent and Provident Institution.**—It is announced that Sir A. K. Rollit, M.P., will preside at the Festival of this deserving Institution, to be held at the Grand Hotel, Charing Cross, on Wednesday, June 22.

**British Archaeological Association.**

At a meeting of this Association on April 6th, Mr. Geo. R. Wright, F.S.A., in the chair, a curious Cingalese MS. was exhibited by Miss Kilner. Mr. Astley described an ancient oak beam which crossed the piers above the roof of St. Michael's Church, Coventry. The inscription, in black letters, appears to express the attributes of the nine choirs of angels which formed the hierarchy of heaven. Mr. Wm. Myers, F.S.A., exhibited Roman pottery found by him close to the ancient foundations of the walls of Chichester, laid open by the Association. Among the articles was a prehistoric flint knife, and Mr. De Gray Birch, F.S.A., called attention to it as evidence of the prior occupation of the site by an aboriginal settlement. Mr. Myers exhibited in addition a fine collection of Egyptian antiquities which he had recently brought to England. Mr. Taylor, of Newcastle, exhibited a large plan of the sites of various Roman remains which have been found in the county of Durham, showing also the courses of the Roman roads. A paper was then read by the Rev. Dr. Hooppell on the remarkable excavations which have recently been made on the site of the Roman Station, Vinovia, near Bishop Auckland. This site, now occupied by the small village of Binchester, which is almost in the centre of the country, is on the line of the Watling-street, the road having gone through the station. It stands on high ground, and the river Wear has destroyed a large portion of the approach. The walls of enclosure have been traced in several places, and are found to have rounded corners at the angles. Several large buildings have been laid bare, and a curiously vaulted cave has been found outside the walls, probably a place for the worship of Myhras. A large quantity of pottery and other relics of Roman date have been found, now in the Durham Museum. The important results obtained are due to Mr. John Proud, who defrayed the heavy cost of the excavations, which were superintended by the Rev. Dr. Hooppell. The paper was illustrated by a series of fine drawings, which will be reproduced in the Society's *Journal*.

**The Adelaide Jubilee Exhibition.**—At the time of the departure of the last mails, the building for the Adelaide Jubilee Exhibition was rapidly approaching completion. The list of applications for space was closed on March 1, and it is therefore now possible to form a pretty accurate estimate of the number and extent of the exhibits. Independently of the British exhibitors, whose numbers will exceed the most sanguine anticipations, the amount of space allotted to South Australia is 50,000 ft.; New South Wales will occupy 15,000 ft.; and Victoria probably about the same. The remaining Australian colonies will, it is understood, only require from 1,000 ft. to 2,000 ft. each. The courts devoted to South Australia, New South Wales, and Victoria, in the interior of the main building, will, it is reported, present a similar appearance to the Colonial Courts of the late Colonial and Indian Exhibition at South Kensington. In the decoration of the walls the names of the different towns of Australia will be set off by views of the places referred to. With regard to the exhibition of fine arts, there will be a grand display by the Royal Academy. The major portion of these works of art will be subsequently exhibited in Melbourne, and, perhaps, in Sydney. The paintings will unquestionably prove a great attraction to visitors from all parts of Australia. The specimens of fine art which recently left London for Adelaide with Sir Herbert Sandford on board the Orient steamer *Austral* are valued at 30,000. It is fully expected that the arrangements at the Exhibition will be completed in time for the opening ceremony.

**Society of Antiquaries of Scotland.**—The monthly meeting of this society was held in Edinburgh last week, Sir W. Pettes Douglas, vice-President, in the chair. The first paper was a notice by the Marquis of Bute of the discovery of a cist at Mountstuart, in Bute, containing an unburnt burial of the Bronze Age, which presented some unusually interesting features. The cist was covered by a large slab 5 ft. 3 in. wide and 6 in. thick. When this was lifted the cist itself was found to be about 4 ft. in length by about 2 ft. in width. In it, resting on a bed of small pebbles, were the remains of the skeleton of an adult person. The bones were so much decayed as to crumble away when touched. Under the neck there were found

100 jet beads of different sizes, which, along with six perforated plates of the same substance, had formed a necklace of a form not unusual in connexion with interments of the period, although it was but rarely that all the pieces were recovered and preserved. Close by the place in front of the face, where the hands would have been had not the bones been so completely decayed, there were found some small fragments of bronze, which are regarded as being the remains of one of the small thin triangular blades of bronze so often found associated with similar burials. At the feet, and towards the north-east corner of the cist, lay an arm of the form known as "fool-vessels" 7 in. high and 7 in. in diameter at the mouth, with two flutings underneath the rim, and ornamented with a pattern of zigzag lines impressed by the teeth of a comb.

**Portobello.**—Considerable progress has now been made with the erection of the new railway station at Portobello, and it is expected that it will be, if not completed, at least nearly so, at the time previously stated,—viz., at the end of June,—notwithstanding a good many alterations in the contract.

**PRICES CURRENT OF MATERIALS.**

| TIMBER.                                   |                       | £.  | s. | d.    | £. | s. | d.    |
|-------------------------------------------|-----------------------|-----|----|-------|----|----|-------|
| Greenheart, B.G.                          | .....ton              | 6   | 10 | 0     | 7  | 10 | 0     |
| Teak, E.I.                                | .....load             | 9   | 0  | 0     | 14 | 0  | 0     |
| Sequoia, U.S.                             | .....foot cube        | 9   | 2  | 0     | 3  | 0  | 0     |
| Ask, Canada                               | .....load             | 0   | 0  | 0     | 10 | 0  | 0     |
| Birch                                     | .....                 | 2   | 0  | 0     | 3  | 10 | 0     |
| Kim                                       | .....                 | 3   | 10 | 0     | 4  | 10 | 0     |
| Fir, Danstic, &c.                         | .....                 | 1   | 10 | 0     | 10 | 0  | 0     |
| Oak                                       | .....                 | 2   | 10 | 0     | 6  | 10 | 0     |
| Canada                                    | .....                 | 3   | 0  | 0     | 6  | 0  | 0     |
| Pine, Canada red                          | .....                 | 2   | 0  | 0     | 3  | 10 | 0     |
| " "                                       | yellow                | 0   | 10 | 0     | 14 | 0  | 0     |
| Lath, Danstic                             | .....                 | 3   | 0  | 0     | 5  | 0  | 0     |
| St. Petersburg                            | .....                 | 4   | 0  | 0     | 5  | 10 | 0     |
| Waincoat, Rigas                           | .....log              | 2   | 15 | 0     | 4  | 0  | 0     |
| " "                                       | Odesa, crown          | 2   | 15 | 0     | 3  | 0  | 0     |
| Deal, Finland, 2nd and 3rd                | .....100              | 5   | 10 | 0     | 8  | 0  | 0     |
| " "                                       | 4th and 3rd           | 2   | 10 | 0     | 8  | 10 | 0     |
| Riga                                      | .....                 | 5   | 10 | 0     | 7  | 0  | 0     |
| St. Petersburg, 1st yellow                | .....                 | 6   | 10 | 0     | 14 | 0  | 0     |
| " "                                       | 2nd                   | 3   | 0  | 0     | 8  | 0  | 0     |
| " "                                       | white                 | 6   | 0  | 0     | 9  | 0  | 0     |
| Swedish                                   | .....                 | 8   | 0  | 0     | 15 | 0  | 0     |
| White Spruce                              | .....                 | 10  | 0  | 0     | 16 | 0  | 0     |
| Canada, Pine                              | .....                 | 17  | 0  | 0     | 25 | 0  | 0     |
| " "                                       | 2nd                   | 11  | 0  | 0     | 16 | 0  | 0     |
| " "                                       | 3rd, &c.              | 8   | 0  | 0     | 9  | 0  | 0     |
| " "                                       | Spruce, 1st           | 5   | 0  | 0     | 10 | 0  | 0     |
| " "                                       | 3rd and 2nd           | 5   | 0  | 0     | 7  | 0  | 0     |
| Deals—New Brunswick, &c.                  | .....                 | 5   | 0  | 0     | 7  | 0  | 0     |
| Flooring Boards, 3/4 in., prepared, First | .....                 | 4   | 0  | 0     | 11 | 0  | 0     |
| " "                                       | Second                | 0   | 8  | 0     | 11 | 0  | 0     |
| Other qualities                           | .....                 | 0   | 6  | 0     | 8  | 0  | 0     |
| Cedar, Cuba                               | .....foot             | 0   | 3  | 0     | 0  | 33 | 0     |
| Honduras, &c.                             | .....                 | 0   | 2  | 0     | 0  | 33 | 0     |
| Australian                                | .....                 | 0   | 0  | 0     | 3  | 0  | 0     |
| Mahogany, Cuba                            | .....                 | 0   | 4  | 0     | 0  | 7  | 0     |
| St. Domingo, cargo average                | .....                 | 0   | 4  | 0     | 0  | 0  | 0     |
| Mahogany, Mexican, cargo av.              | .....                 | 0   | 0  | 33    | 0  | 0  | 33    |
| Tobacco                                   | .....                 | 0   | 0  | 4     | 0  | 0  | 0     |
| Honduras                                  | .....                 | 0   | 0  | 4     | 0  | 0  | 0     |
| Maple, Bird's-eye                         | .....                 | 0   | 0  | 0     | 0  | 0  | 0     |
| Rose, Rio                                 | .....                 | 7   | 0  | 0     | 10 | 0  | 0     |
| Bahia                                     | .....                 | 8   | 0  | 0     | 10 | 0  | 0     |
| Box, Turkey                               | .....ton              | 5   | 0  | 0     | 15 | 0  | 0     |
| Satin, St. Domingo                        | .....foot             | 0   | 5  | 0     | 0  | 0  | 0     |
| Porco Rico                                | .....                 | 0   | 0  | 0     | 0  | 30 | 0     |
| Walnut, Italian                           | .....                 | 0   | 4  | 0     | 0  | 0  | 0     |
| METALS.                                   |                       |     |    |       |    |    |       |
| Iron—Bar, Welsh in London                 | .....ton              | 4   | 7  | 6     | 4  | 15 | 0     |
| " "                                       | in Wales              | 4   | 2  | 6     | 4  | 7  | 0     |
| " "                                       | Staffordshire, London | 5   | 10 | 0     | 8  | 0  | 0     |
| Sheets, single, in London                 | .....                 | 6   | 15 | 0     | 8  | 0  | 0     |
| Hoop                                      | .....                 | 8   | 0  | 0     | 7  | 0  | 0     |
| Nail-rod                                  | .....                 | 6   | 15 | 0     | 8  | 10 | 0     |
| COPPER.                                   |                       |     |    |       |    |    |       |
| British, cake and ingot                   | .....ton              | 43  | 0  | 0     | 43 | 0  | 0     |
| Best selected                             | .....                 | 44  | 5  | 0     | 45 | 0  | 0     |
| Sheets, strong                            | .....                 | 50  | 10 | 0     | 51 | 0  | 0     |
| Chili, bars                               | .....                 | 39  | 15 | 0     | 42 | 5  | 0     |
| Yellow Metal                              | .....lb.              | 0   | 0  | 4 1/2 | 0  | 0  | 4 1/2 |
| LEAD.                                     |                       |     |    |       |    |    |       |
| Pig, Spanish                              | .....ton              | 12  | 8  | 9     | 0  | 0  | 0     |
| English, common brands                    | .....                 | 12  | 15 | 0     | 0  | 0  | 0     |
| Sheet, English                            | .....                 | 13  | 13 | 9     | 13 | 18 | 0     |
| SILVER.                                   |                       |     |    |       |    |    |       |
| Silesian, special                         | .....ton              | 14  | 2  | 6     | 0  | 0  | 0     |
| Ordinary brands                           | .....                 | 14  | 0  | 0     | 0  | 0  | 0     |
| TIN.                                      |                       |     |    |       |    |    |       |
| Straits                                   | .....ton              | 102 | 0  | 0     | 0  | 0  | 0     |
| Australian                                | .....                 | 102 | 0  | 0     | 0  | 0  | 0     |
| English ingots                            | .....                 | 105 | 10 | 0     | 0  | 0  | 0     |
| Zinc                                      | .....                 | 16  | 0  | 0     | 0  | 0  | 0     |
| English sheet                             | .....ton              | 16  | 0  | 0     | 0  | 0  | 0     |
| OILS.                                     |                       |     |    |       |    |    |       |
| Lined                                     | .....ton              | 20  | 5  | 0     | 20 | 10 | 0     |
| Cocanut, Cochil                           | .....                 | 32  | 0  | 0     | 35 | 0  | 0     |
| Ceylon                                    | .....                 | 25  | 0  | 0     | 25 | 10 | 0     |
| Palm, Lagos                               | .....                 | 21  | 10 | 0     | 0  | 0  | 0     |
| Reaped, English pale                      | .....                 | 21  | 15 | 0     | 0  | 0  | 0     |
| " "                                       | brown                 | 20  | 5  | 0     | 0  | 0  | 0     |
| Cottonseed, refined                       | .....                 | 19  | 0  | 0     | 20 | 10 | 0     |
| Tallow and Oleine                         | .....                 | 25  | 0  | 0     | 46 | 0  | 0     |
| Lubricating, U.S.                         | .....                 | 5   | 0  | 0     | 8  | 0  | 0     |
| " "                                       | refined               | 5   | 0  | 0     | 12 | 0  | 0     |
| TURPENTINE.                               |                       |     |    |       |    |    |       |
| American, in casks                        | .....cwt.             | 1   | 8  | 0     | 1  | 0  | 0     |
| TAR.                                      |                       |     |    |       |    |    |       |
| Stockholm                                 | .....barrel           | 0   | 15 | 0     | 0  | 0  | 0     |
| Archangel                                 | .....                 | 0   | 12 | 0     | 0  | 0  | 0     |



CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Table with 5 columns: Nature of Work, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes entries for Norwegian Kurb and Granite Sets, Road-making and Paving Works, etc.

PUBLIC APPOINTMENTS.

Table with 5 columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes City Surveyor, York Corporation, 350l., April 23th.

TENDERS.

Table with 2 columns: Contractor Name, Amount. Includes BAYSWATER, For building Tabot Tabernacle, £5,994 0 0.

Table with 2 columns: Contractor Name, Amount. Includes BEDFORD, For the erection of new school-room, £2,517 0 0.

Table with 2 columns: Contractor Name, Amount. Includes BERMONDSEY, For building two houses and stabling, £320 0 0.

Table with 2 columns: Contractor Name, Amount. Includes BEXHILL-ON-SEA, For constructing new roads and drains, £2,550 0 0.

Table with 2 columns: Contractor Name, Amount. Includes BIRMINGHAM, For the erection of shops and offices, £5,275 0 0.

Table with 2 columns: Contractor Name, Amount. Includes BUCKS, For restoration of mansion at Wilton Park, £5,869 0 0.

CHELSEA.—For the erection of Nos. 1 and 2, St. Leonard's Studios, Smith-street, Chelsea, for Messrs. Cooke & Ivoryth, Mr. Walter J. Ebbetts, architect, Strand:—

Table with 2 columns: Contractor Name, Amount. Includes J. Leggat, £275 0 0; Staal Bros., 624 0 0; H. Baylis, 614 15 0.

CLAPTON.—For alterations and additions to house at Clapton, for Mr. Alfred F. Fuckeridge, Mr. W. G. Bartlett, architect, Strand:—

Table with 2 columns: Contractor Name, Amount. Includes Colls & Son, £2,380 0 0; Brass & Son, 2,073 0 0; Heard, 2,060 0 0; Ashby Bros. & Sons, 1,970 0 0; F. & F. J. Wood, 1,955 0 0.

CHESTER.—For the erection of a villa at Copford, for Mr. George Mason, Mr. J. W. Start, architect, Colchester:—

Table with 2 columns: Contractor Name, Amount. Includes Shead, £287 0 0; Beard, 551 0 0; Depont, 500 0 0; Ambrose, 473 0 0; Dias, 435 0 0; Bado, 397 0 0; Chambers, 395 0 0.

FINCHLEY.—For house in Finchley Park, North Finchley, for Mr. A. C. Kean, Mr. T. H. Smith, architect, Basinghall-street. Quantities supplied:—

Table with 2 columns: Contractor Name, Amount. Includes S. Yardley & Sons, £1,719 0 0; J. C. Hill, 830 0 0; J. W. Falker, 825 0 0; Ward & Lambie, 793 0 0; H. B. Stephens, 784 15 0; Hale & Twitcomb, 750 0 0; Stillwell & Ely (accepted), 633 6 8.

HORNSEY.—For the supply of about seventy-six tons of 4-inch cast-iron pipes and examination boxes for the Hornsey Local Board, Mr. T. De Courcy Meade, engineer:—

Table with 4 columns: Contractor Name, A\* (Fence, Double Gate, Single Gate), B† (Fence, Double Gate, Fence), O‡ (Fence, Double Gate, Fence). Includes J. T. Roberts, Swan and Small Heath Foundries, West Bromwich (accepted), £4 8 9, £21 1 0.

HORNSEY.—For the supply of wrought-iron fencing, for the Hornsey Local Board, Mr. T. De Courcy Meade, engineer:—

Table with 4 columns: Contractor Name, A\* (Fence, Double Gate, Single Gate), B† (Fence, Double Gate, Fence), O‡ (Fence, Double Gate, Fence). Includes Brookes & Co., £5 10 6, £6 0 5, £5 15 11.

\* Contract A.—Supply and erection of about 1,270 yards wrought-iron fence, 6 ft. high, with gates, &c., complete. † Contract B.—Supply and erection of about 2,460 yards wrought-iron fence, 4 ft. high, with gates, &c., complete. ‡ Contract C.—Supply and erection of about 90 yards wrought-iron continuous flat bar fence, 4 ft. high.

LBE.—For rebuilding the "Woodman" Tavern, High-road, Lee:—

Table with 2 columns: Contractor Name, Amount. Includes Mark Patrick & Son, £3,624 0 0; Patman & Fotheringham, 3,443 0 0; Smith & Sons, 3,287 0 0; Harris & Wardrop, 3,141 0 0; Geo. Bush (too late), 3,057 0 0; Colls & Sons, 3,020 0 0; S. Jerrard, 2,959 0 0.

LIVERPOOL.—For the new Liverpool City Hospital (South), Grafton-street, for the Corporation of Liverpool, Messrs. John W. Simpson & E. J. Milner Allen, joint architects, London. Quantities by Messrs. D. Howarth & Son:—

Table with 2 columns: Contractor Name, Amount. Includes Beakley, £17,341 0 0; Taylor, 16,000 0 0; Joshua Henshaw, 15,458 0 0; Hughes & Sterling, 15,303 0 0; Tomkinson & Sons, 15,377 0 0; W. & G. Johnson, 15,298 0 0; Haigh, 15,250 0 0; Webster, 15,100 0 0; G. Woods, 15,040 0 0; Dilworth, 14,940 0 0; Roberts, 14,883 0 0; Tidderington, 14,825 0 0; Tomkinson & Co., 14,833 0 0; J. Urmsion, 14,589 0 0; Thomas Tyson, 14,596 0 0; Morrison & Sons, 14,580 0 0; Brown & Baukhous, 14,545 0 0; Nicholson & Clarke, 14,500 0 0; Thornton & Sons, 14,335 0 0; Gabbatt, 14,100 0 0; Holms & Green, 13,957 0 0.

LONDON.—For rebuilding 57½, Old Broad-street, and 7, Austin Friars, E.C., for Mr. R. Whitehead, Messrs. J. & J. S. Edmondson, architects:—

Table with 2 columns: Contractor Name, Amount. Includes Trollope, £16,943 0 0; Kyaach, 16,140 0 0; Boyce, 15,840 0 0; Cooder, 15,377 0 0; Nightingale, 15,246 0 0; Colls, 15,260 0 0; Sheppard, 15,168 0 0; J. & J. Greenwood, 15,151 0 0; Smith & Son, Newwood, 14,250 0 0.

LONDON.—For alterations and repairs at 81, Alexandra-street, St. John's Wood, Mr. Delessa Joseph, architect, Basinghall-street:—

Table with 2 columns: Contractor Name, Amount. Includes C. Cooke & Conay, £153 0 0; J. W. Falkner, 373 0 0; A. W. Hammond, 278 0 0.

LONDON.—For repairing the private road at Diana-place, Euston-road, for Messrs. Geo. Rowney & Co. Mr. Walter J. Ebbetts, architect, Strand:—

Table with 2 columns: Contractor Name, Amount. Includes H. Baylis, £247 16 0; Asphalt, 236 10 0.

LONDON.—For alterations and additions to the College Arms, Crowdsale-road, St. Pancras, for Mr. F. Austin, Messrs. Furniss & Thorpe, architects, Kentish Town-road:—

Table with 2 columns: Contractor Name, Amount. Includes J. Beale, Westminster Bridge-road, amended Tender (accepted), £1,150 0 0.

LONDON.—For rebuilding No. 476, Kingsland-road, for Mr. J. Farlong, Mr. W. Smith, architect:—

Table with 2 columns: Contractor Name, Amount. Includes Lound, £497 0 0; Clarke & Son, 485 0 0; Taylor, 474 0 0; Steel Bros., (accepted), 461 0 0; Dearing & Son (accepted), 455 0 0.

LONDON.—For rebuilding musical instrument works, Commercial-road, for Mr. Jones, Mr. Joseph Harris, surveyor, Bow:—

Table with 2 columns: Contractor Name, Amount. Includes Toole, £1,313 0 0; Hearle & Son, 1,263 0 0; Russell, 983 0 0; Timson, 894 0 0; Lusk (accepted), 880 0 0.

LONDON.—For alterations and additions to No. 10, Gloucester-walk, Camden Hill, for Mr. T. H. Cartwright, Mr. W. Jaomb Gibbon, architect, Great James-street, Bedford row:—

Table with 2 columns: Contractor Name, Amount. Includes S. E. Hayward, £1,336 0 0; Bray & Pope, 1,149 0 0; Gibbon & Son, 1,135 0 0; Raymont & Son, 1,075 0 0; H. Chapman, 988 10 0; Martin, 891 17 4.

LONDON.—For building the Home for Destitute Boys, Shaftesbury House, Shaftesbury-avenue, Mr. B. P. Loftus Brock, F.S.A., architect:—

Table with 2 columns: Contractor Name, Amount. Includes Devonport, £10,025 0 0; Weston, 8,545 0 0; Maddock, 8,377 0 0; Nightingale, 8,374 0 0; Bush, 8,303 0 0; W. Johnson, 8,200 0 0; Shepherd, 7,969 0 0; Bywaters, 7,968 0 0; Peto Bros., 7,710 0 0; Kynoch & Co., 7,535 0 0.

LONDON.—For the erection of walls to enclose land on the northern side of the Infirmary at Notting Hill, for the Guardians of the Parish of St. Marylebone, Messrs. H. Saxon Small & Son, architects:—

Table with 2 columns: Contractor Name, Amount. Includes C. Eschelder, £1,185 0 0; Paine Bros., 1,110 0 0; J. M. Goodwin, 1,050 0 0; Rowall & Co., 1,025 0 0; H. C. Belch, 1,019 0 0; Wall Bros., 995 0 0; Leslie & Knight, 894 0 0; Wm. Martin, 850 0 0.

LONDON.—For alterations, additions, and repairs, to the Chartered Mercantile Bank of India, London, and China, 85, Old Broad-street. Mr. W. Kidner, architect:—  
 Conder ..... £3,584 0 0  
 Higgs & Hill ..... 2,994 0 0  
 Brass & Son ..... 2,990 0 0  
 Colls & Son ..... 2,870 0 0  
 Ashby Bros ..... 2,844 0 0  
 Grover ..... 2,698 0 0

PARKESTON, Essex.—For eight houses, for Mr. Thomas Moy, Mr. H. A. Wooster Reeves, architect, Devonshire-square, Bishopgate. Quantities not supplied:—  
 Johnson, Wood Green ..... £2,000 0 0  
 Brown, Braintree ..... 1,998 0 0  
 Grimwood & Sons, Sudbury ..... 1,968 0 0  
 Harlock, Hford ..... 1,880 0 0  
 Cox, Ipswich ..... 1,828 0 0  
 Dupont, Colchester ..... 1,773 0 0  
 Carnow, High Barnet ..... 1,763 0 0  
 Everett & Son, Colchester ..... 1,760 0 0  
 Bunting, St. Ives ..... 1,660 0 0  
 Ambrose, Colchester ..... 1,549 0 0  
 Wawman, Felixstowe ..... 1,529 0 0  
 Dobson, Colchester ..... 1,392 0 0  
 Furlong, Dorcourt ..... 1,320 0 0  
 Dias, Colchester (accepted) ..... 1,310 0 0  
 Fox, Walton ..... 1,080 0 0

PENGE.—For alterations and additions to Nos. 06 and 10, Beckenham-road, Penge, for Mr. Bryce Grant, exclusive of shop fronts or fixtures and fittings. Mr. Frederick W. Fryer, architect, Pancras-lane:—  
 Waddington ..... £663 0 0  
 Clarke ..... 627 0 0  
 Rice ..... 598 0 0  
 Jones, Beckenham ..... 589 0 0  
 \* Accepted; work to be done within a month.

RIPON.—For works at Grastley Hall, for the Right Hon. Lord Granley. Mr. George Malinson, architect, Ripon:—  
 Nicholson Bros., Leeds ..... £7,000 0 0  
 J. Keswick, Milegate, York ..... 6,495 0 0  
 W. Appleton, Harrogate ..... 5,770 0 0  
 J. France, Middlebrough ..... 5,779 2 11  
 R. Brasfield, East Keswick, near Leeds ..... 5,090 0 0  
 T. Walsh, Baildon, near Leeds ..... 5,262 0 0  
 Longley Bros., Hunslet-road, Leeds ..... 5,100 0 0  
 J. Hall Thorp, Roman-jark, Leeds ..... 5,069 0 0  
 Wood & Sons, St. Mark's-terrace, Leeds ..... 5,015 0 0  
 J. Chambers & Son, Commercial-street, Sheffield (accepted) ..... 4,999 1  
 \* Not including plumbing.

ROTHERHAM.—For reinstating premises after fire, for Mr. E. Talbot, Church-passage, Rotherhithe. Mr. E. Thomas, architect:—  
 A. White & Co. (accepted) ..... 161 0 0  
 Chafen ..... 157 5 0

SOUTHBOROUGH.—For works at High Woods, Southborough, for the Southborough Local Board:—

|                      | Roads and Sewers. |           | Outfall Syphon. | Water Extension. | Total. |
|----------------------|-------------------|-----------|-----------------|------------------|--------|
|                      | £. s. d.          | £. s. d.  | £. s. d.        | £. s. d.         |        |
| Cattell .....        | 5,390 0           | 0 423 0   | 0 1,788 0       | 0 8,605 0        | 0      |
| Oseinton .....       | 5,219 0           | 0 379 0   | 0 611 0         | 0 6,399 0        | 0      |
| Nicholson .....      | 6,558 6           | 0 431 8   | 0 701 10        | 0 6,510 10       | 0      |
| Streeter .....       | 4,610 10          | 4 392 2   | 6 839 5         | 11 5,747 18 9    |        |
| King .....           | 5,629 0           | 0 395 0   | 0 800 0         | 0 5,724 0        | 0      |
| Thos. Adams .....    | 4,363 14          | 11 414 8  | 8 789 10        | 0 5,870 13 8     |        |
| Ties .....           | 4,281 14          | 10 409 4  | 3 829 7         | 15 570 6 2       |        |
| Marshall .....       | 4,244 12          | 3 363 13  | 0 804 12        | 6 5 442 17 9     |        |
| Cowdery .....        | 4,346 0           | 5 392 3   | 6 568 8         | 25 407 1 1       |        |
| Potter .....         | 4,249 0           | 0 359 0   | 0 669 0         | 0 5,368 0        | 0      |
| Gillett .....        | 4,108 2           | 4 395 5   | 8 746 0         | 0 5,249 7 7      |        |
| Punnett .....        | 4,109 18          | 3 492 8   | 6 784 2         | 0 5,296 8 9      |        |
| Cunliffe .....       | 4,218 0           | 0 929 6   | 0 600 0         | 0 5,147 6 0      |        |
| Woodhams & Fry ..... | 3,987 9           | 0 443 0   | 0 698 17        | 6 5 129 15 6     |        |
| Deario .....         | 4,064 5           | 5 338 3   | 0 686 0         | 0 5,099 8 5      |        |
| Young .....          | 4,037 6           | 11 363 11 | 6 683 0         | 0 5,085 18 5     |        |
| Brooker .....        | 2,160 18          | 0 0       | 0 0             | 0 2,160 18 0     |        |
| Oravatt .....        | 0                 | 0         | 0               | 0 783 19 3       |        |

\* The tender of Mr. Cunliffe for outfall syphon and water extension accepted.  
 † The tender of Messrs. Woodhams & Fry for roads and sewers accepted.  
 ‡ For portion of roads only.

SHORTLANDS (Kent).—For works at Sherlands Bridge, Kent, according to plans prepared by the County Surveyor:—

|                                 | Contract No. 1. |          | Contract No. 2. |          | Total. |
|---------------------------------|-----------------|----------|-----------------|----------|--------|
|                                 | £. s. d.        | £. s. d. | £. s. d.        | £. s. d. |        |
| Dover, Wood & Co., London ..... | 1,687 0         | 0 657 0  | 0 2,324 0       | 0 0      |        |
| J. Farrow, Maidstone .....      | 1,083 4         | 2 431 15 | 10 1,560 0      | 0 0      |        |
| W. & T. Donne, Walmer .....     | 1,000 0         | 0 433 0  | 0 1,423 0       | 0 0      |        |
| G. Torkington, Battersea .....  | 893 0           | 0 475 0  | 0 635 0         | 0 0      |        |
| T. Lansbury, Bromley .....      | 823 15          | 0 368 0  | 0 1,311 15      | 0 0      |        |
| W. H. Dearn, Chichester .....   | 917 0           | 0 370 0  | 0 1,287 0       | 0 0      |        |
| J. W. Jones, Beckenham .....    | 839 0           | 0 447 0  | 0 1,266 0       | 0 0      |        |
| G. E. Wallis, Maidstone .....   | 801 0           | 0 974 0  | 0 1,374 0       | 0 0      |        |
| Pell & Sons, Bromley .....      | 786 0           | 0 430 0  | 0 1,236 0       | 0 0      |        |
| J. Marshall, Brighton .....     | 800 0           | 0 403 0  | 0 1,203 0       | 0 0      |        |
| T. Lye, Sutton .....            | 723 0           | 0 355 0  | 0 1,108 0       | 0 0      |        |
| Ball & Gammon, Strood .....     | 720 0           | 0 316 16 | 0 1,039 16      | 0 0      |        |

\* Accepted.

TUNBRIDGE WELLS.—For sewerage, road-making and other works, on the Molesey Park Estate, Mr. W. B. Hughes, architect and surveyor, Tunbridge Wells:—  
 Brooker & Goldsmith, Tunbridge Wells .....

Fulham Town-hall.—In the list of tenders for this building, published by us a fortnight ago (p. 656), it was stated that Messrs. Freasore & Son's tender had been accepted. We are informed that this is incorrect, as Messrs. Freasore & Son have withdrawn from the competition, owing to a clerical error in one item.

Deard School, Grays Thurrock.—In reference to the list of tenders for this job (which appeared on p. 641 of our last issue), we are informed that Mr. Grist has withdrawn his tender of 6,718l., which should have been 6,718s.

\* SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 48, Catherine-street, W.C., not later than 12 Noon on THURSDAYS.

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### Architecture at the Royal Academy.



THE show of architectural drawings this year is a very good one, better if anything than last year's, which was also an improvement on the collections of several preceding years. A high standard seems to have been maintained in the selection; there is a certain amount of unoccupied space in the upper part of the walls, but no drawings on the usual scale of architectural drawings could have been seen if hung on these upper levels; and though one must sympathise with those (we suspect not a few) who have been disappointed by the return of respectably-executed drawings, illustrating no doubt in many cases buildings which had been carried out with care and in a manner suitable for their purpose and with satisfaction to their owners, we cannot think that the Academy are wrong in restricting the exhibits, as has evidently been their intention, to such drawings as illustrate something of what may rightly be called the poetry of architecture, and of architectural drawing, which also has its poetry and its prose. The Architectural Room at the Royal Academy is not to be regarded as a kind of Building Exhibition, where a representation of a building is to be hung up merely because it is an executed work which has cost a good deal of money, and brought a respectable percentage to the contractor and a more modest one to the architect. The object of an architectural room at the Academy is to illustrate architecture as an art,—as the art of giving to buildings picturesque and expressive character, and rendering their objects of beauty and delight as well as of utility. In any other view architectural drawings have no *locus standi* at an Academy of Arts,—a fact which has certainly been forgotten in some previous years, when drawings have been hung representing great hocks of building, the sole interest in which may be said to have been a matter of five per cent. As it is, there are really very few drawings in the room which have not some picturesque interest and character. There is far less of the mere street house element than there used to be; there is a great deal of variety in the style and feeling, and in the methods of execution of the designs and drawings; and the praises which an eminent French architect has recently, in the pages of a French journal, lavished on the English architecture of the day in respect of its picturesque qualities, may he fairly said to be borne out by the very

typical collection in the Architectural Room at Burlington House.

One other comment is suggested by a general look at the drawings; viz., that the Queen Anne heresy in its cruder form seems to be dying out. Some little time ago the rooms used to be full of "Houses in — Place," all exceedingly like each other, all showing the same bald repetition of brick quoins and cannon-ball finials. There may have been more of these sent in than we can conjecture, but if so, few of them have found favour in the eyes of an enlightened Hanging Committee. There are designs which are, no doubt, developments of Queen Anne, but then they are really developments, and have left the cruder stage behind. It may also be noted that there is distinctly more evidence of a leaning to Gothic feeling and taste than we have seen of late years; in this case also not that mere imitation (generally) of Gothic styles which was in favour a good many years ago, but an inventive architecture which uses the old materials after a new fashion; and while the collection is thus of considerable interest to those who study architecture with some knowledge of the subject, the variety and effective character of many of the drawings, considered merely as drawings, and the number of different methods of delineation employed, ought to render the Architectural Room more interesting, even considered merely as an additional "picture room" to the public generally, than it has commonly been considered. Of late years, indeed, we have discovered a certain awakening of interest on the part of the public in the architectural drawings; the room devoted to them is not such an entire solitude as it was wont to be; and it must be said that a good many of the architectural exhibitors are going in the right way, by the fine character of their drawings, to encourage this laudable increase of interest on the part of the general body of visitors to the Academy.

The central positions on two of the walls are occupied by the diploma drawings of two Academicians,—Mr. Pearson's perspective view of Truro Cathedral from the north east (1,631), a highly-finished pen-and-ink drawing, and Mr. Waterhouse's view of "Manchester Town-hall" (1,680), a large water-colour drawing in an effective though somewhat loaded style. The architects do not, it would appear, like the painters, put off their least valuable works on their brethren as diploma deposits. Each of these diploma drawings is very carefully executed, and each shows its author at his best in his own special qualities of architectural design. The Manchester Town-hall is, of course, a pretty old building now, but Mr. Waterhouse made a good choice in presenting a drawing of it

as his diploma work. It is not only one of the most important and best-known of his works; it is of all others, perhaps, the most typical of his method of treating Gothic materials. It is a pity that the plan was not added, for the plan was a remarkably successful one, dealing with a very complicated problem or puzzle in planning; and we may here observe that the absence of any plan of the various buildings illustrated is even more conspicuous than it was last year. Our wish to see more plans of buildings appended to the drawings is by no means at variance with the opinion expressed just now that architectural art, as distinguished from mere building, is the proper element for an Academy Exhibition; for plan is the basis of design; and without the plan it is impossible to understand rightly the meaning of the design, or the manner in which the architect has succeeded in rendering what might have been a mere utilitarian erection a thing of beauty and interest. There is no need that the plan should be large enough to make an extra drawing, or to be a disfigurement to the perspective drawing; a plan to a small scale would suffice to explain all the architectural qualities of the building; and if the Academy, instead of tacitly encouraging architects to ignore plans in their exhibits, would issue an edict that all drawings (except those which are only picturesque illustrations of remains of ancient architecture) should have appended to them a small-scale plan, they would be greatly increasing the interest of the exhibition to architects and architectural students, and they might even in time teach the public something about the relation between plan and design, about which the said public know at present absolutely nothing.

The perspective view of Truro Cathedral shows Mr. Pearson, we have observed, at his best, though that remark must be taken with a certain kind of reservation. It exhibits him as the most complete master of reproduced Gothic architecture since the death of Scott. The drawing shows an early thirteenth-century cathedral, recalling Lincoln more than any other cathedral in most of its details, except in the treatment of the termination of the tower; a picturesque group, with an octagonal chapter-house, rising above the roofs of some low houses which form a foreground to the picture. The drawing is finished with great care, and in this respect is a rather wholesome practical protest against the somewhat too rough and "dashing" style of architectural pen-and-ink which is in vogue with some draughtsmen. But there is not a new thought in the design; it is simply a Medieval cathedral over again. Some years since, when the geometrical drawings for it were exhibited

here, we expressed our regret that with such a splendid opportunity as the building of a large modern cathedral *ab initio*, there had been no attempt made to produce, if a Gothic cathedral, at least some kind of development of that type, both in plan and design, suited to the requirements and feeling of the present day. Other smaller churches by Mr. Pearson have left no doubt of his capability and of his willingness to do this when called upon; we must presume, therefore, that a pure Medieval cathedral was the result wished and asked for; but the most learned reproduction of a Medieval building cannot rank with original thought and design, and therefore we say that Mr. Pearson is really at his best in some of his smaller churches, rather than in this mere re-creation of the architecture of the past.

Another of the important drawings occupying a central place in the hanging is that representing the interior of "The Queen's Hall of the People's Palace for East London" (1,679), by Mr. E. R. Robson. This shows a large hall with an elliptical ceiling covered, on the broad ribs which mark the bays, as well as on the interspaces, with very elaborate panelling and ornament. Each rib springs from a cornice projection carried by two Corinthian columns, the shafts fluted for one quarter of their length below the capital; the architrave breaks over each column, except the corona and upper moulding, which are carried unbroken across the two columns; between each couple of columns is a statue. The columns rise from the level of a gallery about one-third the height of the room, carried on Caryatides standing free on the floor with a small subsidiary column behind each. The lower portion of the wall under the gallery is plainly treated; the gallery has a front projecting in a series of slight curves from bay to bay, with cantilevers under. The effect of the whole is dignified and rich; the weak point is the treatment of the upper portion of the end wall, which is panelled in large square and circular panels in a manner which looks rather bare and bald as contrasted with the richness of the remainder. The drawing, in pen-and-ink line without shading, is an admirable piece of careful and painstaking draughtsmanship, of which we will give a reproduction in a week or two.

Another large drawing is "Charity: a Design for a Stained-glass Window, Philadelphia" (1,733), by Mr. H. Holiday. This is merely a carefully-executed red crayon cartoon, not, of course, giving any idea of the working of the design in glass. In the centre is a triple alcove, shown partly in perspective, the two side alcoves being at an angle with the centre; in the centre alcove stands the figure of Charity, a noble-looking fully-draped female figure; on either side two subordinate figures distribute bread and other provisions to folk on the lower level, in defiance of the Charity Organisation Society's maxims; beneath the centre is a double flight of steps and a platform, on which children are brought and laid before the goddess of Charity. The architectural background, which fills up nearly all the composition behind the figures, shows well worked-out details of Lombard character; on the top of it are reclining figures. The whole is a graceful composition, and the figures, it is almost needless to say, are admirably drawn; but a cartoon of this kind is not the best way of showing a design for stained glass; there is many a slip between the idea and the due working out of it in lead and glazing.

Shortness of time prevents our going further into the collection in detail in the present number; in future issues we will go through notes on most of the designs exhibited, taking them in the order of hanging.

**Timber Drying.**—We are asked to mention that the Universal Cool Air Drying Company, Limited, have opened a new dryer on the cool air system at Macclesfield-street, City-road, E.C., on the Regent's Canal, for the seasoning of every kind of timber. The premises are very large and commodious, and the dryers, specially adapted for timber already finished, are capable of treating about 1,500 squares of 1-in. boards at one operation.

### CANALS, LOCKS, AND CANAL-BOATS.\*

IN continuation of our remarks on the subject of water transit and the importance of putting our canals into working order for present conditions of traffic, it may be useful to add some suggestions more in detail as to the adaptation of canals and boats to present requirements. The size of boat best adapted to an improved canal navigation need not be the same for all canals, but it would be desirable that it should be so for the through routes, and that these main lines should be joined so that traffic may take any direction without change of vessel,—in the same "bottom," to use the navigation term. But the branch canals and those traversing agricultural districts, other than the main lines, would need but little alteration; perhaps none in respect of locks or bridges. A boat drawing 4 ft. of water will carry 50 tons if the length of the boat be 60 ft. and its width 14 ft., or 60 tons with the same width and a length of 70 ft. If the draught be 4 ft. 6 in., the length of the boat 75 ft., and width 14 ft., the weight carried would be 80 tons. This is the least of any of the propositions for enlargement of the present means of transit. If the boat were 110 ft. long, 11 ft. 6 in. wide, with a draught of water of 6 ft., the weight carried would be 120 tons.

As a basis for the scale on which improvements should be made, we ought to consider the opinions of those who are practically engaged in canal operations, although we ought not to be limited by those opinions in any design of improvement in water transit on a large scale; and perhaps it is only on a large scale that anything can be done at all, of any national value. However, amongst the evidence given before the Select Committee of the House of Commons on Canals in 1883 was that of Mr. Morton, a member of the firm of Fellows, Morton, & Co., railway and canal carriers, of Wolverhampton, to the effect that if the canals were adapted for a boat or barge propelled by steam, and capable of carrying 80 tons, the cost of haulage would be reduced to less than one-half of what it is now by the narrow boats carrying 30 or 40 tons. For such an improvement he thinks there is a good nucleus already in existence, and he would propose to open up that line in the first instance, viz., from London to Wolverhampton. The total distance is about 168 miles, and for 110 miles the locks will admit vessels carrying 80 tons. This leaves but 58 miles, or a little over one-third of the distance, which would require extensive alterations; and even of that 58 miles 16 consist of the Birmingham Canal, which he thinks would be wide enough in its present state.

The route here indicated by Mr. Morton from Wolverhampton to London takes the following lines:—First, the "Birmingham Canal," from Wolverhampton to Birmingham, 15 or 16 miles; then by the Warwick Canals to Napton, a distance of 37½ miles; then on a level piece of the Oxford Canal for 5 miles to Braunston; and thence by the Grand Junction Canal to the Thames near Brentford, a distance of 91 miles, and down the Thames about 15 miles, on the average, to the Pool or the Docks. But it may be said that instead of coming into the Thames at Brentford the boat might leave the main line of the Grand Junction Canal at or near Norwood, and proceed by way of Paddington into the Regent's Canal, and so on to the Thames at Limehouse, a distance of 110 miles from Braunston. Mr. E. J. Lloyd, C.E., the engineer and manager of the Warwick Canals, stated that 65 tons is the greatest cargo which can now be carried on the Grand Junction Canal; but it would appear from other evidence that the locks are long enough and wide enough for vessels of 80 tons. Mr. Lloyd proposes that between Birmingham and London the locks be made 120 ft. long, 12 ft. wide, with a depth of water on the sills of 7 ft., and that the vessels be 110 ft. long, 11 ft. 6 in. wide, and drawing 6 ft. of water, carrying 120 tons. As an instance of a through route upon which he

would adopt these dimensions he mentioned to the committee the route between Liverpool and London. Starting from the Thames at Limehouse, with a vessel of 80 tons, the following would be the experience of the present canals, taking the shortest of three possible routes. First, by the Regent's Canal to Paddington, nine miles, and by the Paddington branch, thirteen miles, to the main line of the Grand Junction Canal, where the cargo would have to be reduced to 65 tons, in order to pass along that canal to Braunston, a distance of eighty-eight miles. Here the boat would enter and pass along the Oxford Canal, and the cargo would be further reduced to 30 tons, and carried in a boat 72 ft. long, 7 ft. wide, and drawing 3 ft. 6 in. depth of water, in order to enter the Warwick Canal at Napton, five miles from Braunston. From Napton the same cargo would be carried to Warwick, fifteen miles, and to Birmingham, a further distance of twenty-two miles, where it would enter and pass along the Birmingham Canal for fifteen miles to the Staffordshire and Worcestershire Canal, along which it would pass for one mile and a quarter, and then enter the Shropshire Union Canal, which would carry it to Ellesmere Port, a distance of sixty-eight miles. But it may be observed that after proceeding along the Shropshire Union Canal for about one-third of that distance of sixty-eight miles, the locks become larger, and the cargo might be put into larger boats. We will say, however, that the narrow boat continues on to Ellesmere Port; the cargo is then transhipped into a larger vessel, in order to navigate the estuary of the Mersey, ten miles, to Liverpool; for the narrow boats which alone can pass through the canals mentioned could not safely reach Liverpool through the estuary. Thus the whole length of this route,—and we take it as being similar to many others,—is 246 miles, the separate parts of which are under the following control, viz., the Grand Junction Canal is under that of an independent company; the Oxford Canal, the same; the Warwick and Napton Canal, the same; and the Warwick and Birmingham Canal, also under an independent company; but the next length, the Birmingham Canal, is under the control of the London and North-Western Railway Company. Then, the Staffordshire and Worcestershire Canal has an independent company, but the Shropshire Union is again under the control of the London and North-Western Railway. So that in this route of 246 miles, eighty-three miles are under the control of a railway company.

The amalgamation of the independent companies for the purpose of forming an improved means of water-transit would not be difficult, but it is expected that the railway interest would throw great obstacles in the way of any such proposal. It could probably not be done at all without an Act of Parliament; and, seeing how many railway directors there are in Parliament, and how strong the general railway interest there is, it is probable that any Bill which might be introduced with the object of providing means for the amalgamation of these independent canal companies, or those of any other route on this or other line, would not pass. It might, moreover, by a possible combination with the railways, not have the effect, ultimately, of reducing the cost of transit so as to enable the manufacturers and traders of the country to compete with those of other countries where the cost is reduced, under Government control, to the lowest possible charge,—that is, to a toll sufficient only to cover the cost of maintenance of the works, both of the canals proper and the river navigations; for, in France and Belgium it is considered to be of national concern that full and free means of transit should be afforded to all alike, the consequences of which are that industries arise along these waterways and in their neighbourhood which before had no existence, and they have been the means of improving the general trade of the country. It has been often said that supply waits upon demand,—that demand creates a supply. The reverse is sometimes the case, as it is in the case of free waterways when properly connected: the supply distinctly creates a demand.

\* See article on "Water Transit," p. 563, ante.

There is a similarity in the two cases of French and English canals in this, that the locks there were formerly of different widths, as they are here, and in 1868 this was found to be so disadvantageous that the French Government decreed that thereafter no lock should be constructed less than 17 ft. in width with 6 ft. 7 in. depth of water on the sills. This width was adopted because it was that of some of the then existing locks. One of the witnesses examined before the Committee we have named,—Mr. F. R. Conder, C.E.,—advised that the existing locks of the Grand Junction Canal should be adopted as the general gauge for all others; they are 87 ft. 6 in. long and 15 ft. wide, and Mr. Conder would increase the present depth of water from 5 ft. to 7 ft. He finds that of the whole number of 1,901 locks in this country, 931 are 80 ft. long, or more. The locks are, on many of the canals, as a matter of original design, congregated in series at a few places, rather than, as in some other canals, one or two locks at more frequent intervals, but as an average of the whole of the canals Mr. Conder found that the mean distance apart of all the locks was 1.37 miles. The effect of these many locks is to reduce the average running speed of the boats from two miles and a quarter an hour to two miles; and if the running speed be increased to four miles and a half an hour, the locks would reduce it to an average of three and a half. It is not, however, unlikely that if main lines of canal can be improved and adapted to the present requirements of trade, locks would be superseded by inclines, and in that case the boats or barges would be of larger dimensions. This was recommended to the Committee by Sir Arthur Cotton, R.E., who would have either an incline, similar to that on the Monkland Canal, or a vertical lift, similar to that in use for transferring the boats from the river Weaver to the Grand Junction Canal. This witness stated that even in the present state of the canals there are lines which convey more than a million tons a year, and that there are several lines on which, if improved and made capable of carrying the traffic, we must be prepared for a traffic of at least five million tons. In his "Memorandum" General Cotton says:—"The first thing, of course, would be to take the line of canal out of the hands of the railway, and the next to put the whole line under one management; and I have no doubt, myself, that it should be taken into the hands of Government and put under a Commission, like the Weaver Navigation in Cheshire. The locks should then be enlarged and put into a far more effective state than at present,—that is, be so constructed as easily to pass a boat in three minutes at most."

In order to enable a speed of six miles an hour to be accomplished the canal would have to be 65 ft. wide at the top and 7 ft. deep, if the boats were 12 ft. wide with 6 ft. draught of water. Mr. E. J. Lloyd, C.E., stated that he had no doubt the line of canal we have named could be purchased and improved to the extent he advised for from 10,000*l.* to 12,000*l.* a mile. Estimates made by other engineers were 12,000*l.* and 15,000*l.* a mile for the purchase of existing canals and their enlargement and general improvement. Sir Arthur Cotton adopts this latter amount, and shows that with the large traffic which cheap transit would produce the cost of transit would be but a small fraction of a penny per ton per mile.

The Report of the French Commission in 1872 was that owing to the facility with which the less costly plant of canals can be increased, as compared with railways, and the ease with which boats can be stopped anywhere, water carriage possesses special advantages. The dimensions of the locks there recommended are 138 ft. long and 17 ft. wide, with a depth of water on the sills of 6 ft. 7 in., which would pass vessels of 300 tons. At the last meeting of the British Association, and also at the Birmingham Chamber of Commerce, Mr. Sampson Lloyd, of Birmingham, brought forward this subject, and in a pamphlet subsequently published, entitled "National Canal" (Cornish, Birmingham; and Simpkin &

Marshall, London), he proposes that the locks should admit sailing vessels of at least 250 tons and steamers of 400 tons, joining the navigations of the Thames and the Mersey by one line and the Severn and the Humber by another. The utility of the existing canals would be increased by these means, inasmuch as they would act as feeders of traffic to the National Canal, and would be fed with traffic by it. He enters into the financial question of how the expenses of so great a work are to be met, and suggests that if his scheme be investigated it will be found that it is safe from a monetary point of view, and likewise would be nationally beneficial, so that it should commend itself to the favourable consideration of all.

It would be unreasonable and hopeless to expect that the initiative of a national work, such as this would be, should be taken by persons of any locality, or of any particular interest; but we have endeavoured to give some idea of the variety in the scale of the proposed work indicated by different persons as their view of what it ought to be. First, we have the canal carrier, boat-owner, and general trader in that line of business; he looks to small measures for improving the present locks and line of canal; and the canal engineer and manager wants a larger vessel, and that the earthen slopes of the canal cuttings shall, near the top, be protected by dwarf walling,—a comparatively inexpensive proceeding, but one which present canal companies refuse to sanction, because the traffic is languishing. Then the independent engineer,—that is, one not immediately connected with canal management under a company,—looks more boldly at the situation of affairs, and recommends an enlarged scheme; then, the largest scheme of all, with a suggestion as to how the financial question is to be met. But whatever the scale recommended by these several authorities, they are all agreed upon one point, that the canals and portions of through routes which have been obtained by railway companies, either by purchase or by lease, or by an arrangement with the canal company for the management of one kind of traffic on the canal,—that this control shall cease, as the first step. Wherever we turn in this question of inland water transit the possession of some portions of the canals by railway companies seems to have a paralyzing effect upon the whole system. Another thing upon which all the witnesses before the Committee we have named seem to be agreed,—except such opponents of the improvement of canals as Mr. Bolton, the Chairman of the Caledonian Railway Company, who, by the bye, was not a witness but a member of the Committee,—is that there would, unquestionably, be a large increase of traffic on canals if better means of transit were afforded. They refer chiefly to manufactured goods and to minerals, but we would point out that the agricultural districts cannot be wholly left out of consideration, for they have been to a considerable extent robbed of their previous means of carriage of marketable produce by the substitution of railway stations at wide intervals for the more numerous and convenient canal wharfs. If it be asked why, with all these advantages, there is no greater traffic on canals, the answer is, that under present circumstances no local canal authority,—unless it be in a few exceptional situations such as those of the Aire and Calder, and perhaps the Gloucester and Birmingham Navigations,—will make a beginning of the general improvement which is desirable, for the reasons we have indicated, and which should be taken up comprehensively.

**Dundee.**—A meeting of the committee appointed to promote the movement to establish a Victoria Art Gallery in Dundee, in commemoration of her Majesty's Jubilee, was held the other day. It was reported that of the 12,000*l.* or 13,000*l.* required, between 5,000*l.* and 6,000*l.* had already been promised, and it was resolved to issue a circular inviting further subscriptions. It is expected that the foundation-stone of the gallery will be laid on Jubilee Day.

## NOTES.



**ROM** a letter of the Manchester correspondent of the *Times* of Thursday, it appears that 2,500,000*l.* of the capital of 3,000,000*l.* which was to be raised in Lancashire and the neighbouring counties for the Manchester Canal scheme, by a given date, has been subscribed; so that the prospects of the canal are looking better than could have been expected a little while since. Whether the remaining half-million will "come up to time" remains to be seen. The *Times* correspondent admits that great pressure has been brought to bear to raise the money, and that the investment in the scheme has been urged in many quarters rather as a moral duty than as a prudent venture. If it be so, we make no criticism on such a state of feeling. On the contrary, it is rather refreshing to think of the financial world being for once inspired by an idea, and willing to risk a good deal for glory. But let it be not forgotten that it is a risk. Money invested as a moral duty brings a return in the next world, let us hope, but it is apt to be recusant in regard to this world.

**A**t a meeting of the Hellenic Society, on April 21st, Professor Percy Gardner read a paper by Mr. W. R. Paton on his recent discoveries at Assarlik. Mr. Paton was himself unable to be present. The tombs opened are upon a ridge facing the Acropolis to the south-east. Mr. Paton thinks that he has lighted upon some of those "hurrying-places of the Leleges" mentioned by Strabo (vii., c. vii., 2), as still existing in his time in Caria, together with certain "deserted fortresses." The paper read gave a detailed account of the structure of the tombs, and woodcuts were shown giving sections of two examples, and also specimens of pottery discovered. From these it is clear that, whoever the people were who made the tombs, they were still in the "geometric" stage; the weapons found are iron exclusively, and the bodies of the dead appear to have been in all cases burnt. The impressed patterns found on sarcophagi are closely analogous to similar patterns found at Corneto. Altogether Mr. Paton's find promises to add important links to the ethnic chain between Asia Minor and the early Italian settlements. Mr. Walter Leaf read a paper on a disputed Homeric passage, and afterwards showed photographs taken by himself of a prehistoric house lately discovered at Tiryns, of which no report has yet appeared, and which promises to be of considerable importance.

**T**HE study of geographical science loses a warm promoter by the death of the late Mr. James Wyld. Amongst his varied labours in that direction was the building, in 1851, of the great Model of the Earth within the enclosure of Leicester-square. This quarter of the town, indeed, has been a favourite centre for exhibitions of a similar character: such as the Leverian Museum at Leicester House; Robert Barker's, subsequently the Burfords', Panorama, the first of its kind; the Mississippi River Diorama at Savile House; the Panopticon on the site of the Alhambra; and so on. Mr. Wyld obtained a ten years' lease of the ground for 3,000*l.*, and erected, after Mr. H. R. Abraham's design, a circular structure 90 ft. in diameter and lighted through the dome ceiling, somewhat after the fashion of the Pantheon. The plaster model of the earth, on a scale of ten miles to an inch, was fitted on to the inside of a globe which measured 60 ft. across. Amongst the minor exhibits we call to mind some highly popular models of siege operations illustrating the Crimean war. On the demolition of the "Great Globe," about twenty-five years ago, the enclosure was suffered to fall into a state of squalor and neglect that rendered it a standing reproach, and a constant theme for harter in the comic press. The chief object of attack was the exhumed leaden statue of King George I., which, after undergoing successive mutilations, was finally besmeared with red, black, and white paints. Having been originally modelled by C. Buehard for James Brydges, first Duke of Chandos, it

had been hought by the inhabitants of the square in the famous sale at Canons (1747), and on more than one occasion was deemed worthy of a coating of gilding.

THE Topographical Society of London and the Society for the Protection of Ancient Buildings are surely asleep. Certain statements that have recently appeared in the daily press go to show how great a misapprehension obtains in respect of the *ci-devant* Western Exchange, by Piccadilly. In one paper we find it described as the work of Inigo Jones, thus carrying us back to the days of the Conduit Mead and Brook-shott Fields, as watered by the Aye Bourne, when Piccadilly itself was unknown by that name so far westwards, and to before the time when Queensbury, Clarendon, and Berkeley Houses stood on open ground. In others it is appropriated for the one scene of nearly all the past chronicles of Old Bond-street. Lying between that street and Samuel Ware's Burlington Arcade (1819), it was erected, we are authoritatively informed, within the current century, over the yard of the Red Horse Tavern. A pewter pot hearing that name was found during the alterations now in progress. It was designed as a kind of bazaar or appanage to the Arcade, with which it communicated by a doorway that has been blocked up for years past. The upper floor consisted of a range of wide galleries, supported by plain deal squared posts; the whole being lighted from above. Having been wrecked by the great storm of forty years ago, it was then taken over by its recent occupiers, Messrs. Holland & Sherry, woollen cloth workers and dealers. That firm converted the galleries into offices and side rooms, but did not alter the main character of the structure. They lately let the premises to Messrs. Morgan & Co., of Long-acre, whose architect, Mr. Wheeler, is rebuilding No. 10, Old Bond-street, and is rehabilitating the Exchange at the back thereof. The posts have been capped in gilt, and ornamentally encased; the galleries thrown open again (their original railing being retained), and some light, tasteful decoration is added to the woodwork. Under "Bond-street," in his "Curiosities of London," (1855), Timbs mentions a large hilliard-room at No. 10 as painted, 1850, in encaustic by E. F. Lambert, with panels bordered with arabesques. We are assured that this description does not apply to the premises under review. Messrs. Holland & Sherry have removed to new premises in Warwick-street, where the former feature of a large hall with galleries around has been reproduced. The buildings cleared away included some notorious tenements along the western side of Lower John-street, together with Golden-place (in that street) and the King of Prussia public-house. The northern portion stands on the site of the house, at the south-western angle of Golden-square, which had been identified with that which was fixed upon by Charles Dickens as the home of Ralph Nickleby. Some relics of the old house have been carefully preserved by the present proprietors.

WE learn from the *Scotsman* that Dr. Rowand Anderson has received instructions to proceed with the drawings for the Hall of the Edinburgh University, the cost of which is to be defrayed by Mr. McEwan, M.P. The dome of the old University buildings is now completed, with the exception of a figure of Youth bearing the torch of Knowledge, which is to form the culminating feature of the lantern, and for which a commission has been given to Mr. John Hutchinson, R.S.A., but it will be some months before it is ready to be placed in position. Dr. Rowand Anderson has departed from the original design by Adam,—which was intended to be of smaller dimensions, and entirely constructed of timber and lead,—the lower stages of the dome now erected being formed of stone, and the roof only of lead upon timber. As seen from many points of view, the dome forms an important element in the sky-line of the buildings, but it cannot be seen from some places, such as the Meadows, from which it was expected by many to point out the *locus* of the University; and

even from the west end of Chambers-street the lantern only appears over the roof of the Museum of Science and Art. The chamber within the dome it is proposed to appropriate to the Professor of Fine Arts, and here is to be placed a bust of Mr. Robert Cox, who left the bequest from which the dome has been erected.

FOLLOWING the popular precedents of "Old London" and "Old Edinburgh," a notable feature of the forthcoming Royal Mining, Engineering, and Industrial Exhibition on the Town Moor, Newcastle, will be a reproduction of the old bridge across the Tyne. Having stood for more than 500 years, that bridge was destroyed by a flood in 1771. It was largely constructed from out of the ruins of an earlier structure which had replaced the bridge of Hadrian (A.D. 120). Having a tower and portentils at each end, it was, like old London Bridge, crowded with houses. It had also a central stronghold, together with a chapel dedicated to the Virgin. Here, according to Lanercost's "Chronicle," was exposed the right-side quarter of William Wallace. In later times the remains of an Earl of Northumberland and of other worthies were similarly displayed. Some authentic representations exist to serve as a pattern for this bit of old Newcastle-on-Tyne. The model, being about 110 yards long, and carried upon nine or ten piers, rising 20 ft. above the water-line, will be thrown across a lake in the Elswick Grounds, recently hought and enclosed by the Corporation. It is expected that the cost of construction, some 3,000*l.*, will be recouped by the letting of shops to be opened on the bridge itself. The existing hydraulic swing bridge was opened in 1876.

IF the Institute of Painters in Water-Colour would hang three hundred works in their centre room, instead of hanging more than a thousand over the walls of their three large rooms, they could make a much better and more high-class exhibition. As it is, there are three rooms containing a quantity of mediocre works, and a good many that are less than mediocre, from among which the minority that possess force and originality have to be painfully picked out. Sir James Linton has an effective and beautifully-executed work, "My Tableau of 1885" (609), representing the Emperor Maximilian visiting the studio of Albrecht Dürer; but judging from the architectural character of the room and the dimensions of the one small window shown, it is not very apparent where Dürer gets the light for his work. Among other figure subjects may be mentioned "Little Dorrit's Visit to her Sister at the Theatre" (625), by Mr. C. Green; the face of the little heroine is a very refined and pathetic study; Mr. Henry Stock's "Love's first Dart" (35), one of his ideal fancies, pretty in sentiment and fine in colour; his other one, "Musician invoking a Sea Nymph" (602), is spoiled by the ugly figure of the man; Mr. Dodd's "The Inglorious Arts of Peace" (469), some military men engaged in cooking, is a brilliantly-painted interior, with figures very well drawn and studied,—there is a want of point in the subject. This objection cannot be urged against Mr. Joseph Nash's "The Miser's End" (808), a tragic scene enough of the interior of the miser's room, with a cold dawn breaking in, papers strewn about the floor, and the chair and its deceased occupant overthrown; the idea is perhaps a little staid, but the picture is effective and striking. Mr. Walter Langley's "Betrayed" (974), a village scene in which the central figure is a woman who walks down the street and is the gaze of the villagers, is a drawing with a subject, rather deficient in the detailed treatment of the figures. Mr. Hugh Carter, in his "Scene from the Legend of Montrose" (884), is taking up a new type of subject; the figures are rather wanting in force both of execution and expression; his peculiar style is better suited to the subjects from rustic life which he has hitherto painted. One of the finest works there is a picture illustrating the pathos of animal life: an old white horse has fallen over, dying, after tugging the plough to "The Top of the Hill"

(161), his companion looking down on him with that dull puzzled sympathy which an animal sometimes shows towards another in distress. Mr. Walter Severn has been making another of his brilliant experiments, "Sunlight on Clouds and Sea" (243), very real in parts, but alas! what can white paper do with the dazzling glitter on the water, between the eye and the sun? There are several of Mr. Knight's highly-elaborated, but rather cold and mechanical, landscapes; some very fine works in a higher artistic key, by Mr. Cotman, "Moston Church" (235), "Cley Church, Norfolk" (429), very fine and broad in style. Among other landscapes may specially be mentioned, "A Rainy Day" (408) and "A New Neighbourhood" (72), by Mr. Alfred East; "Setley Heath" (174), by Mr. Wimperis; "A Windy Day on the Moor" (388), by Mr. R. Carrick; "Going to Fold" (527), by Mr. Edwin Dale; "A Shepherd and his Sheep" (573), by Mr. G. F. Wetherbee; "A Sandy Bay" (791), by Mr. C. E. Holloway; "Passing Showers" (114), by Mr. W. A. Ingram. All these are landscapes with true feeling for nature in them, contrasting with such a piece of hard-mannered mechanism as Mr. Fahey's large "Sunset, Martham Broads" (899), the sort of thing which gets an honoured place at the Institute. Mr. Napier Hemy seems to have a new kind of sea, which is not at all equal to his old ones. Among works specially architectural are a fine drawing by Mr. Fulleylove, "An Italian Garden" (681), not possessing, however, the force and depth of colour of some of his works; a Spanish Patio (468), by Mr. Macquoid; Mr. Cyrus Johnson's "Stratton, Cornwall" (254); Mr. R. Barratt's "Library Door, Siena Cathedral" (536), and Mr. R. Dudley's "Fountain of Charles V. at the Alhambra" (32), a very nice bit of architectural representation.

THE Metropolitan Board of Works have adopted a recommendation of the Bridges Committee, based on a report of Mr. Baker, that Lambeth Bridge should be extended and repaired, and the wire cables anchored in the new work, at a cost of 4,000*l.* It was stated in connexion with the report that "the bridge as originally designed was of less strength than was required as a public and not a toll-paying bridge." Thus it will be observed that the abolition of tolls on bridges sometimes involves questions other than those of financial policy merely.

IT is stated that an American gentleman has secured Mr. Herbert's original painting for the fresco in the House of Lords of "Moses bringing down the Tables of the Law from Mount Sinai," and that the artist has been commissioned by the same gentleman to finish the series originally contemplated for the House of Lords, "The Judgment of Daniel," "The Judgment of Solomon," and "The Sermon on the Mount." These paintings, it is understood, are to form "the nucleus of an art college" in the United States. Admirers of the artist's recently exhibited works on the walls of the Royal Academy will, no doubt, realise what an artistic benefit is thus about to be conferred on the fortunate but as yet unnamed locality in the United States.

#### SOME NORFOLK FONTS.

AMONGST the many fine fonts to be found in Norfolk, some of the finest are those in the north-west portion of the county. Although the subjects carved on them are usually the same, yet there are probably not two exactly alike in composition. They thus afford examples of the versatility of the Medieval designer, even when his stock of subjects was necessarily somewhat limited. On the richer fonts the bowl is generally ornamented with groups of figure sculpture,—often the Seven Sacraments and the Crucifixion. Others have seated figures, while the plainer kind usually have either traceried panels, the emblems of the Franciscans, shields with emblems of the Passion, or other simpler modes of decoration. Colour has also been largely used,—blue, red, and green remaining on the ground-work of the sculptured

panels in many cases. The number of steps varies from three downwards, and there are many examples that have lost their steps altogether. Undoubtedly the finest example of a Perpendicular font in Norfolk, — and perhaps in England, — is that at Walsingham.\* The font itself is octagonal in form, with an ogee-headed niche on each face of the howl containing the Seven Sacraments and the Crucifixion. (It may be here noted that in most cases the Crucifixion occupies the side facing west). At the angles are pinnacles which were once supported by angels, now destroyed, while above the niches is a cresting, and below them an embattled moulding. A single patera occupies the space between the angels in the large hollow moulding of the lower part of the howl. The stem is richly ornamented with niches, having four seated and four standing figures (the latter with scrolls), and at the angles smaller niches, on the pedestals of which stand angels. The plinth is bold and plain, but relieved by paterae on four faces, and on the other four broken by the intersection of the figure pedestals. The steps, three in number, have their risers richly panelled with quatrefoils and other tracery, the upper step being in the form of a Maltese cross. The height of the font is 3 ft. 9½ in., the diameter of the bowl 2 ft. 6 in., and the height of the steps 3 ft., giving it a total height from the ground of nearly 7 ft.

Not far from Walsingham is East Dereham, which possesses another fine font. As at Walsingham, the Seven Sacraments and Crucifixion occupy the eight sides of the howl. Instead of pinnacles at the angles, however, are small niches, containing figures of seraphim. These niches are supported by ribs which rise from columna at the angles of the stem. Arches are thrown across underneath the carved panels, and below are angels, with hands together, in the attitude of prayer. The stem has a single standing figure, under a vaulted niche (the canopies are broken away), and below, round the plinth, are seated figures in cows, and three out of the four of the evangelistic symbols. The winged hull of St. Luke is not, for some reason, given, and the angle shaft of the stem merely finishes with a base mitreing on the plinth in the usual way. The great height of this font, 4 ft. 9 in., necessitated a raised step for the officiating priest. This is placed on the west side, and consists of an oblong block, 2 ft. by 1 ft. 6 in., and 1 ft. 4 in. above the upper step. There are two steps, the upper one panelled with quatrefoils, and the lower one plain.

Other examples of a similar kind occur at Walsoken (fig. 1), which has shields bearing at



Fig. 1.—Walsoken.

emblems of the Passion at the angles of the plinth; Binham Abbey, where the Crucifixion is not given on the west front of the bowl, but some other group now too much worn to be made out; Cley, now much worn, and plainer in character; South Creake, an example approaching that at East Dereham in general arrangement, but without seated figures round the plinth, and retaining considerable remains of colour; and others.

\* See lithograph plates in this number for illustrations of fonts at Walsingham, East Dereham, and Leverington.

Fonts of the second kind,—those which have the emblems of the Evangelists in the panels of the howl,—occur at Wymondham, Blakeney, Fakenham, and other places. There are one or two very fine examples of this type near Norwich. Of these probably the font at Wymondham is the finest, but it has been very much defaced. The bowl has the symbols in four panels, and the other four are filled by angels holding shields, one shield being charged with three crowns. At the angles are pinnacles, and the bowl is supported by angels, whose wings cross each other. The stem has, below an embattled moulding and a row of paterae, eight pedestals on the plinth, four having lions seated on their haunches, and four standing figures. The total height of the font is 3 ft. 11 in., and it stands on three steps.

The font at Blakeney (fig. 2) is of the same general design, but without the seated figures at

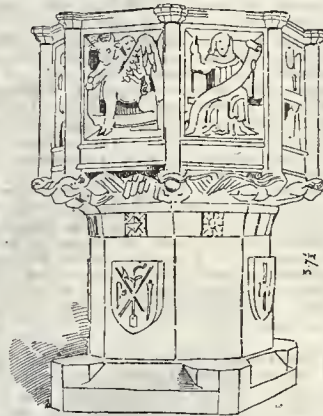


Fig. 2.—Blakeney.

the base, and has shafts at the angles of the howl instead of pinnacles. Shields bearing emblems of the Passion occupy four sides of the stem, and the plinth itself is square, having four pedestals at the angles, which bear no traces, however, of ever having had figures on them.

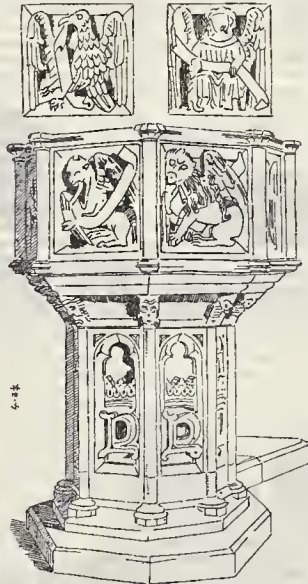


Fig. 3.—Fakenham.

The howl at Fakenham (fig. 3) is similar to that at Blakeney (fig. 2), the panels being vigorously carved. The howl is here supported by grotesques, which have a much earlier appearance than the rest of the font,

and the stem has a panel on each face, in which is carved the monogram, "D.L." with a ducal coronet above,—referring to the connexion between the Church and the Duchy of Lancaster.

The example given from Leverington is, although strictly in Cambridgeshire, one of the Norfolk type. It has seated figures round the howl, instead of groups, with bold pinnacles at the angles, supported by angels; a row of canopied figures round the stem, some kneeling; and a plain plinth with paterae on each face. The font is carved out of a soft sandstone, and is much worn.

ON SOME DESIGNERS IN GROTESQUE.\*

In the works of Fantin (his curious little hook was published "à Chastodun, 1619") and of Elias Holl (born at Nuremberg in 1638) we come across another distinct species of grotesque. It is a little difficult to determine to which of the two artists the quaint design, fig. 8, should be ascribed: it is nameless in the British Museum collection, but the treatment of the ornament seems to suggest that it is the work of the German rather than of the Frenchman. The design is typical of a great deal of decorative work executed in the seventeenth century. As we indicated in our issue of January 15, Le Blond and many other designers used to cut those of their paterae which were apparently intended for enamelling in white lines on a black ground. The design, looked at as a piece of engraving, was not very beautiful; but a new effect was produced, and it was seized on by a number of designers of grotesques, not because it gave some idea of the result of a design when finished in enamel, but simply on account of its bizarre appearance. The octagonal centre-piece in fig. 8 is, however,



Fig. 8.

apart from its method of execution, a good study of line for linoc's sake: the space is very evenly covered, and the flow of the lines is exceptionally graceful. Fig. 9 is taken from Fantin's hook, and fig. 10 from Elias Holl's; the main idea in both books is the same; there is little sketch of a rustic scene at the bottom of the page, and "in chief" a curious device in "enamel ornament." In one it takes the form of a beetle,—in another of a leaf: in one a simple lozenge,—in another a heart; and in one the drawing is of two sawyers in a saw-pit, the end of the log on which they are at work being ornamented in this way. Holl's book contains twelve plates of the months, the sketch being of the rural occupations characteristic of each.

In the work of Peter Ahnry, a printseller of Strassbourg, who was born at Oppenheim in 1596, we have another curious and grotesque use of decorative forms. From his *Neues Lauberbuschlein Zufinden* we have extracted a specimen, reproduced in fig. 11. The general idea in all the plates seems to be to treat a shrub in a conventional manner in the foreground of a landscape. The lines of the branches are always very gracefully drawn, and spring naturally from the main stem: the leaf much resembles the one with which we are familiar in the work of Aldreger. Indeed, the whole conception seems to have been inspired by Aldreger's designs, more especially those of his first period: the treatment of the plant has a most remarkable affinity with figures 20 and 21 of our issue of December 12th, 1885 (part II).

\* Continued from p. 600, ante.



Fig. 9.



Fig. 10.



Fig. 11.



Fig. 12.



Fig. 13.



of "The Decorative Work of the Early German Engravers"), which are typical of this first period. The disfigurement of the landscape is, of course, Anby's own idea. It is most curious to note how popular this grotesque form of decorative illustration became in the early part of the seventeenth century. Fragments of many books containing them abound, among which are to be noticed those by Baltazar Lemerisier and Hans Georg Mosbach, both published by Baltazar Moncornet in 1623; and that by Pierre Labarre published in 1630, with conventional trees on a much larger scale than Anby's.

But perhaps the most remarkable applications of serious ornament to grotesque purposes are to be found in the extraordinary designs of Wolff Byron von Bismmel, of Nuremberg. We have reproduced two (figs. 12 and 13) of the six which have recently been added to the British Museum collection. They exhibit the most marvellous command of curve-drawing,—every leaf comes away from another leaf, or its parent stem, in a perfect tangential flow. There is not a "dog's hind-leg" anywhere, not even in the dog's hind-leg itself; and there is not a line introduced, with the exception of the pipe and stick, which is not a legitimate line of ornament. The features even of the man's face are formed from the serrations in the leaf,—so, too, are the dog's jaws. The whole of the dog's head is, indeed, a masterpiece of constructive skill. The smoke, too, from the man's pipe comes in for conventional treatment, and forms a link between the early German work and the later French work of Pierre Bourdon, noticed in our issue of Jan. 8.

#### STRAY THOUGHTS ON EDUCATION.\*

We always feel a pleasure in communicating our experience to those who are younger, and when one fancies one has something to say on education, it is fascinating to say it to those who have felt the want of it, and especially to those who have started the only good school of architecture in the kingdom, a school, too, that no one is obliged to attend, so that every scholar is such in fact as well as in name. Every one of such scholars, to some extent at least, knows what he wants to learn, and tries to learn it in the best way he can.

I have always taken a deep interest in education, but I have unfortunately met with few books on the subject of any value. Mr. Herbert Spencer's is at once the best and most original of any that I have read, but that is on general education. He divides education into five heads of decreasing value, as follows:—First, How to preserve your life and health; secondly, how to get your living; thirdly, how to bring up your children; fourthly, how to be a good citizen; fifthly, how to amuse yourself and others. In this last he includes all the fine arts and languages; so it is practically what education used to be. I strongly recommend every one present who has not read his book to read it, though it is not without some doubtful, if not erroneous, matter.

As the general education of the body is to exercise every joint and muscle, so the general education of the mind is to exercise all its powers. In early training the importance of general bodily and mental education cannot be too much insisted on, and this double education should never be wholly relinquished. Most of us, however, have to learn certain particular bodily and mental exercises, partly to get our living, partly to show mankind what we can do, and partly to benefit our fellow creatures.

Architectural education is mainly technical; I might say wholly so, because the art by which the higher emotions are excited in the beholder cannot be taught. The question we have to ask ourselves is how can the powers of each student's mind and body be so exercised as to make him the best architect he can be?

When I first read Adam Smith's "Wealth of Nations," I was struck with this remark that

"Those parts of education . . . of which there are no public institutions, are generally the best taught. When a young man goes to a fencing or a dancing school, he does not, indeed, always learn to dance or fence very well; but he seldom fails of learning to fence or to dance."

The reason is plain, he wants to fence or

dance up to a certain point. So it is with you. A student wants to learn something of construction, or planning, or designing, and he does learn this more or less well.

I particularly wish you to attend to this point, i.e., what *must* be learned. There are many things which it is agreeable to know, and be able to do after one is an architect, but the one object is first to be an architect, i.e., to be able to construct soundly, to plan conveniently, to arrange healthfully, and to design agreeably. Nor can one overlook this fact that there is now an examination to pass before you can enter into that select body of architects that forms the Royal Institute.

The requirements of that examination must have a great influence on your studies, and it is important that there should be nothing superfluous in it.

It is the fashion to talk of architecture as if it were a very easy and simple art, and that unless a man be equipped with many other things besides architecture he has not much to boast of. As Ben Jonson says of the cook, "He is an architect, an engineer, a mathematician, a philosopher"; you may put it down if you please to my incapacity, but I have never been able to agree with this view. You may instance Vitruvius, Orcagna, Brunelleschi, Leon Battista Alberti, Leonardo da Vinci, Michelangelo, or Sir Christopher Wren, and say these men were not only architects, but poets, painters, philosophers, and mathematicians, and what not besides, but these men were rare geniuses who appeared now and then, men of encyclopedian minds to whom the bulk of us are no more to be compared than Hyperion to a Sisyphus. The course should, in my opinion, be rather what the ordinary man proposing to be an architect can reasonably accomplish,—it is of course understood that he does make himself a capable architect,—I was almost inclined to say the average dunce, than to start it on the ground that every man ought at least to know what Wren knew.

Architecture is not one transcendental art, but at least two, science and art, combined with a very large amount of common sense, and one of these is mostly found to belong to a temperament antagonistic to the other, so that a great architect is the rarest sort of genius to be found.

Strong common sense is not infrequently found in persons with great mathematical or with great artistic powers; but you want for a great architect one who has a mathematical mind, refined taste, and artistic invention as well, and the artistic temperament is mostly nervous and opposed to the mathematical.

We may, by stretching the term, call a man a mathematician who has a smattering of plain geometry and algebra, but no sooner do we take up any advanced book on statics than we find we cannot understand it unless we have mastered the differential calculus, and can use it like the multiplication table: yet how few men can master the differential calculus!

In the same way, many men pass their whole term of learning in learning to draw, and even then do not draw very well, setting aside all the difficulties to be overcome in learning to plan, to construct, and to design. There is, too, a vast body of necessary knowledge to be acquired in learning the qualities of materials, and the way they are to be put together. I therefore think we should endeavour to restrict our examination to purely necessary knowledge, and merely allow those who have more capacity to take in as much as they like.

I do not believe you can make a genius out of an ordinary man by any amount of education, but I think that if you will only force and cram a man enough you may turn a genius into an idiot.

Mark Pattison, who had plenty of examining experience, says "accumulated learning stifles the mental powers"; and again, "little did we foresee we were only giving another turn to the examination screw till it has become an instrument of mere torture which has made education impossible, and crushed the very desire of learning."

When the late W. Burgess and I were in Italy we thought a good substratum for an architect would be that he should be able to play the fiddle and hunt, read a Greek play at sight, and be a thorough master of the differential calculus: our ardour was rather damped by the reflexion that both of us would be excluded.

We all know too well the talk of what an

architect should know: he should be a master of English; he should know who designed,—or is supposed to have designed,—every building in Europe, and all the styles of architecture that the world has known; and he should know all history, and at least the Latin, Greek, French, Italian, and German languages; but if we ask ourselves what an architect is wanted to do, we find all this mass of knowledge about as useful as dancing on the tight-rope. A client wants you to build him what he wants conveniently, soundly, and agreeably, and, I need not add, as cheaply as possible. If he asks you to an evening party, and you are young, he likes you to play and dance and sing; if he asks you to his country-house and you are middle-aged, to shoot, fish, and play at billiards; and if you are elderly, to talk well and play a good rubber at whist; but he does not employ you as an architect if all you can do is to waltz, play lawn tennis and amateur theatricals.

The old Duchess of Gordon wanted a cook, and heard that a neighbouring lady was parting with hers, so the Duchess called and asked about the cook. The lady replied, "She is a very decent body." "D— her decency," said the Duchess; "can she cook collops?"

These remarks mainly aim at this:—Is the knowledge of every past style of architecture essential, or is it merely an accomplishment? Is knowing the name, or the supposed name, of the architects of the main buildings of the world essential or not? Did the Arab architects who built the great mosques, palaces, and tombs know who built the Parthenon? Did the Mediæval architects who built the castles, monasteries, and cathedrals know? As we have no national architecture at present, and many of us get our living by tinkering up old buildings in the way they were supposed to be built, I am forced to admit that knowing what mouldings, what ornaments, and what construction people used at certain former periods, may be average ground for enabling some of us to get our living,—but it is archæology and not architecture.

When architects come to be equal to the old Mediæval ones they will not trouble their heads about what their inferiors did, and I think that we might with advantage supplant the present method by asking a candidate how he would make a moulding, or a group of mouldings that would produce a given effect; at any rate, that would employ other powers of mind than mere memory.

I would also abolish the word "style" from the instructions for the design, and say the building is to be made beautiful, imposing, threatening, or what not. We want rather to encourage originality than copying, and considerably more time should be given to this subject than is now allowed. One whole day may be well given to the plan and elevation and another to the practical section and details. In the other questions, too, I would suggest that they be mostly simple and straightforward, capable of really testing the necessary minimum of knowledge, and free from those catch-questions which may have been picked up by an examiner during a thirty years' practice.

I think we lack system in our education. With us all is baphazard. I am not inclined to run this down so much as most people, for "self-taught is well taught," but time may be money, and power too, and if we can teach systematically what is really wanted we can, perhaps, save the time generally lost in blundering about till we find our way.

If it be possible I would have every master (it is the fashion to call them "Professors" now) an architect, because he will be most likely to hear in mind what is wanted for an architect.

I cannot too strongly insist on having the most able man that can be got for each master.

The Jesuits were, I believe, the best school-masters the world has known, and they always put their best and most learned men to teach the elements. Good habits are most important, and the man who is deeply versed in his subject knows what is most likely to be of the greatest ultimate use.

Professor De Morgan used to say, that in teaching algebra, it should be so arranged that it rendered the after-learning of the differential calculus easier; but there is also this to be said, that a man ought to have the gift of teaching, or at least of making people learn. Doubtless, one of the great things is to make each man use his brains as much as possible, but if you

\* By Professor G. Aitchison, A.R.A., being a paper read before the Architectural Association on the 22nd inst., as elsewhere mentioned.

† Education. By H. Spencer. 8vo. Williams & Norgate, London and Edinburgh. 1861.

‡ Book v., chap. 1, p. 168. 8vo. London, 1729.

master has not the gift of teaching he is too apt to be like the man with the seven-leagued hoots, at his first step he is out of sight, and this is discouraging to all but the aptest and most robust scholars; but even such a man is much better than a teacher who is only one or two steps in advance of you,—he cannot really teach you anything but bad habits. I think that practical geometry, stereotomy, and stone-cutting are shamefully neglected amongst the English architects.

All the great architecture of the world has had geometry for its basis, and I fear little that is great and good will reappear until architecture has been again based upon it.

What the architectural teaching in the Middle Ages was is unknown to me, but we all know its results. That geometry in a practical form must have been well known both to architect and mason can be deduced from their work with as much precision as a proposition in Euclid, and we know too that most of the architects were called stone cutters.

The Bons who came from France to build the Ducal Palace at Venice were called stone cutters. Longhena, the celebrated Venetian architect, who was not born until the end of the sixteenth century, was the son of a mason, and carried on the business till his death.

Although T. Hope says that some descriptive geometry was used by the Medieval architects for getting the thrust of their vaults, and Viollet-le-Duc also gives a diagram of this method of ascertaining thrusts, it is probable that their great skill in construction was mainly due to experience, observation, and daring. In the twelfth century, in France at least, a good many of their buildings fell down or went to ruin. If the architects mostly rose from the mason's hanker, they were possessed of practical experience as to the quality and behaviour of various sorts of stone, and I look upon it that they acted as a chair-maker does now,—be has stock scantlings for chair-frames, and he lightens them till some chair gives way; but nowadays we have analyses and easy means of testing the strength of materials, but at the same time we are absolutely without the practical experience and that close knowledge of the materials that these Medieval architects had, and we lack their close reasoning, inventiveness, and daring in construction. Every man preparing to be an architect should be able to solve the statical problems of how thick an isolated wall should be in proportion to its height, to resist the force of wind, to bear a given weight, and to resist a given thrust, the formula for the resistance of uprights to a downright weight with the coefficients for brick, stone, iron, and timber, the pressure of water against the sides of a tank, the thrusts of arches, groined vaults and domes, the statical problem of girders, trussed and otherwise, and of roofs.

There is a shocking want of any good text-book on this subject. There wants to be one made for architects, not only clearly explaining the reasoning and giving the formulas, but working out practical cases in various materials. Is there any book that gives the problems of stone and brick spires, both vaulted and corbelled, or of tall chimney-stacks?

In the same way there wants to be a good text-book for practical geometry, stereotomy, and stone-cutting.

South Kensington has published a book in three volumes on building construction and materials, but I cannot say what its value may be.

An architect must know the main qualities of the principal materials he uses, and how mortars, cements, and concretes are made, and what weight they will bear, after what time; and he must know enough about the methods of putting materials together to ensure safety and success.

He must know, too, the main principles of healthfulness in buildings, and the proper methods of ensuring the results. There must also be added to all this, some of those subjects which are commonly called professional, that touch on the law of contracts, of rights, of easements, and those laws made expressly for buildings.

I would hold forth for your admiration and imitation, the engineers; they had a new material to deal with,—Iron. And by logic, science, daring, and invention they have built structures that rival those of the Middle Ages in lightness, originality, and daring, but the engineers have eliminated beauty from their structures.

The art of planning is primarily the use of common sense directed to this particular object, but after examining many plans of similar buildings we see, that some are much better arranged than others merely as plans, and we also see that amongst the great architects some with this added, that they were more original and effective, and lent themselves to exterior features that are striking or impressive.

Amongst English architects, the plans of Wren and Vanbrugh are excellent and original, and so are those of Soane and the late Sir Charles Barry. Longhena's Sta. Maria della Salute is a marvel, and M. Cbas. Garnier's plan of the Opera is admirable.

The way of teaching, or the way of learning, how to make things beautiful is a different matter altogether.

The English are born constructors, but during the latter part of their career, excluding the present time, we could hardly venture to say that they were born artists.

I think that we may fairly say that proportion is the soul of architecture. How is proportion to be taught? The Greeks had by experience found that certain proportions were satisfactory, and had noted them down as we learn from Plato and Vitruvius, and we try to cultivate our eye, by drawing out Greek buildings and their parts, by calculating their proportions and by studying them, or casts of them, and we pursue the same plan with all buildings, the fame of whose proportions has been accepted by successive ages. And when we are more advanced we apply the same means to ascertain the proportions of those we admire, and we paraphrase them; we also try to improve our sense of proportion and beauty by the study of nature, in every one of her manifestations.

Doubtless man and flowers give us the most beautiful instances, but lessons are to be learned from animals, from trees and rocks, from the heavens and the waters.

On the road to Amalfi there are series of rocky points that at a distance look like the spires and pinnacles of some Gothic town.

"Mouldings," says Viollet-le-Duc, "are architecture." By studying the Greek mouldings we learn the infinite trouble taken to make them elegant and effective, and they are without doubt the finest that the world has seen, but they were made for a sunny climate, and were executed in marble, and are ineffective in England,—absolutely so when the sun does not shine. I think we cannot study them too closely, not for imitation, but to learn the causes of their success.

When the early Renaissance architects tried to give some of the grace and elegance of the ancients to their buildings, they were delightful; but when the later architects raised the Roman orders into divinities that could only be dumbly imitated, their buildings rapidly sank into dreariness and insipidity, and only emerged from it to fall into contortion.

I must perforce boid up the Saracens and the Mediaevals for your imitation, as regards their mental attitude. When they began to build they were little better than barbarians, and what the Romans had done appeared to them to be the work of enchanters; but they soon surpassed their masters, and you can readily fancy with what contempt the architect of the honey-comb domes at the Alhambra, or the architect of St. Urban at Troyes, or of King's College Chapel at Cambridge, looked down on the Roman architects. The works of these Saracens or Medieval architects were like Newton's "Principia" to his seventeenth-century contemporaries; the question was not who else could have written it, but how many people in Europe could understand it when it was written.

We have plenty of examples of artless buildings now in houses and warehouses, which are simply dead walls with holes in them; the question for us is, how can we make them beautiful without copying? We have wood posts and girders and trussed roofs. What can we do to turn these into beautiful objects? Each one of you may possibly say, if I could make these things beautiful to my own taste, how can I be sure that any one will like them? You cannot be sure, and therefore the only hope for architecture is that those who have this noble ambition will consider it to be its own reward; it is only by this self-denial and devotion that any art, calling, or occupation can be ennobled. Read Brunelleschi's life. This able sculptor was ready to travel to Rome and gain his living as a goldsmith, so as to be able

to study Roman ruins and the Pantheon, and to ponder how the cathedral at Florence could be domed. He met with success, and became immortal; but he might have perished unknown in his attempt,—"unwept, unhonoured, and unused."

When I was a pupil all the architectural instruction that was to be had was in an office; books were rare, and the teaching at the Royal Academy was confined to six lectures, and a permission to draw from the antique. Thanks to the Royal Academy, the Royal Institute of British Architects, and to South Kensington, books are only too plentiful; there is some teaching, and a good deal of direction, and, thanks to yourselves, there are the means of supplying in some measure what is deficient elsewhere.

In common justice, I must say the young architects of to-day have in certain respects made a noble use of their opportunities, their powers of delineation are such that in my youth all the architects would have crowded to see them as they did to see the drawings of Barry, Cockrell, and Pugin. The best of them would have been snatched up as illustrators of books. The architectural skill, too, exhibited in private buildings is as delightful as it is extraordinary, and all that seems to me to be wanting is more thorough and systematic teaching, a greater unanimity in the choice of a type, so that all the isolated and divergent energy of the profession may be applied in one direction to the furtherance of our art, that a greater determination to invent rather than to paraphrase may show itself, and that more attention may be paid to the perfecting of monumental art.

I trust that some of you gentlemen will find time to attend the discussion on teaching at the ensuing Conference meeting, and will give us in short any matured judgment you may have formed on the subject.

[For a report of the discussion which followed see p. 654.]

#### HENDON DRAINAGE WORKS.

THESE new works, constructed at a cost of 60,000*l.*, were opened on Saturday last, and the Local Authorities were able to signalise the occasion by securing the presence of Mr. Gladstone, who is residing in the neighbourhood, at Dollis Hill, and who made a speech on the vast improvement in the public health of the country, and the energy and enterprise displayed in the construction of improved systems of sewage disposal within the last few years. The Hendon scheme is on what is known as the lime and filtration system, though there are special features introduced with the view of securing even a greater degree of efficacy than that hitherto attained. It may be mentioned, in the first place, that the system provides for the drainage disposal of the sewage of Hendon, Childshill, Cricklewood, Golder's-green, and Temple Portane. The total length of the sewers is 14½ miles, and they vary in size from a 3 ft. circular brick to a 9-in. pipe sewer. The whole district contains 8,382 acres, and the rateable value is 101,000*l.* The population in 1881 was 10,484, but the scheme provides for a population of 24,000*l.* At the works, which have an effluent outfall into the Brent, the coarse solid matters are removed by straining; lime is introduced for the purpose of defecation and precipitation of some of the organic matters, and the resulting suspended matters are removed by settlement in tanks; the effluent water from the tanks is purified by filtration through specially prepared beds.

At Hendon, lime is, as already stated, used, but differently from the lime treatment pursued elsewhere. It has been considered that the addition of what is called "milk of lime" is not so effectual as if the lime added is lime water, because it is only dissolved lime, or that in solution, which is effectual. All sewage is highly charged with carbonic acid, and the particles of lime in the milk of lime combine with the carbonic acid, and form a coating of carbonate of lime on the outside of the particle which is insoluble, and the lime cannot enter into solution, and is prevented from doing its work. At Hendon works, one-sixth part of the whole sewage is withdrawn from the carriers, and pumped into a continuous mixing vessel, provided with agitating arms. Then milk of lime is added containing lime equal to 15 grains per gallon of

the whole sewage, or 90 grains per gallon of that passing through the lime-water mixing apparatus. The lime is thoroughly dissolved, and the lime-water so obtained is added to the remaining five parts of the raw sewage, mixed by a salmon ladder arrangement, and run into one of the settling-tanks. After five or six hours' rest in the tanks the effluent water is run on to the filter-beds. The sludge is pressed into portable cakes by Messrs. Johnstone & Co.'s presses. The effluent from the filter-beds is discharged into the Brent.

The quantity of lime used for treatment is a little less than 2 cwt. for every 100,000 gallons of sewage entering the works, and about 100 lb. of lime for every ton of compressed cake turned out from the presses.

The annual cost of working the whole system is estimated at 570l. The method of precipitation by lime, supplemented by land filtration, adopted at Hendon was recommended by Professor Frankland and Dr. Stevenson, and approved by Dr. Dupré. They consider that no addition to the lime in the shape of sulphate of alumina is necessary when precipitation is supplemented by land filtration. To carry out the recommendation of properly dissolving the lime in one-sixth of the volume of sewage and afterwards mixing it with the remaining five-sixths required specially-designed machinery, which has been manufactured by Messrs. Johnstone & Co., of Stratford. Some difficulty was experienced when it was discovered that the site of the proposed filter-bed consisted of a stiff clay; but the difficulty has been overcome by the engineer, Mr. Cousins, by placing in the bed 14 in. of burnt ballast, with tranches of that material at intervals, averaging 5 ft. 6 in. in depth; and on the surface 1 ft. of mould. The beds have an area of 30,300 square yards. Mr. Harry Smith, of Chiswick, was the contractor for the works, which have been carried out in a substantial manner. It may be said that the general outline of the scheme was designed by Mr. Pollard, the former engineer to the Hendon Local Board, but many important alterations have been made, and the scheme completed, under the superintendence of Mr. Cousins.

#### CRYSTAL PALACE SCHOOL OF ENGINEERING.

THE Easter term closed on Saturday by the delivery of the report of the examiners on the students' work for the term, and the presentation of the certificates awarded. Sir Robert Rawlinson presided and presented the certificates. The report of the examiners, Messrs. W. Crickman, C.E., and W. Lawford, C.E., having been read.

The chairman addressed the students. This, he said, was the third occasion of his having had the pleasing duty entrusted to him that he had again to discharge. It gave him great pleasure to come amongst the young men, and if any words of his could give them stimulation and encouragement in their work, his doing so would give him personal gratification. Some young men, and elder people also, were disposed to regard the future as a gloomy prospect, and sometimes the discouragement was natural. He advised his young friends to hopefulness. The world was not to be taken by storm; ability, patience, perseverance, and steady application, would succeed in the end. He would advise them not to be too particular as to what they might get to do at first, nor to think they could pick and choose, accept this and reject that, at their pleasure, but to take any honest, honourable, manly work, which was no disgrace to the son of either prince or peasant, that might come in their way, and what their hand found to do, to do it heartily. Vast fields were open and opening for the employment of young engineers of capability and worth. Japan had begun, China was beginning to require their services, they had the fields of India, Barmah, the Australasian colonies, North America, South Africa. Sanitary works were needed in all of them; in some water-supply was an urgent want, roads, railroads, and harbours had to be made, and structures of all kinds had to be put up. In these the young engineers of this country, and of this school, would find ample scope for the employment of their best powers. He hoped that in their future career his young friends would sustain the reputation of England for honour, probity, and truthfulness.

The reports of the Examiners on the students' lecture examination and work done during the term were in highly commendatory terms. They also ascribed unqualified praise to Mr. Wilson, the Principal, and his staff, for their excellent methods and great pains taken with their pupils. The lectures for the term were on "Steam." Twenty-eight of the students were eligible for examination, of whom sixteen received certificates. B. G. Lloyd was first with 238 of an attainable 277 marks. In the drawing office nine certificates were awarded, E. C. R. Nelson first; in the pattern and smiths' shop, ten certificates, J. S. Lea first; in the fitting-shop, ten certificates, J. H. Chute first, also second for lecture examination, with 211 marks. In the Civil Engineering Section, five certificates were awarded for students of the first term; general surveying and preparation of plans for Parliament, W. E. Underwood, first; second term, calculations, plans, and estimates for a railway and dock, eleven certificates, E. J. Prew, first; third term, designing and construction of existing and other engineering works, twelve certificates, F. B. Dixon, first; fourth term, sanitary work and water supply, three certificates, H. A. Minchin, first. Four first-grade and two second-grade certificates were awarded in the Colonial Section. To J. F. Harrison the examiners awarded the Bronze Medal of the School of Art, Science, and Literature. Of the students who have passed through the School, 151 have become Students, and 53 have been elected Associate-Members, of the Institution of Civil Engineers.

#### ARCHITECTURAL SOCIETIES.

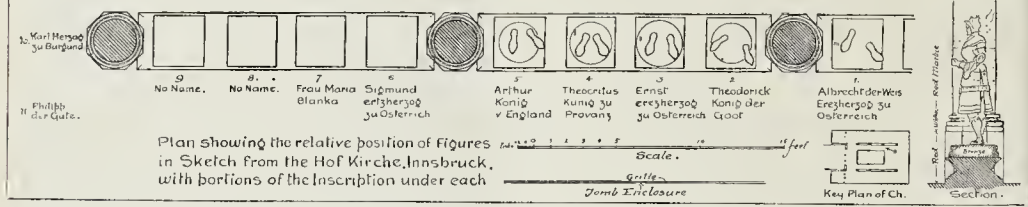
*Leeds and Yorkshire Architectural Society.*—The annual meeting of the members of this Society was held on the 21st inst., the President (Mr. C. B. Chorley) in the chair. The Secretary (Mr. E. J. Dodgshun) read the eleventh annual report, in which the Council stated that they saw cause for congratulation in the steady increase in the number of the Society's supporters, and the greater influence which it exerted from year to year by co-operating with other societies for the advancement of architectural education and professional practice. The name of the museum were gradually being more fully understood by the public, and members and exhibitors alike were making use of the facilities which the institution offered. The trades' catalogue library was maintained in efficiency. The sanitary exhibition was open to further extensions. The library had received more attention, a donation of 20l. from the funds of the society, and a gift of 5l. 5s. from Mr. C. R. Chorley having been made. The Council was also indebted to its honorary treasurer (Mr. J. B. Fraser) for a very valuable gift of four large cases of timber samples, together with a MS. descriptive catalogue, which was being printed by the Society. Other members had also made contributions of books. Now that Her Majesty had granted a supplementary Charter for the purpose of effecting certain reforms in the constitution of the Royal Institute of British Architects, the Leeds Society were anxiously looking forward to changes which would enable all provincial architects to benefit more fully from a connexion with the Institute. The Hon. Secretary, Mr. G. B. Bulmer, having resigned, his resignation was accepted with regret, and the best thanks of the Council, on behalf of the Society, were tendered to him for his valuable services during the last four years. Mr. E. J. Dodgshun had been appointed as his successor. On the motion of Mr. J. W. Cannon, seconded by Mr. J. Rhodes, the report was adopted, after which officers for the ensuing year were appointed, including Mr. Chorley as president, Mr. J. B. Fraser as treasurer, and Mr. E. J. Dodgshun as secretary.

*Northern Architectural Association.*—The annual meeting of the Northern Architectural Association was held in the Old Castle, Newcastle, on Tuesday afternoon, Mr. E. Shewbrooks presiding, in the absence of Mr. Hoskins, President. Mr. Frederick Clark and Mr. W. J. Moscrop, jun., were elected members of the Association. The Hon. Sec. (Mr. F. W. Rich) read the report of the 28th session, which stated that reference was made in the last annual report to the probability that, owing to the revision of the rules, the roll of members would be increased, and the committee were

glad to announce the fact that since that date twenty-one members had been added to the roll,—viz., four members, eight societies, and nine students,—and on that day six more members stood for nomination, and two for election. Eight excursion meetings were held last summer,—to New Town Hall, Middlesbrough, Raby Castle, Elswick Works, residence of Captain Andrew Noble, C.B., Jesmond Dene House, and residence of the Hon. Secretary. Sketching meetings were held at Hexham Abbey, Seaton Delaval Hall, Ryton, and St. George's, Cullercoats. The question of federation or registration had engaged the attention of the committee, and they had the pleasure of reporting that the President had been appointed a member of the Special Federation Committee on the Royal Institute of British Architects. It was decided to offer prizes to students for excellence in design and construction. The treasurer's statement showed a small balance in hand. The Chairman, in moving the adoption of the report, said that the Association promised to prosper. The designs which had been sent in reflected great credit on the young gentlemen who had competed. It must also, he thought, be a matter of gratification that they had got at least the nucleus of a library. The report was adopted, and after the transaction of formal business the meeting terminated.

*Edinburgh Architectural Association.*—The members of the Edinburgh Architectural Association visited Dirlton Castle on Saturday afternoon last under the guidance of Mr. David MacGibbon. The conductor first drew attention to the exterior of the castle, and pointed out the advantages of the site for defence, the wall being built on a rock, which, although not lofty, was too hard to be undermined, and the whole being surrounded with a wet ditch. This was crossed by a long wooden gangway, the stone pieces to support which still exist, and part of which formed the drawbridge. The oldest parts of the buildings date from the thirteenth century, and formed a portion of the castle which was besieged and destroyed by Bishop A. Beck in 1298. These consist of three large towers at the south-west angle, and a part of a tower at the south-east angle, all the details of which belong to that period. The castle was rebuilt, to judge from its style, in the fifteenth century. The entrance gateway with the portcullis room above, the hall and other buildings on the east side, are all parts of this restoration. The hall has been a splendid apartment, 72 ft. by 25 ft., with screen and minstrels' gallery at the south end, and the dais and lord's apartments at the north end. The kitchen is on the same level, and has a very lofty vault with aperture for ventilation. It is provided with two large fireplaces and a good service-room; below this are the bakehouse and wine-cellars. Under the lord's private room are guard-room and dungeon. In the sixteenth century a private dining-room and other apartments were erected at the south-west angle of the courtyard,—dining in the hall being then given up. The gateway in the outer enclosing wall and the dovecot were pointed out as deserving of notice. Dirlton belonged in the thirteenth century to the De Vaux family, whose heiress brought it to Sir John Halliburton. His grandson, created Lord Halliburton in 1440, was Lord Treasurer for Scotland, and the castle was probably restored by him. In 1603 the property was conferred by James VI. on Sir T. Erskine, who saved the king in the Gowrie conspiracy. It afterwards passed into the hands of Sir James Maxwell, and in 1663 was purchased by Sir John Nisbet, who, as Lord Advocate, bore the title of Lord Dirlton. The castle still remains in the possession of his descendant, Lady Mary Nisbet Hamilton, to whose taste and liberality the public are indebted for the careful preservation of the buildings and ready access to the beautiful gardens which surround them. At the close of a very enjoyable day a hearty vote of thanks was accorded to Mr. MacGibbon for his interesting paper.

*Paisley.*—The infirmary which for many years has served the wants of the burgh of Paisley has of late seen found altogether inadequate to meet the demands made upon its resources, and increased accommodation has become an imperative necessity. At present the accommodation of the infirmary is limited to about 120 beds, and the directors propose to add 80 to this number, which would entail an outlay of about 8,000l.



Illustrations.

EDINBURGH CASTLE: A SUGGESTION.

The lamentable state of the buildings which compose Edinburgh Castle, as they are now and have been for the past two hundred years, is a standing disgrace to the country. Perched in mid-air, in one of the most prominent positions of any building, ancient or modern, in the world, they stand in the most abject state of desolation as regards architectural beauty. What they were in ancient times can to a great extent be gathered from drawings which have from time to time been published; and the accompanying suggestion is intended to show what might be done to make the present uncouth mass more presentable and more worthy of its past glories and traditions.

The side represented is by far the finest view of the castle, and is taken from a south-east point, somewhere about the position of Heriot's Hospital. It shows the royal apartments or lodgings in the south-east angle, with the Half-moon Battery on the east, and the old Parliament Hall to the south.

This Hall, so rich in historical memories, has been sadly ill-treated from time to time, and is now cut up by floors and partitions, and serves as a hospital for the garrison. The author of the accompanying design (see phototype plate in this issue) had the privilege of examining it through the courtesy of the Engineer officer in command a year or two ago, when alterations were being carried out in the interior, and when some curious discoveries were made in the wall-paintings and floors. Much of the old open roof framing was then exposed from the interior, showing the early fifteenth-century work, very much shorn of its ornament; an enriched stone corbel remains supporting one of the principal rafters of the roof; it seems to be of a much later date than the roof, being decidedly Classic in its character; it is possible that the early and severe corbel may have been carved in this style when the more modern additions were made to the castle in the sixteenth century. The south side of the Parliament Hall is at present disfigured with a corbelled-out erection used for latrines and other sanitary provisions connected with the hospital, and from it an external drain, composed of huge cemented clay-piping, coils its unsavory way down the venerable rocks like an enormous serpent. All the windows of the Hall are blocked up or removed, and the outer roof has sunk below its old level, and is broken up with a row of storm windows of a decidedly workhouse character which peep over the old corbelled parapet. In the drawing all this has been removed, and the large millioned windows have been restored.

The Royal Lodgings, being, as their name indicates, the domestic portion of the castle buildings for the use of the royal household, extend from the east end of the Parliament House round the south-east corner, and terminate at the Half-moon Battery, built by the Regent Morton. These buildings are of several periods, the lowest portions consisting of dark stone arched vaults cut on one side out of the solid rock, which also crops up in the floor, which is simply the virgin rock roughly levelled. These vaults were used as dungeons, some of the iron rings to which the unhappy prisoners were chained still remaining in the walls. Many of these lower vaults and those below the Parliament Hall and in the block of buildings beyond are of a very early date, and are, in all probability, part of the buildings of a very early period. Several curious, straight, narrow stairs, made in the thickness of the walls, lead up to the rooms overhead. The upper part of these walls is mostly of fifteenth-century work.

\* We are not, of course, responsible for Mr. Lyon's opinions or suggestions.—Ed.

although repaired and added to in the sixteenth century, the most modern part being that over the Half-moon Battery, which is dated 1613.

All these buildings are shown with a new roof of a picturesque and varied skyline. The oriels have been restored and the upper part of the buildings generally adorned with corbelled-out parapets, gargoyles, turrets, crows-stepped gables, and details of the sixteenth-century Scottish baronial architecture, all the lower portions of the buildings being left untouched. The more modern part of the Royal Lodgings has been raised by the addition of a high-pitched roof with dormer windows in place of the old flat roof, the angle turrets being finished with ogee terminations.

At the back of the Half-moon Battery is shown a restoration or rather rebuilding of David's Tower as near its original site as possible. This tower was built by David II. about 1380, and was for long the most conspicuous object of the castle buildings, but was hattered down in Drury's siege of the castle in 1573.

The parapets below the Parliament Hall have been restored in accordance with the rest of the proposed work above, and a large circular tower placed on the corner of the block beyond the Parliament Hall to the west. Beyond this, again, is seen the hideous block of barracks erected at the end of the last century. It is proposed to improve this by throwing out towers breaking the monotony of the line of buildings somewhat in the manner of Fyvie and Saltcoats Castles.

WALTER F. LYON.

IN THE HOF-KIRCHE, INNSBRUCK.

We give a reproduction from a drawing by Mr. W. J. N. Millard of the celebrated Tomb of Maximilian I., in the Hof-Kirche at Innsbruck, or rather of a portion of the remarkable group of bronze figures of kings and heroes which surround the tomb, and to which mainly it owes its fame. There certainly never was a more weird or poetic idea in relation to monumental design than that of surrounding a tomb



The Figure of King Arthur, Maximilian Tomb, Innsbruck.

with this guard of solemn, silent, bronze figures, standing as if they had taken up a position for the moment round the tomb to do honour to the remains of the monarch buried there.

The tomb, which is itself adorned with delicate sculpture, and enclosed, like our

Henry VII.'s tomb, with a high grille of elaborate metal work, stands in the middle of the nave, whilst between the columns of the arcade are ranged the attendant figures, face inwards, twelve on each side, with two couples more flanking the entrance to the chancel. The small plan subjoined shows the positions of the figures in the plate, No. 1 in the plan being the foreground figure. They are all gorgeously clad in full armour or dress of the richest description, though as statues they are not all equally well conceived and modelled. In fact, there is something almost grotesque in the pose and general treatment of several; but conspicuous among the company for spirited action combined with fine execution, stands "Arthur König v. England," as runs the legend inscribed beneath him,—a figure of which Mr. Millard gives a separate sketch, and which may well cause an Englishman a passing sensation of pride in being represented at the tomb of an alien monarch by so gallant a knight.

The pictorial effect of the great dark bronze effigies and the polished red marble columns together, opposed to the light streaming in from behind them, is not to be readily forgotten.

FONTS.

For a descriptive article relating to the fonts shown in our lithographed illustrations, see "Some Norfolk Fonts," p. 632.

PREMISES IN BROOK-STREET, HANOVER-SQUARE.

This block of buildings has just been erected next to the gabled house at the corner of New Bond-street, and advantage has been taken of the prominent position to provide saloons above the shops, with large show windows for the display of goods. In addition to the three saloons on the ground-floor, a top-lighted picture saloon has been formed in the rear, and the two upper stories are constructed especially for a photographic studio.

The whole of the front above the shop cornice is in terra cotta, of a warm brown tint, supplied and fixed in a very creditable manner by Messrs. Wilcock, of Barmantofts.

Messrs. N. S. Joseph & Smithem were the architects, and Messrs. Kilby & Gayford the general contractors, Mr. Charles Evans supplying the wall tiles and painted-glass decoration.

ST. SAVIOUR'S UNION INFIRMARY, CHAMPION-HILL.

In our issue of February the 26th we gave a view of a part of this large building, with plans and particulars of it generally. At the request of the architects, Messrs. H. Jarvis & Son, we give a bird's-eye view showing the whole building, as the drawing published before, showing the administrative block to a tolerably large scale, gave no idea of the size of the whole building.

In reference to the description of the work in the Builder for February 26th, Messrs. Jeakes & Co. ask us to state that they executed the work for the steam cooking and steam laundries.

EDINBURGH MUNICIPAL BUILDINGS DESIGNS.

SIR,—I notice in your last issue you call attention to an apparent discrepancy between the plan of my design for Edinburgh Municipal Buildings and the elevations.

The apparent discrepancy arises from the omission on the part of your printer (from the title) of the words "Alternative Plan."

I may add that I asked you to publish the alternative plan, as I thought it rather better than my other plan.

BRIGHTWEN BINYON.

\*\* It is rather illogical, however, to send us up elevations of one design and plans of another.—Ed.

CHAPTER I

THE EARLY HISTORY OF THE UNITED STATES

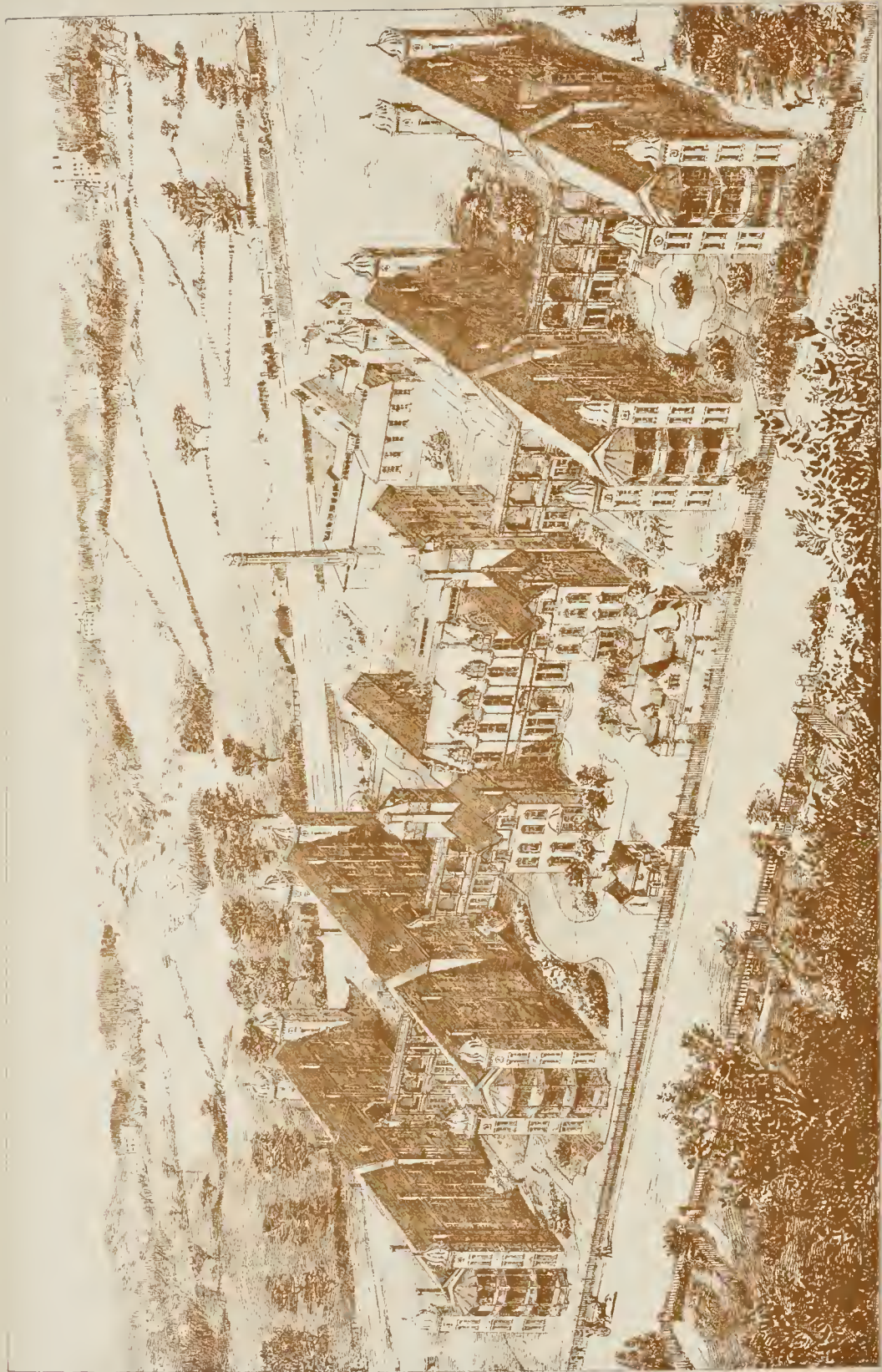
THE first discovery of the continent of North America was made by Christopher Columbus in 1492. He sailed from Spain in search of a westward route to the Indies, and on October 12th he landed on the island of San Salvador in the West Indies. This event marked the beginning of European exploration and settlement in North America.

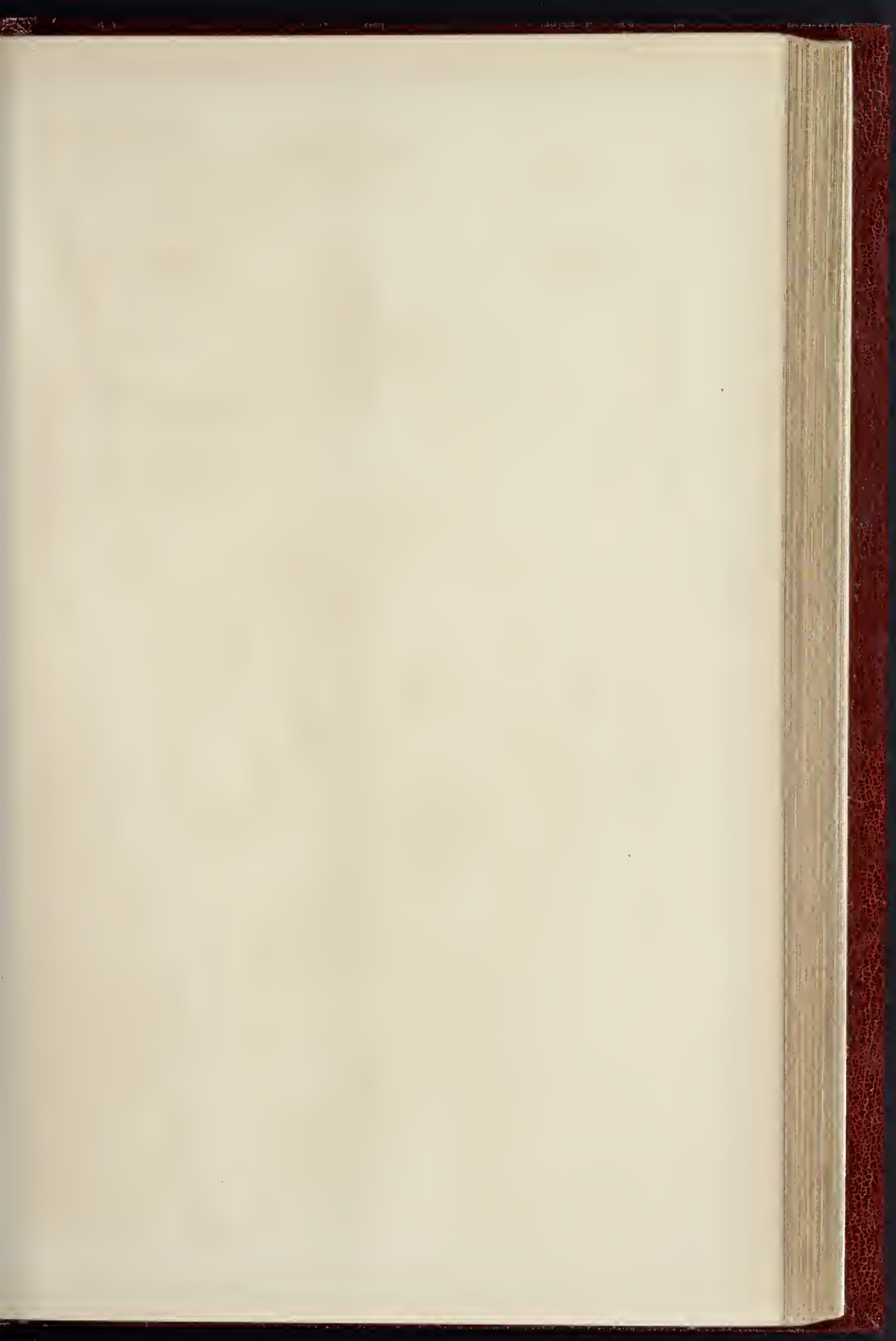
The early history of the United States is characterized by the discovery and settlement of the continent by European explorers. The first European to set foot on the continent was Christopher Columbus in 1492. He was followed by other explorers such as Amerigo Vesputi, John Cabot, and Vasco da Gama. The discovery of the continent led to the establishment of colonies and the eventual formation of the United States.

The early history of the United States is a story of exploration, discovery, and settlement. It is a story of the brave men and women who ventured into the unknown and paved the way for a new nation. The early history of the United States is a testament to the human spirit of adventure and discovery.

THE BUILDER, APRIL 30, 1887.

THE BUILDER, APRIL 30, 1887.





THE BUILDER, APRIL 30, 1887.



NOTE: The font is constructed of Sandstone  
The casing is all very much worn.

Ipswich  
County of Suffolk  
England  
April 27, 1886.



Ipswich  
County of Suffolk  
England

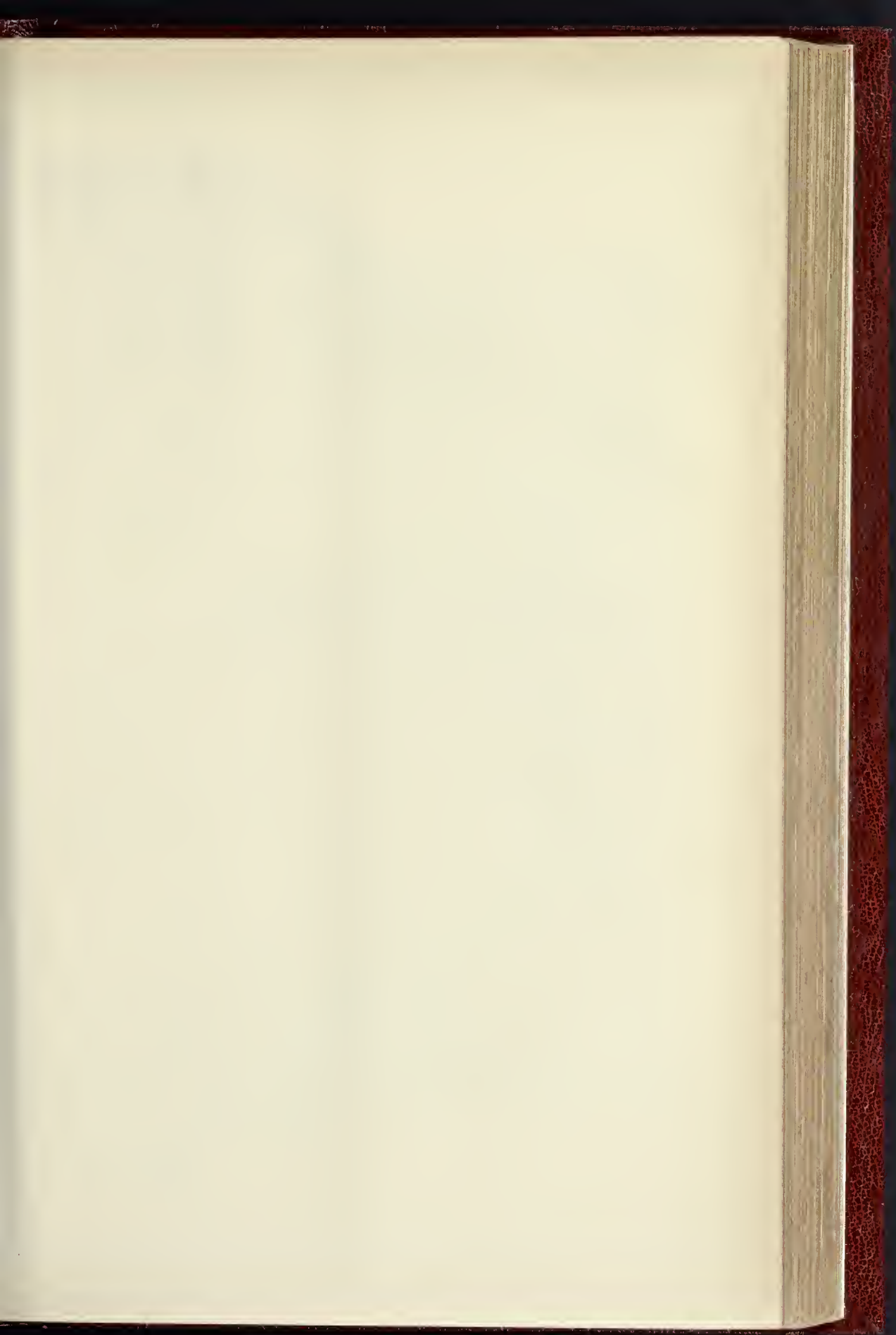
It has been noticed before  
that in the first part of the  
drawing the figures are in the  
middle of the shaft, whereas  
in the second part they are  
at the top.

Sketches of the monument  
by Mr. D. G. G. G. G. G.  
The monument is made of  
sandstone and is very  
much worn.



Ipswich  
County of Suffolk  
England  
April 27, 1886.





THE BUILDER, APRIL 30, 1887

THE BUILDER, APRIL 30, 1887



A RESTORATION OF EDINBURGH CASTLE. From a Drawing by Mr. WALTER F. LYON, F.R.I.B.A.

The Phototype Co., 66, Strand, London.

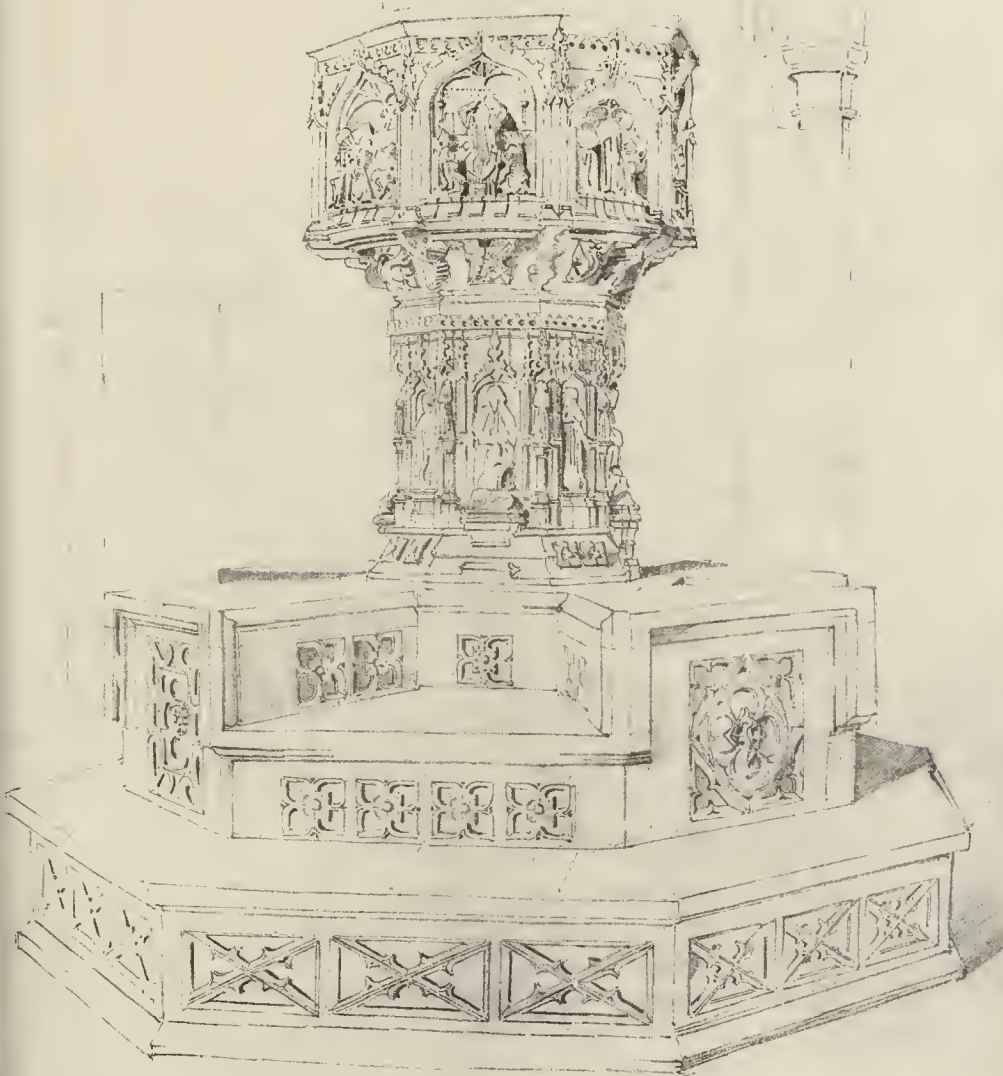


The Photo Engraving Co., 308, Strand, London

THE BRONZE FIGURES ROUND THE TOMB OF THE EMPEROR MAXIMILIAN AT INNSBRUCK.  
From a Sketch by MR. W. J. N. MELLARD, A.R.I.B.A.

*Collection of the Emperor Maximilian  
1850-1867*

THE UNIVERSITY OF CHICAGO



Walsingham, Norfolk.  
Font.

Walsingham  
18.10.86.

THE PHOTO. SPRAGUE & CO. 21, MARTIN LANE, LONDON, E.C.

THE HISTORY OF BRITAIN BY HENRY SPENCER



PREMISES IN BROOK STREET.—MESSRS. JOSEPH & SMITH, ARCHITECTS.

THE HISTORY OF THE UNITED STATES OF AMERICA



ROYAL INSTITUTE OF BRITISH ARCHITECTS.

REPORT OF THE COUNCIL.

The Report of the Council, to be submitted to the Annual General Meeting on Monday next, contains the following passages:—

The official year, which terminates with the Annual General Meeting of 1887, may fairly be reckoned one of the most important in the annals of the Institute. Such were the words used, except in the matter of date, in the Report to the Annual General Meeting of 1877, with respect to the measures taken at that time for the improvement of the Institute. The recommendations made by the two Improvement Committees which sat prior to May, 1877, were, however, restricted in their aim by certain provisions of the Charter of 1837. Such obstacles to extension and development are now removed by the grant from her Majesty in Council of a Supplemental Charter, and the issue of Letters Patent under the Great Seal, bearing date the 28th of March, 1887. The document, which is printed as it was received from the Home Office in the current No. (13) of the Journal of Proceedings, is now in the possession of the Corporate Body.\* But until the new By-laws to be made under its provisions have been adopted by the Fellows, and submitted to and approved by the Privy Council, the Institute is to be administered in conformity in all respects with the Original Charter and the By-laws now in force. The Council have therefore given notice of their desire to receive from members suggestions for altering or amending certain of the existing By-laws, prior to calling a Special General Meeting. Meanwhile they beg leave, on behalf of the Royal Institute, to express their high sense of the increased privileges and obligations conferred on the Corporate Body by the Queen in Council, and their thanks to the seven architectural societies who supported the petition.

In the Report of 1876-77 the Council congratulated the members on the maintenance of the rate of increase in the classes of Fellow and Associate, and they stated that during that official year twenty-eight Fellows and twenty-four Associates had been elected,—a larger number than had been admitted for many years past. At that time there was no Examination test for the admission of Associates,—a test which, it might fairly have been assumed, would reduce the numbers of that class of members; but the facts show that, in the long run, no such reduction has resulted. The number of Associates elected during the present official year is thirty-eight,† and a comparison with that of 1876-77, so far as concerns the election of candidates in the class of Associates, gives the following:—

|         |         |
|---------|---------|
| 1876-77 | 1886-87 |
| 24      | 38      |

A comparison of the total number of professional members in 1877 and 1887 affords equally satisfactory results, viz.:—

|                 |         |         |
|-----------------|---------|---------|
|                 | 1876-77 | 1886-87 |
| Fellows.....    | 330‡    | 431§    |
| Associates..... | 318     | 680     |
|                 | 648     | 1111    |

In the course of the official year, which terminates with the annual meeting in May, twenty-four fellows have been elected, nine of whom were previously members in the class of Associates, thereby making an increase of fifty-three new professional members, as against forty-five in 1876-77; and at the present moment there are twenty-eight gentlemen eligible to become candidates for the Associateship.

The losses by death have been considerable. Amongst the Fellows they are:—R. K. Penson, F.S.A., Edward Hughes, George Key, George Bell, and George Villiamy, Past Vice-President, the Superintending Architect to the Metropolitan Board of Works. Amongst the Associates:—C. B. Thurston, F.S.A., Lionel T. Waller, George Smith, Oswald Adhead, Thomas Farrer, H. Saxon Snell, and R. A. Fraser.

\* We also reprint it in the *Builder* this week.  
 † Except in the period of four years between 1878 and 1882 when the Obligatory Examination came into force, this is the largest number of Associates admitted in the course of twelve months. During the decade preceding 1878, the largest number of Associates elected in one year was 31, the lowest 14.  
 ‡ Including 46 Life Members.  
 § Including 85 Life Members.

Amongst the Hon. Associates:—E. E. Antrobus, F.S.A., Colonel Morant, R.E., and Major-General Moody, late R.E. Amongst the Hon. Correspondents:—M. Prosper Morey, of Nancy; H. H. Richardson, of Boston, U.S.A.; and Olivier Rayet, of Paris.

The Council submit statements, divided into Ordinary and Trust Funds, of the Receipts and Disbursements for the year ending December 31st, 1886, signed by Mr. Alexander Graham and Mr. G. Richards Julian, the auditors appointed by the last annual general meeting. [Here follow the revenue accounts and balance-sheets of both funds.]

The special disbursements incidental to the Conference, and the legal and other expenses incurred in connexion with the Supplemental Charter, will have to be partially defrayed out of capital.\*

In the course of the official year two Examinations in Architecture have been held in London, one during the week commencing November 22nd, 1886, the other during the week commencing March 21st, 1887. Thirteen applicants were admitted to the November Examination, eight of whom passed; and four were relegated to their studies, with the privilege of again presenting themselves without fee. This being the third and concluding Examination of the year 1886, the Board considered the several claims to the Ashpitel Prize of the thirty-nine gentlemen who passed at the Examinations in London and Leeds; and awarded it to Mr. Henry Thomas Hare, of 3, Regent's Park-villas, Gloucester-road, N.W. Thirty-two applicants were admitted to the March (1887) Examination. The examiners who set the questions and assigned the marks were Messrs. H. D. Appleton, S. Flint Clarkson, Alexander Graham, E. A. Cruning, J. D. Mathews, E. C. Robins, John Slater, Ernest Turner, and Aston Webb. The moderators who superintended the written and graphic portions of the Examination were seven in number, namely, Messrs. G. Hamilton Gordon, F. Hooper, J. M. Kennard, W. R. Low, W. Millard, Walter L. Spiers, and C. J. Tait. The Oral Examination lasted two entire days. The Board reported that twenty-five had passed, and that three had not passed; while three were relegated to their studies for one year. Lastly, the Council have required one candidate to present himself again for examination in sanitary science, strength of materials, shoring, &c.

An Examination for Certificates of Competency granted under the Metropolitan Building Act, 1855, and other Acts of Parliament, was held on the 28th and 29th of October, 1886, when nine candidates presented themselves, of whom six obtained Certificates of Competency to act as District Surveyor in London, and one as Building Surveyor under local authorities. Another Examination will take place this month (April).

The report of the Library Management Committee says that:—

"During the twelve months elapsed from 1st April, 1886, to 31st March of the present year, the total additions to the Library amounted to 244 volumes and 124 pamphlets, and to the Loan Collection 12 volumes and 3 pamphlets, exclusive of periodicals, reports, and transactions of societies, and parts of works issued in a serial form. The number of volumes presented to the Library was 224, and to the Loan Collection 5. Of pamphlets, 123 were presented to the Library and 3 to the Loan Collection. The valuable bequest of the late Mr. Ferguson, Past Vice-President, of such of the architectural works in his library as were not already in the Library of the Institute, brought to the Library an accession of 138 volumes and 3 pamphlets, which are included in the foregoing enumeration. Of drawings, engravings, and photographs, 166 sheets were presented, exclusive of the 'Sketch-Book' of the Architectural Association. The other donations included several specimens of timber, and a medal struck by the Corporation of the City of London.

The works purchased comprise 29 volumes and 1 pamphlet for the Library and 7 volumes for the Loan Collection, together with several Parliamentary papers. The want of shelf-space in the Library has been temporarily met by the erection of a new bookcase; but, while recognising this help, it must be pointed out that it cannot be regarded as so final, as an immediate and pressing difficulty, and that the question of further accommodation for books will before long again have to be taken up. The Committee reported to the Council on a scheme for providing shelving for books of reference in the meeting-room, to be left open for readers. This scheme was referred back by the Council for reconsideration. The new bookcase will enable some shelves in the meeting-room to be cleared out for its above purposes.

The attendances of readers in the Library were close upon 3,000, details of which are given in a tabular form in an appendix. The day attendances show an increase of more than 26 per cent., and the evening attendances an increase of more than 31 per cent., as compared with those of last year.

\* The portion of capital now held in Coudsols, which, at the beginning of 1881, after the cost of the building alterations had been met, was £1,760*l.* 17*s.* 9*d.*, has reached the sum of 4,076*l.*

The number of fresh tickets (exclusive of renewals) issued for admission to the use of the Library and Loan Collection was 84, an increase of more than 9 per cent. upon that of last year. The number of volumes issued on loan was 910.\*

The new series of the Journal of Proceedings has, in its third volume, assumed a literary character. On the recommendation of the Standing Committee for Literature, the Council have admitted into the Journal contributions of varied description from members, under the heads of "Sessional Notes," of "Members' Memoranda" on the papers read at the ordinary meetings, and of "Correspondence." The several books, drawings, &c., presented by members and others, have also been separately noticed, and in some cases have been carefully reviewed; while, from the foreign periodicals and the Bulletins of Societies, matter has been obtained for "Foreign Notes," written for the most part by members of the Literature Committee. Indeed, the Council feel that they are greatly indebted to the already large number of contributors to the Journal, and especially to Mr. Alexander Graham, who, as Vice-chairman of the Literature Committee, has taken the greatest interest in the work. Mr. Roger T. Conder, one of the Hon. Secretaries of the Committee, has also regularly assisted on the Wednesdays preceding the day of issue, generally until a late hour of the night. Eight meetings of the Literature Standing Committee\* have been held, and the work of procuring papers for reading and discussion has been materially aided by the energy of Mr. G. Richards Julian, the senior Hon. Secretary of the Committee.

The Standing Committees for Art and for Practice have also met regularly about once a month, and three meetings of the Standing Committee for Science have been held. The memoranda and business of the Special Light and Air Committee have been taken over by the last-named, and, beside other matters of importance, they have commenced an inquiry into the subject of "Rot in Timber."

The business of the original Committee for the Conservation of Ancient Monuments has been taken over by the Standing Committee for Art, and they have brought up careful reports respecting well-known buildings of historical and artistic interest. They have considered a scheme, drawn by Mr. E. J. Tarver, one of the Hon. Secretaries of the Committee, for the improvement, at its southern opening, of the new street from Charing-cross to Tottenham Court-road. On their recommendation, the Council addressed a letter to the Metropolitan Board of Works, and submitted a plan for amending the line of the new street in the eastern frontage of the National Gallery, and for joining the triangular plot at the back, containing a public-house still standing, to the National Gallery, thus absorbing the east end of Hemming's-row. A proposal made by the Fine Art Committee of the Royal Commission for the Adelaide Jubilee Exhibition,—that the Institute should collect and send out, at its own expense, a certain number of photographs of executed works, taken from the buildings themselves,—was delegated to the Art Standing Committee to carry out; and owing to the exertions of Mr. Ralph Nevill, F.S.A., the other Hon. Secretary of the Committee, about 100 photographs were got together. An exhibition of the photographs, which were contributed by thirty-two members of the Institute and others, was held in the Arbitration Room, during the greater part of a week, and the collection is now on its way to Adelaide.

The Standing Committee for Practice have been actively engaged in arranging the preliminaries of an inquiry into points connected with the Metropolitan and Provincial Building Acts, and they are considering the "Heads of Builders' Contracts" now in use. The Hon. Secretaries, Mr. T. M. Rickman, F.S.A., and Mr. E. T. Hall, have further collated, from the Minutes of the Institute, particulars of the several suggestions for Professional Practice, Declarations, &c., made from time to time during a number of years, with other items of information, for the use of the Committee.

The Competitions Committee reported in

\* The four Standing Committees met early in the official year to appoint their officers. The Art Committee called Mr. Atchison to the chair, and Colonel Edis became vice-chairman. The Literature Committee appointed Mr. Blomfield chairman, and Mr. Graham vice-chairman. For Practice, Mr. Curry was made chairman, and Mr. Gates vice-chairman. For Science, Mr. Worthington was chairman, and Mr. Charles Fowler vice-chairman. The names of the Hon. Secretaries of these Committees, two to each are given in the text of the report.



thereof shall subject to the previous sanction of a Resolution of a General Meeting confirmed at a subsequent General Meeting held not less than seven and not more than twenty-eight days after the former Meeting thereon to be exercisable by the Council who shall have the management and superintendence of the said property.

23. The Royal Institute may after complying with all requisites from time to time required by law in that behalf receive and hold any donations or endowments consisting of property of any description real personal or mixed for the general purposes of the Royal Institute and may also receive donations or endowments for Prizes Medals Exhibitions Studentships or Scholarships or for any special objects connected with the Royal Institute which shall not be inconsistent with the provisions of the Original Charter as amended by this Our Charter.

24. The Royal Institute may after complying with all requisites from time to time required by law in that behalf receive and hold any donations or endowments consisting of property of any description real personal or mixed which have been or may be given for any benevolent purposes connected with Architecture.

25. No person who shall hereafter become a non-subscribing Member shall in any case or at any time nor shall any person who shall hereafter become a subscribing Member and shall afterwards cease from any cause whatever to be a Member or any of their representatives have any interest in or claim against the property of the Royal Institute.

#### VII. General Meetings.

26. General Meetings of the Royal Institute including such as may be summoned by the Council on the requisition of Members or otherwise shall be held as By-Laws may from time to time prescribe and at least one General Meeting shall be held in every year.

27. At General Meetings Fellows shall be entitled to be present and to take part in the discussions on any subject brought before the Meetings and to vote at such Meetings.

28. At General Meetings Associates shall be entitled to be present and to take part in the discussions on any subject brought before the Meetings, and to vote at such Meetings, provided always that no Associate shall be entitled to vote in respect of the making and adopting altering revising suspending or rescinding of any By-Law.

29. At General Meetings Honorary Associates shall be entitled to be present and to take part in the discussions on any subject brought before the Meetings and subject to such limitations or restrictions as By-Laws may from time to time prescribe to vote at such Meetings provided always that no Honorary Associate shall be entitled to vote in respect of the making and adopting altering revising suspending or rescinding of any By-Law.

30. At General Meetings Honorary Fellows shall be entitled to be present and to take part in the discussions on any subject brought before the Meetings but unless holding the office of President shall not be entitled to vote.

31. At General Meetings Honorary Corresponding Members shall be entitled to be present and to take part in the discussions on any subject brought before the Meetings but shall not be entitled to vote.

32. At General Meetings any Resolution adopted by such a majority as By-Laws may from time to time prescribe of those Members having a right to vote and voting at such Meetings shall be deemed valid and shall be deemed to be a Resolution of the Royal Institute. In the case of an equality of numbers the person presiding shall have a second or casting vote.

#### VIII. Bye-Laws and Interpretation.

33. The Royal Institute may from time to time by resolution of a General Meeting confirmed at a subsequent General Meeting which shall be held not less than seven and not more than twenty-eight days after the former Meeting make and adopt such Bye-Laws as may be deemed expedient and may in the same manner vary suspend and rescind any Bye-Laws and make and adopt others in their stead but so that the Bye-Laws for the time being be not in any respect repugnant to the law of England or inconsistent with this Our Charter. Provided always that no such Bye-Laws shall be of any force or validity whatever unless and until they have been approved by the Lords of our Most Honourable Privy Council.

34. Subject to the provisions of this Our Charter Bye-Laws shall define regulate and prescribe

(a) The conditions of Membership and the mode of election and admission and the privileges obligations and benefits of the several classes of members of the Royal Institute and the payments to be made by members.

(b) The cases and manner in which a member of the Royal Institute may be excluded or suspended from membership.

(c) The mode time and place of summoning and adjourning the Meetings whether Ordinary Business Special Annual or otherwise and the quorum for and the mode of voting at such Meetings whether in person or by proxy or by ballot or by voting papers or otherwise and the number of Votes which shall form an effective majority at

such meetings and the conduct of proceedings thereat.

(d) The qualification and mode of election of the President and the number qualification and mode of election of the Vice-Presidents and of the one or more Honorary Secretaries and the number qualification and mode of election of the other members of the Council and their respective tenures of office and the mode of filling casual vacancies in the Council and the quorum for Meetings of the Council.

(e) The mode of election tenure of office and duties of two Auditors of the Accounts of the Royal Institute.

(f) The appointment of Standing Committees and the proceedings thereof.

(g) The terms and conditions for such Prizes Medals Exhibitions Studentships or Scholarships as have been or may from time to time be established by the Royal Institute.

(h) The relations of the Royal Institute to such branches thereof as may be established within the United Kingdom or India or any Colony or Dependency of the United Kingdom and to other Societies having kindred aims and purposes.

35. In this Our Charter the expression 'the Council' means the Council of the Royal Institute, and the expression 'the United Kingdom' includes the Channel Islands and the Isle of Man.

And We do also further will and ordain that subject to the provisions contained in this Our Charter, the Original Charter shall be so far as unrepealed have full effect and validity and We do hereby confirm the same accordingly.

In witness whereof We have caused these Our Letters to be made Patent Witness Ourselves at Westminster the Twenty-eighth day of March in the fiftieth year of Our Reign.

#### Schedule referred to in Sect. 1, Clause 1.

The portions of the Original Charter repealed are—From Section Three beginning with the words 'And our will and pleasure is and We further ordain' to the end of Section Ten which ends with the words 'construction and purposes whatsoever.'

By Warrant under the Queen's Sign Manual,  
MULR MACKENZIE.

[Here follows copy of the Great Seal.]

#### WATER SUPPLY FROM WELLS.

##### INSTITUTION OF CIVIL ENGINEERS.

At the meeting of this Institution on Tuesday, the 19th of April, Mr. Edward Woods, President, in the chair, four papers were read on the subject of obtaining water-supply from wells, namely, "Chalk Springs in the London Basin," by Mr. J. W. Grover, M. Inst. C.E.; "Borings in the Chalk at Bushey, Herts," by Mr. William Fox, M. Inst. C.E.; "On a Borehole in Leicestershire," by Mr. T. S. Stooke, Assoc. M. Inst. C.E.; and "The Wells and Borings of the Southampton Waterworks," by Mr. William Matthews, Assoc. M. Inst. C.E.

In the first paper, Mr. Grover began by pointing out what a large and rapidly-increasing water-supply was required for London, and that the Upper and Lower Greensands did not yield water in any quantity, and therefore were not available, as Professor Prestwich had hoped, for furnishing a supplemental source of supply for the metropolis. He showed that the Chalk was the true source, but that care must be exercised in selecting a site for sinking a well into it; and that whilst only a moderate supply of water could be obtained where the Chalk was overlaid with a thick bed of clay, owing to the compression of the fissures by the superincumbent weight, and the distance the water had to travel underground, a large supply might be secured by sinking a well at the outcrop of the Chalk, at a point near a river, which indicated a subterranean flow of water. Consequently there was no prospect that any large volume of water could be obtained from the Chalk under London, or from the Upper or Lower Greensands, owing to the immense pressure upon them. The author then proceeded to describe in detail the various works carried out for supplying the Newbury, Wokingham, Leatherhead, and Rickmansworth districts with water. A plentiful supply was readily obtained for the Newbury district by sinking a 7-ft. well, 13 ft. deep, in the valley of the Kennet, on the west side of the town. The chalk-spring struck there proved of excellent quality, and the water was raised by pumps into two reservoirs, at a high level, each having a capacity of 110,000 gallons, and commanding the whole of the town. The cost of the works had not exceeded 20,000l. Two wells had been previously sunk in the Wokingham district to depths of 366 ft. to 734 ft., through the Bagshot Sands, London Clay, and Woolwich and

Reading Beds, into the Chalk, which failed to give an adequate supply of water, owing, in the author's opinion, to the flowing in of the fine running sand of the Woolwich and Reading Beds. By sinking another well down into the Chalk, which was reached at a depth of 345 ft., and carefully excluding the fine sands of the Woolwich and Reading Beds in its descent, a fine chalk-spring was struck at 405 ft., which rose to 30 ft. from the surface. The well was sunk in twelve months; and several trials were made of the yield of the well, which proved that the spring flowed more freely after pumping, owing, doubtless, to the fissures giving passage to the water being cleared out and enlarged. A lower set of pumps draw the water from 125 ft. below the surface. The upper pumps, capable of pumping 10,000 gallons an hour, lifted the water into reservoirs 144 ft. above the engine-house floor, having a capacity of 220,000 gallons; and a constant service was afforded at a capital cost of under 20,000l. The Leatherhead district included eight parishes in Surrey, having an area of 24 square miles; but it would be possible to extend its limits, and to afford a supplemental supply to South London from the Leatherhead springs, for which no other at all equally available source of supply existed. A 12-in. boring was sunk to a depth of 200 ft. in the chalk, through flint beds containing powerful Chalk-springs; and the yield of water at the depth reached far exceeded any possible requirements, the flints being continuous for the last 40 ft., and forming a natural reservoir, from which the water rose to the surface when liberated by the bore-hole. The catchment area embraced the whole basin of the Mole above Leatherhead, over 100 square miles in extent; the water in the well kept a level of 2 ft. to 3 ft. above the River Mole, and maintained an even temperature of about 53° all the year round. From trials made with the pumps drawing 15,000 gallons an hour, it appeared that 1,000,000 gallons a day could be raised by the pumps from the surface, and by enlarging the borehole down to the great reservoir of flints below the 97-foot level, a minimum daily supply of 4,000,000 to 5,000,000 gallons could probably be obtained. A constant supply was provided from a reservoir, containing 125,000 gallons, the level of which would command South London with a high service. The collecting basin above Rickmansworth was 234 square miles in extent; and the water rose in many places bright and pure from the flint beds in the Chalk. The subterranean flow had been estimated at 70,000,000 a day at Rickmansworth; and from 5,000,000 to 10,000,000 gallons might probably be intercepted. A well was sunk near the River Colne, at a bend in the valley, where the chalk-spring broke out with the greatest volume, to a depth of 300 ft. through Chalk and flint beds. The water rose in the well to a level of about 3 ft. above the adjacent River Colne; and the volume of water obtained from the well was much augmented by enlarging the borehole and further sinking. Trials were made, during the operations, of the effects produced on the water-level by pumping 21,600 gallons an hour, when the water soon regained its original level on stopping the pumps.

Mr. Fox described, in his paper, the works carried out, in the valley of the Colne, for supplying a large district lying between Walford and London. A well and boring were commenced in 1874, and completed in 1876, to a depth of 212 ft., having pierced 20 ft. of hard rock chalk, where it was stopped, owing to no greater supply of water being anticipated from further sinking. Trials of the yield of the well showed that it had decreased from 820,000 gallons in twenty-four hours in 1876, to 650,000 gallons in 1881; but, by lowering the pumps 20 ft., the yield was raised from 900,000 to 1,000,000 gallons, which was found to have been maintained on testing it again in 1885. Observations of the amount of water pumped, the level of the water in the well, and the rainfall, showed that the well and adjacent strata acted as a storage reservoir supplied by the rainfall. In order to increase the supply for an enlarged demand, a new well was sunk, in 1885, down to the Gault, 700 ft. from the surface, at an average rate of 16 ft. a day. No increase of water was obtained in the last 200 ft. The flow of water from the top of the bore-hole, 43 ft. below the surface, into the well had diminished from 656,000 gallons to 555,000 gallons in twenty-four hours, at which rate

it flowed steadily. The water in the new well was conveyed through a tunnel into the old well, from which it was pumped. When the communication was closed by a valve, the water-level in the old well was lowered by pumping without affecting the level in the other well, showing that the sources of supply of the two wells were separate. From the results obtained in sinking the new well, it would appear that a much larger supply of water could have been obtained from the old well by sinking the bore-hole 300 ft. more. The supply was now 1,500,000 gallons a day; but some new pumps could be arranged to draw 15 ft. below the present level of the old well; and by lowering the well this amount, and modifying the pumps, the yield could be increased to 2,000,000 to 3,000,000 gallons a day.

A borehole was sunk, in 1880, to a depth of 754 ft., by the Local Board of Hinckley, in Leicestershire, acting under the advice of Mr. Plant, for seeking a supply of water from the "Waterstones" of the Triassic formation, at the base of the Keuper Marls. The water-line was met with 80 ft. below the surface; and, in 1883, Mr. Stooke advised that pumping should be effected with easily available plant. Boring rods, 3 in. in diameter, and 450 ft. long, served for suction-pipes; and boring-rods, provided with rubbers, were used as pumping-rods to a depth of 300 ft. The pump was worked with a stroke of 18 in.; and 400,000 gallons of water were pumped out of the borehole in April and May, 1883. The water contained about 500 grains of solids, and 40 grains of chlorine, to the gallon. A 3-in. borehole was then carried 51 ft. lower, and gave evidence of more favourable water-bearing strata. A plug was obtained to separate the upper from the lower water, as the tubing had not been carried below 476 ft. from the surface; and the pump was arranged for the plug to act at a depth of 690 ft. The quality of the water, however, was no better, the solids ranging from 425 to 395 grains per gallon. The plug was then placed at a depth of 731 ft., and afterwards as near the base of the original borehole as practicable, without any better quality of water being obtained. On the plug being raised, it did not appear that any water could have passed it; and the water from the upper strata must therefore have passed to the pump through fissures in the rock.

Mr. Matthews, after explaining the hydrographical conditions of the district round Southampton, proceeded to describe the several steps taken to obtain a water supply of 3,000,000 gallons a day for the borough, at a cost of 60,000*l.* A small 3-in. boring was first sunk 105 ft. in the Chalk, just above its outcrop at Otterbourne, where a remarkable convergence of water gradients, as obtained from ninety wells, had been found, with the object of ascertaining the actual presence of water before executing further works. Water was found in the Chalk in good quantity at a depth of 20 ft. Two 12-in. borings were then sunk in eleven days, each 50 ft. from the small boring, and in a line parallel to the outcrop. On pumping continuously from both borings for sixteen days, a mean discharge of 20,960 gallons per hour was obtained with a loss of head of 9 ft. 8 in.; and, on ceasing to pump, the water rose rapidly to its normal level, which is very constant there at all seasons. An adequate yield having thus been proved, the regular works were proceeded with. As the trial borings had been sunk so easily and rapidly by the ordinary "chisel-and-shell" method, the author determined to sink two bored wells, each 6 ft. in diameter, instead of one large well sunk by hand in the usual manner, thereby gaining the advantage of having two independent wells, and saving the cost of temporary pumping-machinery. After executing the foundations of the engine-house, and forming a strong working-floor, the wells were bored, to a depth of 100 ft. from the surface, by breaking up the Chalk and flints by dropping down the iron 3-in. boring rods, furnished with three steel-pointed chisels, and raising the *débris* by the "miser" to the surface. The chisels and the miser were given a rotary motion by manual labour, and the miser usually came up about two-thirds full. The first well was bored in thirty-three days, having been delayed by accidents; but the second well was completed, with slightly altered tools, without mishap, in fourteen days,—a rate of over 5 ft. per day. The wells were lined with 4-in. mild steel tubes, 5 ft. 11 in. in

diameter, in 6-ft. lengths, with twenty-four 6-in. holes in each length, to allow the free ingress of water. The cost of the bored wells was under 1,700*l.*; whereas the author estimated that a single large well, lined with 18-in. brickwork, would have cost between 2,000*l.* and 2,500*l.* The two wells being distinct, with independent pumps, any accident to one would not interfere with pumping in the other, and any deepening could be easily effected in one without affecting the clearness of the water in the other. The author added a short account of the deep well on Southampton Common, bored, between 1835 and 1851, to a depth of 1,317 ft., when it only yielded 130,000 gallons a day. It traversed 850 ft. of Chalk, but did not reach the Upper Greensand; and an attempt, in 1882, to deepen it being frustrated by a broken tool lying at the bottom, it was finally abandoned, having involved a cost of 20,000*l.*

#### ARCHITECTURAL ASSOCIATION.

THE twelfth ordinary meeting of this Association for the present session was held on the 22nd instant, Mr. J. A. Cotch (President) in the chair.

The following new members were elected, viz., Messrs. H. W. Braddock and P. Hayton. Mr. G. Aitchison, A.R.A., read a paper entitled "Stray Thoughts on Architectural Education," which we print on another page.

The Chairman, in opening the discussion, said that Mr. Aitchison's "Stray Thoughts" were most suggestive. His tribute to the Association was well deserved, but, at the same time, it was in one sense a matter of regret to the profession that a voluntary concern should be the foremost means of obtaining an architectural education. There were in reality signs that if care was not taken the Association would eventually outgrow its own strength, and that the multiplicity of work undertaken, if grappled with effectively, would really develop into something more than had yet been attempted. He hoped, therefore, that in the forthcoming Conference some sort of means might be shadowed forth by which this important question might be met. The work done by the Association was most excellent, and he hoped it would be in no way slackened until it was replaced by something which was national in its character. The idea that ran through Mr. Aitchison's paper was an excellent one; it was that people should be made to think for themselves. When Mr. Aitchison said he desired style to be abolished, he (the speaker) could not help thinking of an observation made earlier in the session by Mr. Rickman, when he mentioned how painful was a false quantity in architecture, meaning that the style should be thoroughly mastered and be entirely pure. He (Mr. Cotch) was bound to say that Mr. Aitchison's suggestion for striking out one's own path rather commended itself to him. Nowadays they did not expect every architect to be a genius. There were over 1,000 members in the Architectural Association alone, and they could not possibly be all geniuses,—indeed, the profession would be in a bad way if they were. He had more than once in that room ventured to describe the arts which affected architecture as "common-sense made beautiful," and that struck him as being a not unreasonable definition. The present age was one of eclecticism. People did not go on from step to step in one style, working out their salvation as the Medievalists did, who toiled in ignorance of what had been done before them. In Greek architecture the portico and the pillars were outside, while in Medieval architecture they were taken inside. It was said that the latter course was pursued for the purpose of getting a greater effect of solemnity, but he did not suppose for a moment that the Gothic builders had any idea of Greek architecture. Mr. Aitchison had mentioned the designing of warehouses. Now directly the architect commenced to design a warehouse, he had to be restricted by the essential factors of the problem, so that if a picturesque building was designed, it might be found that some of the elementary notions ruling the designing of warehouses had been transgressed. One of these rules was that almost all the windows would have to be of one pattern, and it would be useless to think out any building of that kind merely as a matter of design; the thing must be based upon the requirements of modern life and the prosaic necessities of trade. The architects of the present day were, therefore, very

much handicapped by restrictions such as were unknown to the Medievalists. At the same time the business of the architect of the present day should be to grapple with those things, and make the best they could of them. If, therefore, they worked upon the lines suggested by Mr. Aitchison, he believed they would come very near solving the problem.

Mr. John Slater, B.A., thought there was a certain amount of contradiction in Mr. Aitchison's able paper, when he first stated that so much information could be obtained from the builder, and then later on told them that the architect should not only know the various methods of joining iron and stone, but also the weights those materials would carry, their compression, tension, and so forth. Now he did not consider that the ordinary builder could go into those technicalities at all. Then, with regard to styles and orders, Mr. Aitchison first said he did not consider it necessary to study the history or the various peculiarities of the ancient styles, but afterwards he said they ought to be studied, not necessarily for imitation, but to find out how the classical and Medieval builders obtained their results. Mr. Aitchison had referred to the Medieval architects and early builders being daring in putting up buildings without any particular knowledge. For a long time he (the speaker) had thought they had erred on the side of excessive strength, and that it would ill become the architects of the present day to refrain from taking advantage of the new discoveries with regard to the strength of materials, or to use an excessive quantity of timber or iron when a less quantity would do. He could not help expressing his personal regret that Mr. Aitchison had not been able to retain his position as one of the Examining Board at the Royal Institute of British Architects, as his services had always been of the greatest value. He agreed with a great deal of Mr. Aitchison's criticism as bearing on the obligatory Examination, though it did not seem to point to a diminution of its stringency, but rather to a division into two. It was a great deal to expect from the candidate to pass from one thing to another so rapidly, and to cram into one week what should be done in two weeks at separate times. Probably, therefore, the results of the coming Conference would tend in the direction of dividing the Examination into two parts. Mr. Slater concluded by proposing a hearty vote of thanks to Mr. Aitchison.

Mr. Lawrence Harvey considered that if a man had worked in stone he would be able to design in that material with much more character than if he had never had anything but sheets of paper before him. He believed he could answer the question as to why the Medieval architects displayed such cleverness in designing. While in Paris he had the *entrée* to a guild of stonemasons, and had seen the way the young men were taught, and the results obtained therefrom. In this case everything was done by means of models, drawings being looked upon merely as a means to make those models, while to be received as a companion of the guild the necessary examination consisted of constructing a model in which every difficulty of masonry came into play. The result was that the head men of the guild were far superior to the professors of stereotomy at the École des Beaux Arts, and the Polytechnic School at Paris, in practical teaching. He considered that the education of architects should be based on practical labour; they ought to be taught carpentry, joinery, stone and wood carving, and, as the basis of all the science of architecture, they should certainly have knowledge of masonry.

Mr. H. O. Cresswell remarked that the paper had created in his mind a feeling that all one's previously-conceived notions of what an architectural education should be were entirely wrong; that they must not study the Greek, Roman, Gothic, or other styles, but begin by being original. That seemed to him to be a dangerous doctrine. They did not come there to learn to be original, for to teach the young architect to be original would be to put a weapon into his hands which would produce very curious results. Mr. Rickman's remarks as to false quantities were entirely opposed to that, and, indeed, Mr. Aitchison would be one of the first to lay his hands upon a false quantity shown in the work of any of the Academy students. If he had misunderstood Mr. Aitchison he hoped that gentleman would correct him, because if the members of

the Architectural Association started on the basis of wishing to be original architects, he did not know where they would be in fifty years' time. He was glad to hear what Mr. Slater had said as to the Examination, because he considered that a great deal too much was crowded into the time; indeed, some candidates had broken down in the course of it. That was introducing into architectural education a system of pernicious cramming, and he believed there were now in the profession one or two men who were architectural crammers. The Examination should be a fair test of whether a man was capable of carrying on the profession of an architect, but it should not be necessary to cram, and he hoped during the Conference some practical turn would be given to the desultory conversations they had frequently had of late years, not only with reference to the Examination but to architectural education generally on this important subject.

Mr. G. Richards Julian seconded the vote of thanks. At the Conference on the 4th proximo several short papers would be read upon education, one by Professor Babcock, of Cornell University, where there was a regular system of architectural education. He believed that these papers, and the discussion that would arise, would do something to further this burning question.

Mr. A. O. Collard said that in thinking of the old architects, he had sometimes wondered how much of their success was owing to their own genius, and how much to the men who worked under them. No doubt Michelangelo designed the outline of the dome of St. Peter's, but he very likely relied more upon some stone-cutter to carry out the work than upon his own ideas of what the thing should be. In the past the architect designed, and trusted to the experience of the men under him, whereas now the practical man trusted to the architect.

Mr. Francis Hooper thanked Mr. Aitchison for his very encouraging paper. As to the voluntary system, the great strength of the Association lay in the fact that they as young men were banded together, and the older men knew what they wanted and had sympathy with the juniors. Young men again were more ready to adopt the latest improvements and innovations than were the older members of the profession, and were more willing to admire the work of contemporaries.

Mr. C. R. J. Hall said that although in the pamphlet supplied by the Institute to candidates for the Examination it was stated there would be nothing recalcitrant in the Examination; some of the questions really required the study of an architectural glossary. An architect could design a thing which a mechanic could not even conceive, and many things based upon theory would frighten carpenters and others. Indeed, he believed that practical experience in building would hamper a man in designing. Ruskin had said in his "Seven Lamps of Architecture,"—which, by the way, seemed badly supplied with oil,—that architecture was a thing which did not exist but as a framework for showing off sculpture and painting, but he could name one brick building in the City without sculpture or painting upon it, and which yet took the notice of every architect. A College of Architecture was essential, and he only hoped the Association would eventually develop into one.

The vote of thanks was then put from the chair, and carried by acclamation.

Professor Aitchison, in replying, observed that it would take too much time to touch upon all the matters referred to in the discussion. The object he had in view in giving this paper was not to gratify his personal vanity, but to see if some clearer idea of what was absolutely wanted for the education of the ordinary architect could not be defined. If a law were enacted that no man should begin to practise as an architect until he had mastered the differential calculus the profession would be tremendously limited, even from a scientific point of view, and much more from an artistic one. What he had wished to point out was, that though the literary and historic part of architecture was delightful, and to some extent useful, it was not absolutely essential. That after a man had sufficient knowledge to enable him to practise creditably the science and art of architecture, he should be allowed to take up those things which would show him to be more highly accomplished as "extra" subjects, the acquirement of which would be regarded as an honour. Architecture without

proportion could hardly be termed architecture at all, and they must learn proportion by studying those buildings that had passed through the ages and had generally met with the approbation of the cultivated. He had not meant to suggest that young students of architecture were not to learn how mouldings had been designed and grouped, and the other effects of architecture were got; quite the reverse. He did not advocate throwing off precedent; all the teaching he had given had been to show how styles appearing to be entirely new and diverse, for instance Saracenic and Gothic architecture, were immediate offshoots from the Roman and Byzantine, while it was new necessities and aspirations which caused the new and peculiar forms. It was very difficult to see, when there seemed no convergence of opinion amongst the profession or the public, how they should teach style, though, he hoped, a beautiful, original, and English style would some day be developed. There was thus striking difference between the architecture of the late Renaissance and that of the Middle Ages. If they looked at the older buildings, they could not help seeing that they were done by somebody consistently on the spot, and that many details were not arranged before hand, showing that the architects were men of originality and invention. The later Renaissance was very different, every part and detail appeared to have been studied and settled before hand. His hearers were those who had to keep alive the feeling for beauty in works of necessity, and although architects were very much overlooked, especially paid, and with little honour, many of their works were the result of great study and very considerable genius.

#### A NEW CUPOLA FURNACE FOR FOUNDRIES.

The German journal, *Stahl und Eisen*, states that Messrs. Greiner & Erpf, of Westphalia, a firm of engineers, some time ago invented a new cupola furnace for foundries. In the ordinary cupola furnace, one of the chief causes of the loss of heat is due to the circumstance that a large portion of the carbonic acid which is formed by the combustion of the coke, becomes, by its passage through the upper layers of red-hot coke, reduced to carbonic oxide, and in this form escapes through the chimney of the furnace. In the Greiner-Erpf furnace, however, the carbonic oxide is by combination with oxygen again turned into carbonic acid in the upper part of the chimney, and the heat produced by this process utilised for the working of the furnace, the escaping gas only containing carbonic acid and no carbonic oxide. The lowest tuyeres before which the coke burned, are constructed as in an ordinary cupola furnace, but at a point above these three rows of smaller ones have been introduced, fixed spirally around the furnace. Each of the latter may easily be opened, tended, and closed, and is also fitted with a peep-hole, covered with a glass disc for the purpose of watching the progress of the combustion within. Experiments with the furnace have shown that there is a certain point in a furnace above the zone of combustion of coke at which, on air being blown into the furnace, the carbonic acid is set on fire and consumed, but not the coke. This point varies somewhat according to the quality of the coke used, the pressure of the tuyeres in the lower hearths, &c., but it may easily be ascertained by observations made in the upper part at different heights. Air is blown in at the moment found most advantageous from these observations, the pressure of the same being regulated by observing through the peep-holes that an even and continuous combustion takes place, and that the coke is not set in blast and consumed. The tending of the furnace is not attended with any particular difficulties. Experiments with the furnace appear to have proved most successful at several ironworks. Thus, for instance, in a furnace 80 cm. in diameter, an experiment was made whereby 100 tons of iron were smelted in twelve smeltings, the results of which showed a consumption of coke of 5.01 per cent. of the iron smelted, representing a saving, according to the proprietors of the works in question, of 33 per cent. of fuel as compared with the old cupola furnace. At some other works where the furnace has been tried the consumption of coke is reported, in percentage of the iron smelted, to have been 4.14, 4.0, 5.7, 4.5 per cent., figures which vary through the quality of the coke used.

#### ARCHITECTURAL ASSOCIATION VISITS.

THE sixth Saturday afternoon visit of the Architectural Association was made on Saturday, the 23rd inst., first to Messrs. Dent & Hellyer's Works, 21, Newcastle-street, to witness some interesting experiments with various forms of traps which had been arranged by Mr. Hellyer to illustrate the remarks he made during the discussion on Professor Corfield's paper read at the Association a few weeks ago. The first trap was a "Bower." This was shown to be untrapped by the discharge of a closet above, and smoke being introduced into the drain, it was seen to pass through the trap. A series of lead syphon traps were then shown, and tested for the amount of water they contained, the point being to show that as good a seal could be got with a pint of water as with 6½ pints, the amount contained in one of the forms. The value of foot ventilation was then shown by means of a length of soil-pipe filled with common gas, and a 1-in. ventilating-pipe over 50 ft. long. The gas burned as soon as the pipe was opened, and went out directly; it was stopped. The next series of experiments were to show the necessity of trap ventilation, and the best forms of traps to prevent syphonage. The construction of valve-closets was explained, and the points of weakness pointed out. The action of flushing-tanks and grease traps was illustrated, and models of manholes illustrating the points to be looked to in their construction pointed out.

The second place visited was St. Bartholomew's-the-Great, Smithfield. Mr. Aston Webb met the members, and explained the restoration of the church which has been carried out under his direction, and which consists principally of work to the apsidal east end. The surrounding property has been acquired, and the next portion of the work proposed to be undertaken is the removal of the forge and the rebuilding of the transepts. As it is not contemplated to rebuild the nave, the organ has been placed at the west end under the western arch of the crossing, and in a position corresponding with the old roof-loft; the stalls underneath will be finished with canopies, so as to screen off the western wall. Only a portion of the woodwork of these stalls is at present carried out. Mr. Webb pointed out that by using blue Bath stone, and, varying the detail, he had been careful to make the restoration work so as not to interfere with the historic value of the old work, and every portion of old work that gave any indication of the various changes in style had been left, as, for instance, the traces of the fourteenth-century square end to the church.

#### THE VENTILATION OF SEWERS.

SIR,—I can endorse all that H. [p. 656, ante] says, on the above subject, and will, with your permission, give the results of my experience.

1. I covered an estate with thirty-three blocks of industrial dwellings. The drains were formed without any intercepting traps, and the soil-pipes were prolonged and carried up well above the roofs, two to each block. Here the drains are kept clean by the pressure of the water from the soil-pipes, and there are no smells in the street.

2. I covered another estate with fifteen blocks of dwellings. The drains were formed with intercepting traps and inspection chambers, where the drains are made of half-pipes. Here the drains are being constantly stopped up, the pressure of the water from the soil-pipes being destroyed at the inspection chambers, and the smell in the street from the gratings was so great that ventilating pipes from the sewers had to be put in to remedy it.

W. S. HORNER.

SIR,—The suggestion is made by "H." on p. 656, that if every house put up a special blow-off pipe at the head of its drain for the sewer, then the foul air of the sewers would become so little dangerous that the present intercepting traps now being put in might be dispensed with. I do not think so; the danger is too great. Isolation entirely in the house from the air of the public sewer is much safer than trusting to ventilation or dilution.

If every house is to put up a special blow-off pipe for the sewer, the said pipe should be joined,—as I have often recommended it,—on the outer side of the main disconnecting trap between the house and the sewer.

If the work referred to by "H." as recently done on the "modern system" caused bad smells at the ground-gratings, I would like to know,

supposing the work well done, what modern system is referred to?

The complaint is an argument for high-level blow-offs, but not for the disuse of intercepting traps.

Glasgow.

W. P. BUCHAN.

#### MEMORIAL CHAPEL, EPWORTH.

SIR,—As one of the competitors for the above, I was astonished to see your last issue containing the illustration, &c., of this building, inasmuch as the estimated cost of the building for which I sent in plans was 2,000*l.*, and not 5,000*l.* which it appears is to be spent on the accepted design. Had the other competitors been allowed the larger sum of money their designs would have been very different, and probably the successful competitor might likewise have been also.

However, Mr. Hicks may, perhaps, be able and willing to explain this.

SAML. MOSGRAVE.

#### TILES IN TABLES.

SIR,—Will you kindly give me space to ask your readers if they could tell me what is the best way of setting Minton tiles in a table-top so that with ordinary usage the joints would not break and water percolate through them? I am afraid that any joint made of plaster of Paris would, in consequence of the unequal and varying shrinkage of the wood and the tiles, soon break. Would a joint made of pitch be better? The table-top would be of tiles with a margin of wood round outside and level with the tiles, and the weakest part of the job would, I think, be the joint between outside rows of tiles and wood margin. Is there not a glue made by some maker of wood-flooring for attaching same to concrete foundation? Would this do, though positions would be reversed, wood being at bottom instead of at top? I should be much obliged by any hints.

W.

#### CHURCH-BUILDING NEWS.

**Andover.**—In Andover Church Miss E. Pressley has placed a memorial to her late uncle, Mr. Henry Thompson, for many years churchwarden and a Justice of the Peace, whose name is associated with the erection of the Cottage Hospital in that town. The memorial consists of ten full-length angels, about 2 ft. 3 in. in height, some in attitude of prayer, and others with musical instruments, sculptured by Mr. Harry Hems, of Exeter, from designs by Mr. William White, F.S.A. They stand upon pedestals left for the purpose, upon the dwarf chancel screen, erected some fifteen years ago, when the choir was brought forward into the nave, and other alterations made.

**Grantham.**—Four new oak screens have just been placed in the bays of the chancel of Grantham parish church, after designs furnished by Mr. J. Oldrid Scott, and forming part of the original design made when the restoration of the church was undertaken, twenty years ago, under Sir Gilbert Scott. With these and the fine painted reredos, by Mr. Blomfield, recently erected, the east end now presents a very rich effect. The screens are of oak, very massive, and a little more than 10 ft. high, of solid panel for about 5 ft., pierced above with tracery of Early Perpendicular character. The contract price for the four screens is 450*l.* The work has been entirely executed at Grantham, in the workshops of Messrs. Rudd & Son.

**Redcar.**—Since his appointment to the living two years ago, the Rev. F. H. Hill has been actively engaged in raising funds for the alterations to the church, and it is expected that the work will shortly be begun. According to the estimate of the architects, Messrs. Clark & Moscrop, Darlington, 800*l.* at least will be required. It is intended to re-seat the church throughout, re-arrange the chancel, lay tiled floors, provide new pulpit and reading-desk, and build a new vestry.

**Sale.**—The Church of St. Anne, Sale, is being extended, and the memorial stone of the new north wall has lately been laid. The extension will include the addition of a north aisle corresponding with the south aisle already existing, the building of an organ-chamber and choir-vestry on the south side of the chancel, and the erection of a porch at the west end of the church. The present accommodation comprises 566 pews and 223 free sittings, and by the projected enlargement the total number of sittings is to be increased to 845. While the workmen are engaged upon the fabric it is proposed also to effect some necessary repairs to the tower and spire and to re-seat the gallery. For the whole of these proposed works a sum of 1,500*l.* is estimated to be necessary, and beyond that sum an expenditure of 500*l.* upon a new organ is contemplated. The contractor

for the new building work is Mr. T. B. Kendall, under the superintendence of Mr. J. Lowe, architect, Manchester. It is anticipated that the operations will be completed about the end of June.

**Sparkwell (Devon).**—A carved oak Litany-desk was placed in Sparkwell Church, South Devon, on Easter Eve. It was designed by the Rev. E. Geldart, of Witham, Essex, and made by Messrs. Luscombe & Son, Exeter. The rector, the Rev. Pender Cudlip, has also commissioned Messrs. Luscombe & Son to make a carved oak pulpit for the church.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

4,065, Spring Hinges. S. Gerish.

The subject of this invention is an improvement on the hinges now generally known as "Gerish's hinges," which are made both single and double acting. The end of the chain, which is used to check the action of the spring, is now by this formed into a screw, and a long cylindrical nut is fitted on to the same.

6,312, Windows. J. Mason.

The windows made in accordance with this invention are mounted on the swing principle, and the swinging sash is carried from the window-frame by means of hinged weathering-plates, which plates are also similarly fitted at the side of the sash so as to cover the joints of the sash and frame. The plates have projecting heads to prevent draught.

6,370, Paints. R. Lavender.

The paints which form the subject of this invention have oxide of iron as a basis. The improvements are in the direction of heating the coppers or sulphate of iron, then crushing or grinding it and exposing it in thin layers to heat with a free passage of air through the retorts.

9,314, Door-knobs. H. G. Hesketh.

The knobs which are the subject of this patent are fastened to their spindles at one end by means of a wedge being driven into a slot cut in the end of the spindle, the spindle thereby expanding inside the spindle-hole, which has been previously widened at its posterior end on two sides of the hole (which is square) to admit of the expansion of the spindle.

4,496, Flushing Cisterns. T. & J. Holt.

This invention has for its object a cheap and serviceable flushing cistern, so arranged that the water can only pass into the flush pipe when the cistern is in actual use. The cistern may be brought into action by either a violent or gentle movement, and when either takes place, the supply of water to the cistern is closed or stopped. In syphon cisterns, the whole cistern is pivoted; in non-syphon cisterns this is impracticable, but a lever carrying a small tray or dash-board oscillates instead, and cuts off the communication between the ballcock and the cistern before the flushing-pipe is opened.

6,019, Gas Brackets. R. H. Best.

This patent relates to cantilever brackets in lights of the Wenham or similar pattern, and allows a regenerative burner to be used with this class of bracket. It not only provides for carrying the burner, but also provides an upward flow governor, arranged and provided so as to be thoroughly accessible without dismantling any structural parts.

6,221, Fireproof Floors. C. S. Williams.

The floors made according to this system are attached to the girders carrying the floor, a casing of concrete or other fireproof material, shaped to receive slabs of a similar material which form the fireproofing between the encased girders.

##### NEW APPLICATIONS FOR PATENTS.

April 15.—5,471, J. Dedicoat, Fasteners for Window Sashes and other Sliding Frames.—5,476, D. Burns, Utilisation of Waste Products and Manufacture of Bricks and Tiles therefrom.—5,477, D. Cowan, Cooking Ranges, Stoves, or Fireplaces.—5,510, H. and E. Rielle, Pegs for joining together Joinery, Carpentry, Cabinet Work, &c.

April 16.—5,575, W. Horn, Kitchen Cabinet.—5,582, J. Scott, Decorating Glass for Windows, &c.

April 18.—5,611, J. Eaton and J. Hubard, Gas-holders, Gas Brackets, &c.

April 19.—5,607, J. Drummond, Chimney Cows.—5,671, W. Roberts, Joints of Drain Pipes.—5,681, R. Black, Die Holder for Bricks, Tiles, Pipes, &c.—5,692, C. Shepherd, System of Sewerage for Buildings.—5,694, F. Griffith, Sound Producing Lock and Door Knob or Handle.—5,702, J. Armstrong, Glazing.—5,723, S. Pitt, Manufacture of Building Materials from Glass.

April 20.—5,732, J. Martin, Pans and Seats of Water Closets.—5,748, A. Payne, Door Bolts, &c.—5,751, J. Horrocks, Ventilating Buildings, &c.—5,752, S. Taylor, Saws.—5,762, T. Panario, Water-Waste Preventers.—5,765, G. Thornborough, and E. Lanour, Swivelling Sliding Doors or Partitions.

April 21.—5,815, T. Lodge, Portland Cement.—5,825, J. Rowland, Air, Water, and Fire Proof Doors.—5,828, J. Ward and W. Jones, Window Sashes.

#### PROVISIONAL SPECIFICATIONS ACCEPTED.

483, E. Wilson, Fixing Door Knockers, &c.—2,805, E. Lloyd, Fastening for Windows, Casements, and Doors.—3,256, G. Jeffrey, Covering for Roofs.—3,537, E. Eaton, Sash and Cord Pulleys.—3,539, E. Abbey, Construction and Formation of Main Drains, Conduits, or Sewage Pipes.—3,978, W. Dunoon, Glazed Roofs.—4,033, R. Ninnes, Casement Stay.—4,151, J. Robertson, Fireproof Floors and Ceilings.—4,194, W. Skinner, Water-closets.—4,254, M. Syer, Water-waste Preventer.—4,285, A. Dresser, Heating Buildings, Rooms, &c.—4,530, J. Hildnes, Automatic Fire Alarm for Buildings, Workshops, &c.—4,772, J. Stawitz, Water Meters.—3,073, D. Knowles, Window Sash Fastener.—3,890, J. Taylor, Self-acting Ventilator.—4,193, H. Stevenson, Horticultural Buildings.

#### COMPLETE SPECIFICATIONS ACCEPTED.

##### Open to Opposition for Two Months.

5,316, W. Allen, Flushing Closets.—7,519, E. Salsandro, Sawing, Cutting, Dressing, or Polishing Stone.—7,666, T. Hollwell, Fixing Sheets of Glass, Zinc, Slate, &c., for Covering Roofs, Flats, or Sides of Railway Stations, Greenhouses, &c.—8,120, S. Lowden, Portland Cement.—8,152, H. Keene, Lead Glazing.—16,080, S. Harvey, Fixing Tiles and Slates to prevent Wind-stripping.—3,938, W. Day, Chimney Cowl.—4,531, P. Davies, Stench Traps.—3,147, W. Smeaton, sen., Water-closets.—8,146, W. Smeaton, sen., Flushing Apparatus.—8,175, T. Howdill, Window Sashes and Frames.—8,318, S. Waller and T. Wiseman, Cowl.—3,436, G. Newman, Door Checks and Springs.

### The Student's Column.

#### FIELD WORK AND INSTRUMENTS.—XVIII.

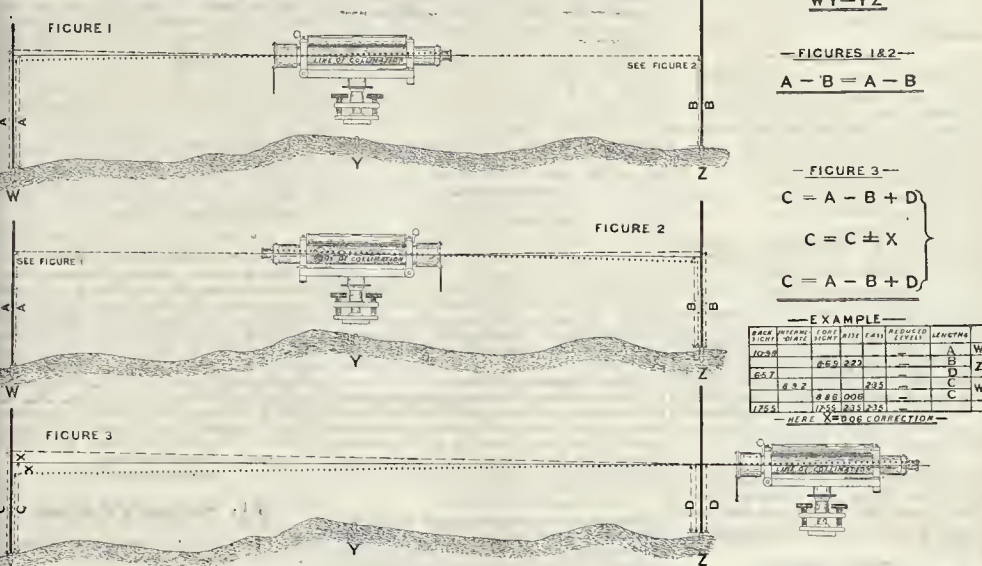
##### Leveling Instruments.

##### II.—ADJUSTMENT FOR COLLIMATION.

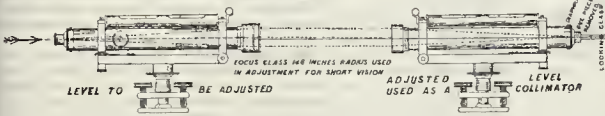
**T**HE line joining the optical centre of the object-glass and a point in the line of the horizontal cross hair in the diaphragm of a Level should be horizontal when the longitudinal bubble is in the centre of its run. This adjustment is effected by the capstan-headed adjustment screws at the eye end of the telescope, which serve to raise or depress the diaphragm plate. Theoretically, a re-determination of this adjustment, known as "the adjustment for collimation," should be effected whenever the object-glass is removed from the telescope; but if the object-glass be carefully screwed home, or returned as near as possible to the exact position it occupied before removal, this adjustment need not be repeated. After conveying the instrument by railway, or when carried in a cab for some distance, the collimation adjustment should be tested prior to using the instrument for taking levels. It is generally determined by the makers, with the use of an adjusted level as a "collimator." The cross hairs of the adjusted level are placed in the principal focus of the object-glass, which is of long focal length, so as to adjust for an infinite distance. The instrument is set up level, and the eye-piece removed from its socket. As a temporary protection for the cross hairs, a piece of plain glass may be inserted. The shade covers are also taken off each telescope. It will be seen from the diagram that when the instrument to be adjusted is set level, a pencil of rays, proceeding from a point in the plane of the horizontal cross hair of the diaphragm of the collimator, will, after passing through the object-glass, run parallel, and should the axis of the pencil be horizontal, the parallel rays between the two levels will be also horizontal. The parallel rays, after emergence from the level, which is used as a collimator, falling upon the object-glass of the level to be adjusted, will be converged to a point within the telescope, and an image of the wires or cross hairs of the collimator will be formed. The horizontal cross hair of the level under adjustment should then be made to coincide with the image of the horizontal cross hair from the adjusted level, which is used as "the collimator," by loosening one of the collimation adjustment screws in the instrument to be adjusted, and tightening the other, care being taken to observe that the longitudinal bubbles in both instruments remain in the centre of their run while the adjustment is being made. As indicated by the diagram, a little difference in the height of the two instruments will not affect the result, but it is desirable to reduce this difference of level to a minimum.

A ready means of adjusting the fixed telescope of a dumpy level for collimation, without the aid of a collimator, is illustrated by figs. 1, 2, 3. Three pegs are driven into

DUMPY LEVEL ADJUSTED FOR COLLIMATION



DUMPY LEVEL—DIACRAM SHOWING METHOD ADOPTED BY THE INSTRUMENT MAKER FOR THE ADJUSTMENT OF THE LINE OF COLLIMATION IN THE LEVEL.



NOTE—THE LEVEL OF THE LINE OF COLLIMATION NEED NOT NECESSARILY BE EXACTLY THE SAME IN THE TWO INSTRUMENTS IN ORDER TO MAKE THE ADJUSTMENT.—(SEE DOTTED AND FULL LINES ABOVE)

HORIZONTAL MEASUREMENT  
WY=YZ

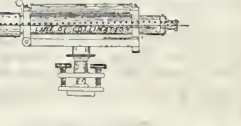
—FIGURES 1 & 2—  
A - B = A - B

—FIGURE 3—  
C = A - B + D  
C = C ± X  
C = A - B + D

—EXAMPLE—

| BACK SIGHT | FOOT | INTER  | FORE SIGHT | REDUCED LEVEL | LENGTH |
|------------|------|--------|------------|---------------|--------|
| 102.3      |      |        |            | A             | W      |
| 65.7       | 265  | 227    |            | B             | Z      |
| 43.7       |      |        | 235        | C             | W      |
| 125.5      | 1755 | 1212.5 |            | D             |        |

—H.B. & CO. CORRECTION—



|                                                                                     |       |
|-------------------------------------------------------------------------------------|-------|
| Stamford Hill—5, Grange Court-road, 88 years, ground-rent 6l. 10s.                  | 2330  |
| 6 and 7, Grange Court-road, 88 years, ground-rent 13l.                              | 700   |
| Stoke Newington—35 and 37, Cowper-road, freehold By C. C. & F. MOORE.               | 900   |
| Mile End—8, 10, and 12, St. Peter's-street, 43 years, ground-rent 9l.               | 725   |
| Old Gravel-lane—"The Meeting House Building," freehold                              | 380   |
| Forest Gate—4, Gordon-villas, 96 years, ground-rent, 3l. 6s.                        | 133   |
| South Hackney—70 and 72, Cassland-road, 63 years, ground-rent 12l. 12s.             | 645   |
| Bexley Heath—A plot of freehold land                                                | 95    |
| By VENTNOR, BULL, & COOPER.                                                         |       |
| Honiton, near—Higher Ridge Farm, 5 a. 1r. 12p., freehold                            | 910   |
| By WORSFOLD & HAYWARD.                                                              |       |
| Dover—29 and 31, Biggin-street, freehold                                            | 3,790 |
| 10 and 11, Winchelsea-street, freehold                                              | 423   |
| 19 and 21, Randolph-garden, freehold                                                | 750   |
| 17 and 18, Queen's-gardens                                                          | 240   |
| By SALTER, BERT, & CO.                                                              |       |
| Kenish Town—22, Carlton-road, 84 years, ground-rent 8l.                             | 290   |
| Highgate—9, 11, and 17, Lulso-street, 83 years, ground-rent 14l. 10s.               | 250   |
| By FULFORD & FULLER.                                                                |       |
| Seren Oaks—Vine Court-road, a plot of freehold land                                 | 180   |
| By HANMAN BROS.                                                                     |       |
| Raynes Park—Two Plots of freehold land                                              | 100   |
| By BARBA & SORE.                                                                    |       |
| Transvaal—Cecilia Homa Farm, about 5,291 acres                                      | 360   |
| Grootfont Farm, about 6,348 acres                                                   | 423   |
| Mosslegate Farm, about 4,243 acres                                                  | 320   |
| Schoongezigt Farm, about 8,349 acres                                                | 330   |
| Herts, Bengoe—Two freehold villas                                                   | 700   |
| Puckeridge, High-street, Brecknock House, and 6 acres, freehold                     | 825   |
| An enclosure of freehold land, 6a. 0r. 25p.                                         | 1,100 |
| Hertford, Birchley-street—Freehold cottage                                          | 80    |
| By C. & H. WHITE.                                                                   |       |
| Brixton—21, Bellefield-road, 77 years, ground-rent 5l.                              | 285   |
| 18, Treherne-road, 76 years, ground-rent 4l.                                        | 325   |
| Stockwell—49 and 48, Aytoun-road, freehold                                          | 970   |
| South Lambeth road—A plot of freehold land, area 7,500 ft.                          | 1,110 |
| A plot of freehold land, area 12,110 ft.                                            | 1,550 |
| A plot of freehold land, area 3,970 ft.                                             | 620   |
| A plot of freehold land, area 5,650 ft.                                             | 1,210 |
| A plot of freehold land, area 4,540 ft.                                             | 680   |
| A plot of freehold land, area 7,125 ft.                                             | 1,280 |
| By C. D. FINE & SONS.                                                               |       |
| Bermondsey—216, 218, and 220, St. James's-road, 62 years, ground-rent 17l.          | 965   |
| 218 to 220 odd, Lynton-road, 62 years, ground-rent 68l.                             | 8,910 |
| 224 to 230 even, Lynton-road, 62 years, ground-rent 20l.                            | 940   |
| Southwark—63, High-street, freehold                                                 | 2,800 |
| Bermondsey—139, Jamaica-road, and 41, Marlborough-street, 59 years, ground-rent 6l. | 680   |
| 45 and 50, Fream-street, 29 years, ground-rent 3l.                                  | 375   |
| Ground-rent of 4l. 10s., reversion in 27 years                                      | 130   |
| Notting Hill—75 and 80, Lansdowne-road, freehold                                    | 1,600 |
| Hammermith—2 and 4, St. Peter's-grove, 39 years, ground-rent 8l.                    | 405   |

RECENT SALES OF PROPERTY.  
ESTATE EXCHANGE REPORT.

| APRIL 19.                                                                                |       |
|------------------------------------------------------------------------------------------|-------|
| By F. JOLLY & Co.                                                                        |       |
| Stamford Hill—46, Cazenove-road, 89 years, ground-rent 11l.                              | 4900  |
| Stoke Newington—31, Osbaldeston-road, 91 years, ground-rent 8l. 8s.                      | 475   |
| By BRAN, HURNETT, & Co.                                                                  |       |
| Brixton Hill—1, 2, and 3, Mill-lane, freehold                                            | 590   |
| By L. SMYK.                                                                              |       |
| St. John's Wood—40, 42, and 48, Cochrane-street, 33 years, ground-rent 15l. 16s.         | 1,100 |
| By ROOBS, CHAPMAN, & THOMAS.                                                             |       |
| Mitcham—Seven plots of freehold land, in 3r. 0p.                                         | 740   |
| By FULFORD, HORSEY, SOYS, & CASSATT.                                                     |       |
| West India Dock-road—3, Limehouse-causeway, freehold                                     | 550   |
| 5, Limehouse-causeway, cophold                                                           | 500   |
| East India Dock-road—1, 3, and 5, Balb-street, 66 years, ground-rent 12l. 10s.           | 550   |
| 1 and 2, Myrtle-cottages, 56 years, ground-rent 4l.                                      | 249   |
| 1 to 9, Grove-villas, freehold                                                           | 2,163 |
| 1 to 4, Ivy-cottages, 46 years, ground-rent 9l.                                          | 620   |
| Bromley—45 to 53 odd, Ellemere-street, freehold 60 to 56 even, Brabazon-street, freehold | 890   |
| By RUSHTON & STEVENS.                                                                    |       |
| Westbourne Park—48, Southampton-street, 76 years, ground-rent 7l.                        | 170   |
| North Kensington—2, Whetstone-road, 89 years, ground-rent 7l. 10s.                       | 220   |
| 31 and 34, Trevarton-street, 76 years, ground-rent 14l. 10s.                             | 280   |
| Shepherd's Bush—60, Coningham-road, 80 years, ground-rent 6l. 10s.                       | 145   |
| By A. & F. CARTER.                                                                       |       |
| Clapham Junction—Ground-rent of 37l., reversion in 92 years                              | 585   |
| By R. TIDY & SON.                                                                        |       |
| Highbury—17, St. Paul's-road, 59 years, ground-rent 7l.                                  | 500   |
| Canonbury—24, Canonbury-villas, 31 years, ground-rent 8l.                                | 333   |
| By LEWIS, SHARP, & HARRINGTON.                                                           |       |
| Bloomsbury—1, Queen-square, freehold                                                     | 1,010 |
| By A. WALTON.                                                                            |       |
| Page Green—2, Park-terrace, freehold                                                     | 590   |
| Carsham—Ground-rent of 18l. 16s., reversion in 92 years                                  | 350   |
| By NEWSON & HARDING.                                                                     |       |
| Hoxton—22 and 24, Felton-street, 50 years, ground-rent 6l. 10s.                          | 1,000 |
| 69 and 70, Forston-street, 16 years, ground-rent 4s.                                     | 500   |
| Holloway—121 and 123, Corbyn-street, 63 years, ground-rent 12l. 12s.                     | 495   |

the ground as far apart as practicable, and at equal distances, say 4½ chains, or about 300 ft. apart. Place the instrument over the centre peg marked Y, and having set the bubble level, read the staff on the peg W (fig. 1). Then turn the telescope horizontally half-round, carefully re-set the bubble, if necessary, and read the staff on peg Z (fig. 2). It will be evident that the correct difference of level between the points W and Z can be thus obtained, because if the reading of the staff A be above or below the true line of collimation, as indicated by the dotted lines in the diagram (fig. 1), the error at the same distance from the instrument will be the same in the case of the staff B (fig. 2). Having determined the true difference of level between the points W and Z by figs. 1 and 2, set up the level near to the highest of these points in line with both points W and Z, but not between them (fig. 3). Adjust the longitudinal bubble to the centre of its run, and read the staff first upon the point Z, and next upon the point W. The difference of level should be the same as previously determined. If any discrepancy exists, calculate from the amounts arrived at by figs. 1 and 2 what the staff C over the point W in fig. 3 should read, and by means of the collimating screws adjust the horizontal cross hair until this reading upon the staff C is obtained. The distance between the instrument and the staff D in fig. 3 should be so simply sufficient to clearly read the divisions upon the staff through the telescope, in order that any divergence of the line of collimation from the true level may have an inappreciable effect upon the height read on the staff D. If the distance between the more distant staff and the instrument be considerable, allowance must be made for the curvature of the earth and for refraction, but it is not advisable to read the staff at a greater distance than the surveyor finds convenient for giving the staff-holder full instructions. It is also necessary to define each point in detail where the staff is held, which cannot be done so accurately when a long distance intervenes between the instrument and the level staff.

Robert Boyle & Son (Limited).—An extraordinary general meeting of this company was held on Wednesday, the 20th inst., in the Cannon-street Hotel, to consider resolutions for altering the company's Articles of Association as proposed by Mr. Robert Boyle, the managing director, and which were passed unanimously.

MEETINGS.

**SATURDAY, APRIL 30.**  
*St. Paul's Ecological Society.*—Visit to West Drayton and Uxbridge.

**MONDAY, MAY 2.**

*General Conference of Architects.*—(First day) Visit to New Stock Exchange. 3.45 p.m.—Opening Meeting, Reception, &c. 7.30 p.m., to be followed by *Royal Institute of British Architects.*—Fifty-third Annual Meeting. 8 p.m.  
*Clerks of Works Association.*—Mr. G. J. Egan on "Granite." 8 p.m.  
*Society of Engineers.*—Mr. J. B. Lightfoot on "Refrigerating Machinery on Board Ship." 7.30 p.m.  
*Liverpool Architectural Society.*—Paper by Mr. E. J. Tarver. 7 p.m.  
*Victoria Institute.*—Professor Hall, F.R.S., on "The Rock-hewn Capital at Idumæa." 8 p.m.

**TUESDAY, MAY 3.**

*General Conference of Architects.*—(Second day) Visits to National Liberal Club, Whitehall Court, Hotel Victoria, and the Holloway College. 11 a.m.—Paper by Mr. J. D. Sedding on "Architecture and the Handicrafts." 8 p.m.  
*Art Union of London.*—Annual Meeting and Prize Distribution. (Adelphi Theatre. 12 noon.)  
*Royal Institution.*—Professor W. E. Ayrton, F.R.S., on "Electricity." 11. 3 p.m.  
*Institution of Civil Engineers.*—Further discussion on the papers by Messrs. Grover, Fox, Stooke, and Matthews on "Water-Supply from Wells." 8 p.m.  
*Society of Biblical Archaeology.*—Papers by Rev. G. H. Tomkins and M.M. Eugene and Victor Revillonx. 8 p.m.  
*Purkes Museum (Lectures for Sanitary Inspectors).*—Paper on "Scavenging, Disposal of Refuse and Sewage." 8 p.m.  
*Birmingham Architectural Association.*—Nomination of Officers. 7.30 p.m.

**WEDNESDAY, MAY 4.**

*General Conference of Architects.*—(Third day) Visit to houses in Harington-gardens, Kensington Court, &c. 11 a.m.—Papers on "Architectural Education." 3 p.m.  
 Mr. John Slater on "New Materials and Inventions." 4 p.m.  
*Society of Arts.*—Mr. J. C. Morton on "Agricultural Education." 8 p.m.

**THURSDAY, MAY 5.**

*General Conference of Architects.*—(Fourth day) Visit to the City and Guilds Institute, South Kensington, 11 a.m.—Report of the Special Federation Committee. 3 p.m.—Conversations at South Kensington Museum. 9 p.m.  
*Society for the Encouragement of Fine Arts.*—Conversations at the Galleries of the Royal Institute of Painters in Water-Colours, Piccadilly. 8 p.m.

**FRIDAY, MAY 6.**

*General Conference of Architects.*—(Fifth day) Visit to the Drainage Works at the House of Parliament, 11 a.m.—Papers on "The Registration of Architects." 3 p.m.  
*Royal Institute of British Architects.*—Presentation of Royal Gold Medal, &c. 8 p.m.  
*Architectural Association.*—Mr. J. L. Robinson, R.H.A., on "An Irishman and his Camera in England, a Dark Scene." 7 p.m.  
*Purkes Museum (Lectures for Sanitary Inspectors).*—Mr. C. E. Cassal, F.C.S., F.I.C., on "Food (including Milk), Sale of Food and Drugs Act." 8 p.m.

**SATURDAY, MAY 7.**

*General Conference of Architects.*—(Sixth day) Visit to the Diploma Gallery of the Royal Academy, &c. 11 a.m.  
*Royal Institute of British Architects.*—Members' Dinner, Freemasons' Tavern, 7 p.m.  
*Architectural Association.*—Visit to the National Liberal Club. 3 p.m.  
*Edinburgh Architectural Association.*—Visit to Linlithgow Palace and St. Michael's Church.  
*Association of Public Sanitary Inspectors.*—Address by the President, Mr. Edwin Chadwick, C.B. 6.30 p.m.

Miscellaneous.

**Birmingham Students of the Institution of Civil Engineers.**—The association of the Birmingham students of this Institution held their seventh meeting of this session at the Colonnade Hotel, Birmingham, on the 21st inst. Mr. C. Hmt, Member of the Institution of Civil Engineers (Vice-President), in the chair. Mr. H. L. Tarbet, student of the Institution of Civil Engineers, read an interesting paper upon the Wellington (Somerset) Waterworks, as designed by Mr. E. Pritchard. The water supply is conveyed by gravitation from springs at Westford to the pumping station (about 450 yards distant), whence it is pumped into a circular iron tank on the top of a brick tower, and then distributed in the town. The pumping machinery and gas engines are in duplicate, and each engine can work separately each or both set of pumps. Downson's patent economic gas apparatus is adopted to drive the gas engines. The paper was illustrated by large diagrams, and an interesting discussion followed its reading.

**Beebles.**—The large east window of Beebles Parish Church has just been filled with stained glass. The window consists of seven long lights and numerous tracery windows. Twenty-one subjects, taken from the life of Christ, have been illustrated in the lights, and the tracery pieces contain figures of the Twelve Apostles, with angels, cherubim, &c. The work has been carried out as the result of a subscription amongst parishioners and friends. Messrs. Heaton, Butler, & Bayne, of Garrick-street, London, were the artists who designed and executed the work.

**New Bank Buildings at Wimbledon.**

Amongst the numerous public and private buildings which are in rapid succession rising up at Wimbledon is an extensive block which has been erected by the London and South Western Banking Company, and to which the designation "Bank Buildings" has been given. The structure is situated in the Wimbledon Hill-road, near the entrance to Wimbledon Park. It has three frontages, the principal elevation being in Wimbledon Hill-road, with a return frontage on the south side, in Compton-road, opposite the recently-erected Free Library, and another return frontage on the north side, the entire block covering a ground area of about 14,000 ft. The Wimbledon Hill-road frontage is about 150 feet in length, and upwards of 60 ft. in height, and contains four lofty floors. It is faced with red brick and red terra cotta, the latter material being freely introduced for ornamentation. The frontage is surmounted by four lofty gables, and at the north end a five-light bay window, surmounted by a balcony, is a special feature at the first floor of the frontage. The bank proper is at the south end of this frontage, occupying also the whole of the Compton-road elevation. The ground-floor part of this portion of the block is entirely faced with terracotta, both frontages having three-light mullioned windows, divided by fluted pilasters. The entrance to the bank is at the angle of the two frontages, and forms an archway with cornice and pediment, supported on each side by massive cantilevers. At the north and south angles of the back frontage in Wimbledon Hill-road, on a level with the third floor, there are octagonal turrets in terra-cotta, and also similar turrets at the extreme north end of the block. The buildings were erected from the designs of Mr. James Edmondson, Mr. H. Johnson, of Park-avenue, Wood Green, being the contractor. Those portions of the block not occupied by the bank consist of shops.

**The Great Eastern Railway Company's New Station at Southend.**—The Great Eastern Company are preparing for a large amount of expected traffic on the approaching opening of their new line, now nearly completed, between the metropolis and Southend. Their station at the Southend terminus, now in course of construction, will occupy an extensive area of land which the company have secured. In the first instance they purchased an estate of twelve acres for station and siding purposes, but this not being considered sufficient the company are now negotiating for the purchase of a still further quantity of land immediately adjoining, in anticipation of its being found necessary to increase the station accommodation now being provided. The dimensions of the station will be seen when it is stated that there will be five platforms, each about 900 ft. long. Amongst the other new stations on the new branch between the main line at Brentwood and Southend, the directors have just decided to erect one at the interesting Essex village of Prittlewell, near Southend.

**St. Mary Church (Devon).**—Mr. S. J. Smith, C.E., one of the inspectors of the Local Government Board, held an inquiry a few days since at the St. Mary Church Town-hall, consequent upon the application of the Local Board for power to borrow 1,650*l.* for works of street improvement, the purchase of a steam roller and crusher, and sundry other purposes. There was considerable opposition to the proposal, which led the Inspector to say that he had abundant evidence that by the use of a steam roller and crusher 30 per cent. was saved in road-making. He was perfectly astonished at the opposition, thinking it would have been "a 'tother way about." In the case of four local boards in Cumberland and Westmoreland, who had joined together in buying a steam-roller, and whose action had been sanctioned by the Local Government Board, the roads were more narrow and hilly than any in the St. Mary Church district.

**The Registration of Plumbers.**—At the Guildhall, on Saturday last, Alderman Knill presiding, supported by Messrs. W. H. Webb, J. C. Ashdown, and L. Gilbert, members of the Registration Committee, certificates of registration were issued to thirty-one master plumbers and seventy-seven journeymen plumbers. Besides those from the London district, plumbers attended from Brighton, Bristol, Cheltenham, Gloucester, Dartford, Eastbourne, Exeter, Gloucester, Grimshy, Guildford, Hastings, Lincoln, Luton, Oxford, Ramsgate, St. Leonards, Salisbury, Tunbridge Wells, Wolverhampton, and York.

**The Strike in the Building Trade at Birmingham.**

The strike in the building trade has now entered upon the third week, and both sides, according to the *Birmingham Gazette*, appear equally resolute. A meeting of representative employers and operatives in the building trade was held on Monday at the Grand Hotel, with a view, if possible, to adopting a basis for the settlement of the dispute. Mr. J. Bowen (Chairman of the Master Builders' Association) presided, and the other employers present were Messrs. A. S. Smith (Smith & Sons), W. Sapcote, inn. (Sapcote & Sons), F. Cowing (Gowing & Ingram), T. Robotham, C. H. Barnsley (Barnsley & Sons), W. Blore, H. J. Woodward (Woodward & Smith), R. Folland, J. W. Bellamy, and E. J. Bigwood (secretary). The operatives' delegates present were Messrs. E. Boraston and B. Bateson (Carpenters and Joiners' Association), I. Ridlee and J. Farr (Stonemasons), W. Nash and F. Freeman (Bricklayers), J. Robinson and R. Cheshire (Plumbers), T. Dalton and A. D. Hopkins (Plasterers). The conference lasted from eleven o'clock till half-past four, but very little progress was made, neither side showing a disposition to give way. It transpired that the members of several branches of operatives declined absolutely to submit the question to arbitration. Eventually it was decided to adjourn the conference till Thursday.

**The Key of the People's Palace.**—The competition for the three best designs for a gold key, to be presented to the Queen on May 14th, at the People's Palace, has resulted in the prizes being awarded by Sir Edmund Hay Currie and Sir George Hayer Chubb to the following—1st, Mr. W. B. Pratt, 162, Sandringham-road, Hackney, E.; 2nd, Mr. George Evison, 8, King's-road, Upton Park, E.; 3rd, Mr. George Jones, 323, Old Ford-road, E. The key will be modelled on the style of the first of these designs, subject to certain modifications, which are found to be necessary by Messrs. Chubb & Sons, the manufacturers.

**Haverstock-Hill.**—New "Stations of the Cross" have lately been erected in the Priory Church of the Dominican Fathers at Haverstock-hill. They are fourteen in number, and the subjects are the same as those always traditionally used. The composition of these subjects is, however, said to be entirely new. This is especially so in the last or fourteenth (the entombment of our Lord), in which our Lord's body is represented entirely swaddled as a mummy, even the face being covered. It is stated that no artist has previously given this treatment. The paintings are by Mr. N. H. J. Westlake, F.S.A.

**Malvern.**—A window, to the memory of the late Mr. Andrew Henderson, M.R.C.S., which has been placed in Christ Church (the Fisk Memorial), by Colonel and Mrs. Forbes, two of the late doctor's patients, was unveiled on the 9th inst. The work has been executed by Messrs. Clayton & Bell, of London. The subject is "The Resurrection."

PRICES CURRENT OF MATERIALS.

| TIMBER.                                     |                | £. | s. | d. | 10 s. d. |
|---------------------------------------------|----------------|----|----|----|----------|
| Greenheart, B.G.                            | .....ton       | 6  | 10 | 0  | 7 10 0   |
| Teak, E.I.                                  | .....load      | 9  | 0  | 0  | 14 0 0   |
| Sequoia, U.S.                               | .....foot cube | 0  | 2  | 3  | 0 3 0    |
| Asli, Canada                                | .....load      | 3  | 0  | 0  | 4 10 0   |
| Birch                                       | .....          | 2  | 0  | 0  | 3 10 0   |
| Elm                                         | .....          | 3  | 10 | 0  | 4 10 0   |
| Fir, Dantsie, &c.                           | .....          | 1  | 10 | 0  | 4 0 0    |
| Oak                                         | .....          | 2  | 10 | 0  | 4 0 0    |
| Canada                                      | .....          | 3  | 0  | 0  | 6 0 0    |
| Pine, Canada red                            | .....          | 2  | 0  | 0  | 3 10 0   |
| " yellow                                    | .....          | 2  | 5  | 0  | 4 0 0    |
| Lath, Dantsie                               | .....fatbom    | 3  | 0  | 0  | 5 0 0    |
| St. Petersburg                              | .....          | 6  | 0  | 0  | 5 10 0   |
| Wainscot, Riga                              | .....log       | 2  | 15 | 0  | 4 0 0    |
| Odessa, crown                               | .....          | 2  | 15 | 0  | 3 0 0    |
| Deal, Finland, 2nd and 1st, std.100         | .....          | 7  | 0  | 0  | 8 0 0    |
| Riga                                        | .....          | 6  | 10 | 0  | 8 0 0    |
| St. Petersburg, 1st yellow                  | .....          | 5  | 10 | 0  | 7 0 0    |
| " 2nd "                                     | .....          | 8  | 0  | 0  | 14 0 0   |
| " white                                     | .....          | 7  | 0  | 0  | 8 0 0    |
| Sweden                                      | .....          | 6  | 0  | 0  | 15 0 0   |
| White Sea                                   | .....          | 7  | 0  | 0  | 10 0 0   |
| Canada, Pine, 1st                           | .....          | 17 | 0  | 0  | 25 0 0   |
| " 2nd                                       | .....          | 11 | 0  | 0  | 18 0 0   |
| " 3rd, &c.                                  | .....          | 6  | 0  | 0  | 9 0 0    |
| " Spruce, 1st                               | .....          | 8  | 0  | 0  | 10 0 0   |
| " 2nd                                       | .....          | 6  | 0  | 0  | 7 0 0    |
| " 3rd and 2nd                               | .....          | 5  | 0  | 0  | 7 0 0    |
| Battens, all kinds                          | .....          | 4  | 0  | 0  | 11 0 0   |
| Flooring Boards, sq. 1 in., prepared, First | .....          | 0  | 8  | 0  | 0 11 8   |
| Second                                      | .....          | 0  | 6  | 0  | 0 8 8    |
| Other qualities                             | .....          | 0  | 5  | 0  | 0 6 0    |
| Cedar, Cuba                                 | .....foot      | 0  | 5  | 0  | 0 3 8    |
| Honduras, &c.                               | .....          | 0  | 24 | 0  | 0 3 8    |
| Australian                                  | .....          | 0  | 2  | 0  | 0 3 8    |
| Mahogany, Cuba                              | .....          | 0  | 4  | 0  | 0 7 8    |
| St. Domingo, cargo average                  | .....          | 0  | 4  | 0  | 0 8 8    |





LONDON.—For alterations and repairs at 23, Denmark-street, Soho. Mr. A. S. Timothy, architect:—
Brand ..... £259 0 0
A. B. Clarke ..... 245 0 0
Longard ..... 190 0 0

MILVERTON (near Leamington).—For building Board School and caretaker's house, Milverton, near Leamington:—
Inwood, Malvern ..... £2,568 0 0
J. Light, Oldbury ..... 2,574 0 0
C. G. Hill, Coventry ..... 2,496 0 0
C. Claridge, Banbury ..... 2,488 0 0
Horsley Bros., Birmingham ..... 2,240 0 0
Espley, Stafford ..... 2,169 0 0
Rowbotham, Birmingham ..... 2,092 0 0
Dorne & Son, Cradley ..... 2,070 14 0
G. E. Smith, Milverton (accepted) ..... 2,060 0 0
Jones & Son, Sedgley ..... 1,995 0 0

NEWPORT (Mon.).—For the erection of new Hotel, now known as "Roller's Arms," Lydnor, near Newport. Mr. E. A. Lansdowne, architect. Quantities by the architect:—
A. Galey, Newport ..... £2,374 12 0
W. M. Blackburn, Newport ..... 2,326 0 0
T. Webb, Newport ..... 2,296 0 0
D. C. Jones & Co., Olmeston ..... 2,167 0 0
J. Firbank, Newport ..... 2,133 0 0
J. Linton, Newport ..... 2,089 0 0
H. Parfit, Pontnewydd ..... 2,060 0 0
Executors of W. H. Gradwell, Barrow-in-Furness ..... 1,875 0 0
C. Miles, Newport ..... 1,947 0 0
J. McLean, Lydnor ..... 1,911 0 0
T. Goldworthy, Newport (accepted) ..... 1,847 0 0

SOUTHAMPTON.—For store on the Town Quay, for the Pier and Harbour Board. Mr. J. G. Poole, architect:—
Garden ..... £1,774 0 8
Franklin ..... 2,326 0 0
Treharne & Co. .... 1,410 0 0
Crook & Son ..... 1,270 0 0
Stevens & Sons (accepted) ..... 1,253 0 0
Ball, Sons, & Co. .... 1,227 0 0
[All of Southampton.]

SOUTHAMPTON.—For additions to lodge at the Cemetery, for the Mayor and Corporation. Mr. W. B. O. Bennett, Borough Surveyor:—
Hornychurch & Mitchelmore ..... £325 0 0
Franklin ..... 257 0 0
Harvey ..... 279 0 0
Ball, Sons, & Co. .... 250 0 0
Crook & Sons (accepted) ..... 237 0 0
[All of Southampton.]

STRATFORD.—For new buildings for the Stratford Co-operative Society, Limited, Stratford. Mr. Henry Foster, architect, Lombard-street:—
E. Conder ..... £5,582 0 0
T. Boyce ..... 6,300 0 0
C. Cox ..... 6,069 0 0
Outhwaite & Son ..... 6,978 0 0
J. Morser, Stratford (accepted) ..... 5,893 0 0
[All exclusive of fittings.]

\*\* SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than 12 Noon on THURSDAYS.

TO CORRESPONDENTS.

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

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS. ADVERTISERS OF ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY MORNINGS.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PREBONS Advertising in "The Builder," may have Replies addressed to the Office, 46, Catherine-street, Covent Garden, W.C. Free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

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"THE BUILDER" is supplied gratis from the Office to residents in any part of the United Kingdom at the rate of 10s. per annum PREPAID. To all parts of Europe, America, Australia, and New Zealand, 25s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.

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### Architecture and Architectural Education.



HE subjects which have been of the most interest in the papers read and considered at the Conference of Architects, so far as we are able to get with it this week in accordance with the exigencies of publication, have

been those which concerned the two questions, what architecture should be, and how we are to attain thereto. Indeed, these may be called the most interesting subjects *sans phrase*; for the class of questions which belong to what may be called professional policy, though apparently burning ones to some people, are really of a much lower order of interest than those which concern the intellectual side of architecture as a great artistic study.

What is an architect to aim at as such, and how he is to train himself or he trained towards his aims, is a much more important and interesting inquiry than any question of professional etiquette, fee-charging, federation, or any other quasi-business matter of that kind. The paper by Mr. Sedding on "Art and the Handicrafts," and the series of short papers read on Wednesday afternoon on architectural education, deal with this higher interest of architecture, and there is a kind of relation between the two, seeing that Mr. Sedding's paper, in spite of a title which might seem to limit the subject a little, was really an inquiry into what architectural art consisted in, and what were the essential conditions of its strength and truth as an art; an inquiry which certainly has a very close connexion with that other one as to the means and the best course of architectural education.

Mr. Sedding's paper is a very picturesque and eloquent one, with that sort of eloquence which comes from real interest in one's subject; it is one we have read with great interest, and with sympathy in a sense with all of it, though we do not know that we can entirely agree with his conclusions. It is the old question, Why is not modern architecture as interesting, as characteristic, as ancient architecture?—by which Mr. Sedding appears to mean Mediaeval architecture; he does not in so many words limit himself to this, but the tone of his paper implies that it is Mediaeval architecture that is before his mind. And the answer he gives is one which has been given before, though he gives it with more consideration and elaboration than some other critics of

modern architecture have bestowed in stating somewhat similar conclusions. "What," asks Mr. Sedding, "is the quality in the architecture of old days which stamps it with its inherent nobleness? How came it with that inimitable touch that gives it this lasting human effectiveness?" And he formulates it, as the reader will see in his paper (printed *in extenso* in our Supplement), in the four propositions: that English architecture is not what it was; that the architect and the handicraftsman are not, respectively, what they were; and that their relations with each other are not what they were. As to the first proposition, of course English architecture is not what it was, because the people who are producing it, and for whom it is produced, though in race and name the same, are very different in their thoughts and habits. The difference is not only in the architect or in his relations to the craftsman, it is in the mass of the people too, for whom the architecture is made. The country is much more crowded, life is more of a struggle, economical considerations press on us with an importunity which cannot be set aside or ignored, life moves much faster, everything is wanted much quicker; if it cannot be furnished quickly it cannot be waited for, the occasion passes by or the quicker person seizes it. We cannot help this; we cannot undo it; these are the facts. The modern generations are no longer under a religious enthusiasm which regards the erection of great cathedrals as a work of piety, before which mundane considerations must give way. There is a good deal of enthusiasm in the present day, more than the *laudatoribus temporis acti* quite perceive or admit; but it has many outlets, and its chief outlet to-day is in the direction of science and scientific discovery, a temper which is not favourable to, and does not even give much occasion for, the expenditure of thought and means in the production of artistic architecture on a great scale. "For what will it cost?" is a question, no doubt, far too prominent in the present day; especially so, as we have often complained, in regard to great public buildings for which adequate means can really be found, without pressing unduly on individual resources. But still the economy question,—economy of time, economy of labour, economy of material,—does press on us in regard to most architectural efforts. There are occasions when it is the higher duty, if people would see it, to ignore mere economical considerations; but they are comparatively few. In the main the necessity of being, before all other qualities, practical, is forced upon us in the present day; we cannot afford to ignore it.

In comparing the interest of modern architecture with that of old, something must, of course, be allowed also for the interest arising

from historic association, and the beauty and picturesqueness born of time and decay, and assuredly inimitable by any artificial or deliberately chosen means. Mr. Sedding would, no doubt, admit that, though he passes it over in his paper. His main position is that in old art the handicraftsman was everywhere. He worked out details on the spot in his own way, unfettered by working drawings: that is the assumption; it wants positive proof, however, though in a great degree it is "probal to thinking," to use Iago's phrase. Mr. Sedding traces in a most interesting manner the marks of the same stamp of handiwork on buildings far apart from each other, showing the impress of the handiwork of the same set of masons; his observation seems to have brought out some new and interesting examples of this. In the present day, he argues, the craftsman is out of touch with the architect or master-builder; he follows detail drawings, furnished him often by one who has little communication with him, or with the building being erected, except by bits of paper sent from a distance; drawings and letters. Yes; and we remember, too, the story of the eminent architect who visited the wrong church, and did not find out, till the foreman told him, that he had been giving orders and making complaints about work done on a building which he had had nothing to do with, not even on paper. The craftsman, unhampered by detail drawings, it is argued, did put, and might again put, his own character and force into the work. He may not do so now. He is the slave of "Detail Drawing, No. 17, referred to in the Specification." And under this regimen the craftsman has lost his power of characteristic and original work. He is assimilated to a copying machine.

There is no doubt whatever that modelling a detail on the spot, and with the feeling of the moment, with the material actually under the hand, is a very different thing from copying another man's drawing; and an architect of judgment will not hamper a good workman too closely about following his drawing. No doubt, either, that the architect ought to be far more in direct contact with the building and the workers on it than he often is. He should see how things look on the spot; not be content with ordering them from a distance, and by the medium only of pencil lines and pen scratches. But those who aspire to this system of doing things must make up their minds that they will have to pay for it. They must give more time and thought for less return. They must limit the number of their commissions. They must live in a simple and inexpensive fashion, and be content with the reward of a good conscience in place of a considerable amount of 5 per cent.; and the demands of modern life are

against this. A man has his family to provide for, and he must go the pace or drop out and let them starve. If he does not take the commission and work it by letter and draw his 5 per cent., his neighbour is ready to do so, and matters will be nothing bettered; he will save his own soul, but will not be able to pay his household bills. Plain living and high thinking must be the order of the day. And, in London especially, the present generation are sadly set against that regimen. Modern habits of life are increasingly luxurious and costly; there is a race for wealth; every one wants more; few people say, like the unfortunate nobleman who had only 10,000*l.* a year, "the great thing is to be content with the little one has"; money-making comes before art, and "they that will be rich fall into temptation and a snare,"—architects as well as others.

But if we take away the drawings, and give the craftsman his head again, shall we be any nearer reviving the old interest of architecture? Mr. Sedding will probably say that we have now demoralised the craftsman too much, and that he will need a long period of liberty to find the use of his hands again,—an objection which would be true enough for the moment. When he found it, and if he were allowed the individual liberty he used to enjoy, in all probability a good deal of characteristic interest would be infused into modern architecture, which it does not at present possess. But we decline to believe that this is a necessary condition of giving life-like interest to modern architecture. It is one condition; not the only one.

The argument is,—ancient architecture had a human interest which modern architecture does not possess. In ancient architecture the craftsman had his own way. The only means to put the same life into architecture is to give him his own way again.

The premises are insufficient, however. We noticed that Mr. Sedding obviously refers to Medieval architecture when he speaks of "old architecture." But why not go back further and take a look at Greek architecture? It will scarcely be asserted, we suppose, that there is no interest in that. But we do not see many signs that the craftsman was an independent agent in that form of architecture. The Parthenon impresses us as the production of one over-ruling mind, bringing everything into harmony with the central idea; as far as the architecture is concerned, that is to say, the sculptors of the metopes may have had their own way to some extent, though, even here, we see a general subordination to a ruling idea; and such a building as the Parthenon must inevitably have been built from drawings or diagrams, and very accurately set-out ones, by whatever method and in whatever medium they were drawn. In the face of the Parthenon, and all that is now known about its refinements, it is absurd to urge that careful setting-out and the superintendence of a directing mind are fatal to architecture; for it is almost demonstrably impossible that the Parthenon could have been built except under such conditions.

There is one other possible influence in giving interest to modern architecture, which seems to have been left out of calculation. What gave interest and life to the craftsmen's work in the Medieval buildings was mainly that they took interest in and enjoyed their own work; they must have done so, or they could not have made it so lifelike and so interesting to us. Well, suppose the system changed, as it is practically at present; suppose that the craftsman is not left free, but has to work out his details from drawings under the guidance of a directing mind; is there not likely to be an important difference in the result, according as that directing mind does or does not enjoy his work, and, therefore, make it enjoyable to his fellow-workers? For that is an unalterable law in art; what you do not take pleasure in inventing, others will not take pleasure in studying. Mr. Sedding complains that "so far as architecture is now conducted as an art and as a profession, it means *design*, not craftsmanship." Well, suppose it does; is there no joy in designing?

And where there is, will not the interest of that he communicated to, and appear in the work of, the craftsman? Truly, in the way architecture is often practised now, it is difficult to imagine the inventor taking much pleasure in it; seeing that he inventeth not in many a case, but combineth shreds of former buildings according to book rule and a kind of artistic multiplication table. But there are some architects among us whose works look as if they enjoyed devising them. We would even rank Mr. Sedding, the pessimist, among the number; but perhaps he will deny the soft impeachment for the sake of upholding his own argument. But that is the secret of making architecture interesting. Let a designer enjoy making an effective plan, let him feel a keen pleasure in the points of his design, and put a detail or a decoration because he enjoys its effect, not because it is the correct thing for that style of work and is found in other examples; let him "design" (even) in this spirit, and the carrying out of his building will be a pleasure to those who work at it and to those who may contemplate it. But if the question is asked: how are we to develop this spirit of work? then, indeed, we can only shake the head and sigh *nascitur, non fit*.

This consideration seems rather to knock on the head the elaborate series of papers on education which have formed an important element in the proceedings of the Conference. Indeed, Mr. Aitchison takes this line, and admits that it is a thousand to one against any student of architecture having any architectural invention, and that invention cannot be taught. We therefore have, he thinks, to furnish them with knowledge that will take the place of invention, as a man may learn to compose respectable music though with no original genius. (N.B. The two things are not quite parallel, though they are often supposed to be so; because architecture, as far as design is concerned, is not under the rigid physical laws of proportion which govern music, to a certain point, inexorably.) Mr. Aitchison's paper is well worth attention, because it makes very pregnant suggestions, without attempting to lay down hard-and-fast rules or theories of architectural education. Among the special suggestions which are made is that of Mr. Lawrence Booth, that the Institute should act as a kind of "Alma Mater" or university, directing the studies of those who are students in the various Associations in correspondence with the Institute; and this is a suggestion which may bear fruit; but in that case the Institute must show itself more keenly alive to questions of architecture proper, and less bent on mere "professional practice" questions. Mr. Gotch complained that any education possible for the student now must be "a curious patchwork education, a lecture here and a lecture there"; and Professor Roger Smith followed with the idea of "a Studio for Architecture" and sketched out very well the course of study which such a studio should undertake to direct. This is an idea very capable of further development; though, in our opinion, it should be plainly recognised that such a studio should be a preparation, a grounding of the student in the subject before entering an architect's office to come into contact with practical work; without which he will never really learn his profession. The advantage of the studio idea is that a student whose heart is in his subject will have leisure there to acquire an adequate knowledge of it in its general bearings, artistic, constructive, and historical, before entering upon that practical routine which is so necessary to fit him for actual practice, but which has such a tendency to shut out from view all the higher aspirations and higher elements in connexion with what ought to be an ennobling and imaginative pursuit, not a mere business.

**The Art Journal.**—The June number of *The Art Journal* will contain a series of Critical Essays upon the Progress of the Fine Arts during the present reign, dealing with the arts of painting, sculpture, and architecture, the industrial and graphic arts, and art education.

#### THE ROYAL ACADEMY.



HERE can be no question that, as far as the paintings are concerned, the exhibition of 1887 is a great improvement on the unfortunate one of 1886, and indeed, in spite of the absence of such painters as Mr. Watts and Mr. Burne Jones, it may be said to be above rather than below the average of Royal Academy exhibitions. If we were asked to select the pictures which specially showed artistic power or interest from among the whole, we should have no doubt as to the first three to be selected. Mr. Tadema's "Women of Amphissa" (305), Mr. Orchardson's "The First Cloud" (291), and Mr. Henry Moore's "The Clearness after Rain" (659), curiously diverse as they are in subject, manner, and association, may be grouped together as the three most powerful works of this year's Academy.

Mr. Tadema's appears to be established as the popular picture of the year, judging by the crowd round it on Monday, and this popularity must be entirely credited to the painter and not to his subject, which is as little interesting to modern spectators as could be. It appears that on some occasion some Priestesses of Dionysos at Delphi, being seized with a religious frenzy (in other words, probably, having got drunk in the service of Dionysos), wandered to the town of Amphissa and slept in the market-place, where the benevolent ladies of the place came about in the morning and fed them and saw them safe out of the town. It is almost impossible to interest a nineteenth-century society in such an incident as this, but it gives the suggestion for the grouping of a number of pictures—quietly-dressed Greek women in pretty attitudes amid a setting of marble architecture. The Doric colonnade of the Agora occupies the right of the picture, in sharp perspective and painted with consummate care and skill; the marble floor extends in the centre, occupied by the fugitive votaries of Dionysos, some still asleep, one standing and stretching herself, two very beautiful brunettes on the left sitting up half-awake, and accepting with a look of gentle surprise the offer of breakfast by one of the townswomen. The majority of the latter form a group in the rear, picturesque with many-coloured garments. The grace of many of the sleeping or waking figures, and the mastery of drawing shown in the delineation of their various postures, render the work a masterpiece in execution, though of intellectual interest, as regards the subject, there is little enough. They are a crowd of Greek figures on a marble floor (very hard to sleep on, by the way!), and that is all.

Mr. Orchardson's picture on the same wall in Gallery III. is a contrast indeed to the last named. They represent almost the opposite poles of painting. Mr. Tadema paints ancient marble architecture so as to be almost illusory in effect. Mr. Orchardson paints the furniture and upholstery of the most modern of London drawing-rooms, and hardly with illusory effect, for his peculiar scale of colour and method of handling constitute a conventionality; we look at the scene through a kind of veil, as it were; and perhaps this manner,—a highly original one, borrowed from no one and imitated by no one,—is of aesthetic value as removing the subject of real life a little away from too obvious a realism. Two figures occupy the scene; the wife, a stately young woman of splendid figure, who moves slowly away through the *portière* into the further room, her back to the spectator, though the head is half-turned; the fingers of her right hand, nervously clutched, show her agitation or anger. The husband, in evening dress, stands with his back to the fire and hands in his pockets, and looking after his companion with an expression in which there is a whole history,—anger, doubt, and an uncomfortable speculation as to the future of life. The highest merit of the work is in the restraint of the artist; the delicate hand with which the situation is touched; there is no exaggeration or extravagance, but the story is told. Mr. Orchardson may claim place with such a writer as Balzac in his manner of depicting this

kind of society tragedy. Many of the other exhibitors paint figures of men and women, more or less well, and in more or less picturesque costumes and attitudes. Mr. Orchardson paints Life.

Mr. Moore's picture, before referred to, is one of those expanses of rough sea which he is fond of painting, but it is one of more than usual power and effect. The rain has gone, but the reflections of clouds still darken the sea in the foreground, the waves being almost inky in parts; but on the horizon is the strip of almost absolutely clear sky frequently seen at such a time, and in the midst of it one white-sailed ship on the horizon line. The force of the painting lies, perhaps, partly in the intensity of contrast between the dark water and the clear sky in the distance; partly, no doubt, in the manner in which the weight and depth of the water is conveyed, and in the grand and broad execution of the whole.

The President's principal work "The Last Watch of Hero" (229) is a figure grandly draped, leaning, with her arms raised above her head, against the jamb of a window, of which the picture-frame seems to form the architrave. The figure is unquestionably fine; the face is expressive and anxious, though not so much so as to disturb the classic repose which Sir F. Leighton seems always to aim at. This repose is attained at the expense of reality and tragic power. Hero, looking out through an open window into the stormy night (for the legend is that Leander was drowned in a storm) should have had her hair and garments blown wildly about in the wind. A small monochrome painting of Leander, thrown up by the waves, numbered separately, but really forming a predella to the larger painting, is not a success: the frame of Leander is extraordinarily lengthy, and if he really tried to swim the Hellespont with a great piece of drapery tucked round him, like that shown here as flying in the wind, he was likely enough to be drowned. Besides, a monochrome predella to a richly-coloured painting is somewhat of an incongruity to the eye. The President's painting of "Simaetha the Sorceress" (160) shows a seated figure of a grand-looking woman, the legend of whom we confess to being ignorant of. The implement of the sorcery appears to be a wheel with an unfortunate bird crucified on it; presumably representing the object of the sorceress's hatred, as witches in the Middle Ages made wax figures of the offenders on which to wreak their spite.

Sir J. Millais's most important picture, in regard to scale and subject, is "Mercy: St. Bartholomew's Day, 1572" (298), a kind of reversal of the motive of "The Huguenot." Here the feminine appeal is not "Do not be a victim," but "Do not be an executioner." A monk opens a door, and beckons to a man with a drawn sword in his hand, who reminds one of the gentlemen who assist at the benediction of poignards in the opera, while a nun, in whom religious zeal has not extinguished womanly tenderness, kneels and tries to cling to his sword-hand. The subject is a fine one, and the armed man and the monk are finely contrasted, the "man of words and the man of blood," as Mr. Swinburne has it; but the painting is curiously hard and flat in effect, in comparison with the best of the painter's later work, nor should we indeed have guessed Millais as the painter's name. "The Nest," a portrait of mother and child (25), is a beautiful work,—the child, with an exquisitely modelled little face, and eyes upturned to look at the bird on her nest, is one of the most lovely children Sir John Millais has ever painted. The mother, a fair-haired lady, in a primrose-coloured dress, is also a beautifully-painted and very characteristic figure. "Lilacs" (214) is another very delicate child's portrait.

Mr. Val. Prinsep has made a success in his painting entitled "Habitués in montibus Echo," a nude figure representing Echo, appropriately reclined in a re-entering angle of a cliff, a corner whence echoes may be supposed to be generated, and with the lips parted as if calling. There is certainly no very wild flight of poetic fancy in this ideal figure, but it is ideal enough to pass for Echo, and the effect of the grey reflections of the rock on the clear

skin in the upper part of the figure, mingling with the natural carminations of the body, and the warm light on the lower portion from the sunlight past the edge of the cliff, is painted in a masterly manner: it is a picture both for study and for pleasure. Another study of the nude figure under a peculiar light is made by Mr. John Collier, in "An Incantation" (716), a fair sorceress seated on a bank and entirely lighted from the flames of a burning cauldron just below her perch. Unlike Mr. Prinsep's picture, it is clever, but not pleasing; the effect of the firelight on the flesh is well given, but the posture of the body is ungraceful and the face leering and disagreeable,—in character, perhaps, for a sorceress, but the result does not seem worth the expenditure of study and ability which have gone to painting it. The only other nude picture that need be particularly mentioned (there are very few,—whether or not on account of the assaults of British Matrons we cannot say) is "A Naiad" (1016), by Miss Henrietta Rae, who has been getting nearer and nearer to the line with nude studies for two or three years past, and is deservedly on it at last. Her painting is a very pretty female figure, seated on a rocky landscape by a stream, the legs draped in a semi-transparent lawn, the face and body beautifully painted; it is true there is no poetic imagining about the thing at all; it is not a goddess or supernatural creation, only a very pretty young lady playing Naiad; but it is capitally painted.

A Naiad of another type serves to give the title to one of the best of Mr. Hook's works, "Fresh from the Waves" (292), a bright breezy coast scene with a delightfully healthy-looking young woman coming up into the foreground in a bathing gown. Another painting, nearly equal to this, hangs as a pendant to it,—"Young Dreams" (299), a boy and girl in the foreground. The style of Mr. Hook's sea-painting varies very little, and perhaps his full power comes out best when he paints a boisterous breezy sea close up to the foreground, and makes us believe we smell salt water. There is, however, a delightfully fresh and out-of-doors feeling about these two works, No. 292 especially; more so than in Mr. Brett's in some respects more powerful and remarkable paintings, "Kyle-Akin" (416) and "Ardevtrive Bay" (421). The former is the most striking picture; the rocky bastion on the right, with its level ranges of sea-weeded ledges, the procession of hill slopes growing more and more purple towards the distance, the bright light on the green middle distance promontory, and the shimmer of sunlight on the translucent water, are all splendidly given; but one cannot help feeling that these constantly repeated intense effects of sunlight can be but rarely met with, and that there is something unreal in them, fine as they are. The other picture is noted as painted under "a very low barometer," with the observation that in this condition of the air "the relative gravity of the birds is increased, so that they find flying laborious," and sit sulkily on the rocks. We should like to ask the birds' view of the matter. Other bipeds, that do not fly, are liable to be sulky and languid under a low barometer, without any such mechanical difficulties as are suggested.

Between Mr. Brett's two paintings hangs a "bravura" work, as we should call it, by Mr. F. Dicksee, "Hesperia" (421), a gorgeous Renaissance Italian woman in a gorgeous garden, with a dress of the most sumptuous description, holding out an orange. The picture is almost startling in its brilliancy, but in its way it is certainly a success. A single-figure work in a far higher mood is Mr. Herkomer's painting of a lady (377) with for title only the lines:—

"Entranced in some diviner mood  
Of self-oblivious solitude."

This painting of a lady in a dark dress, and with all the prevailing tone dark, is placed, with a certain dramatic effect, on the very piece of wall a year or two ago occupied by the same artist's brilliant success in white painting in the shape of the well-remembered portrait of Miss Grant. This is a finer achievement, however. The technical execution is as good;

and it is pervaded by a deep feeling in keeping with the quotation; the small beautifully-formed head and dreamy countenance of the lady have quite a fascination in them: if this is a portrait, it is portraiture raised to the rank of ideal art. The same room contains Mr. A. Moore's principal picture, "Midsummer" (394), a new effect in colour; three of his usual pretty but mindless damsels in orange-coloured scarves, one of them seated on a chair inlaid in white and black; the two standing figures hold green fans, a piquant note in colour; the background is a very dark green dado. Mr. Sargent's "Carnation Lily, Lily, Rose" (359) is a picture sure to be looked at as much from its extraordinary hideousness of colour as for any better reason; two children lighting Chinese lanterns amid a crowd of flowers; to increase the effect of the lantern lights and their reflections on the figures, the grass, &c., in the foreground is painted a livid "viridian" sort of green, like no vegetation in any healthy painter's world; this, we presume, is one of the "high horizon" pictures, as the whole background is of a kind of quasi-grass tint; but the children's faces are not in accordance with this in regard to perspective; the whole thing is an extravagant muddle.

One of the most thorough successes of the year is the beautiful though quiet landscape by Mr. H. W. B. Davis, "Summer" (153); a shallow river, with cows standing blissfully in it, and the blue summer sky reflected in it, a meadow in sunlight, and another with shadows straying over it; a scene painted with such absolute reality of effect that it becomes almost an illusion. This is not the highest aim of landscape-painting, though one is apt to think it is while looking at the picture. In another work, "Now came Still Evening on" (231), Mr. Davis has given beautifully the doubtful light, half warm, half cold, over an evening landscape, where twilight is just beginning to be lit up by the moon. Mr. Alfred Hunt's picture, illustrated by a line of Browning's,—

"Our interests on the dangerous edge of things,"—is another and larger view of a scene which appears in a drawing in the Society of Water Colours Exhibition, though under very different atmospheric circumstances. It is an evening scene from the top of a high cliff, where houses cling together, looking over a calm sea, in which the rising moon is reflected. It is curious to contrast this art with that of Mr. Davis's "Summer," which hangs nearly opposite to it: the one working out the most exact resemblance to nature by the practical use of pigments; the other neglecting mere detailed resemblances to get near the heart of the feeling of the scene, and to escape from the recollection of pigments altogether; which Mr. Hunt certainly contrives to do to a wonderful extent. There are hardly any other landscapes of the highest class in the rooms; Mr. Oulless's "Hailstorm at the Devil's Bridge" (186) is a very remarkable work, however, with a wonderful dash of sunlight on the bridge.

Among the smaller pictures which are among the more noticeable in the exhibition (and of such alone we are now speaking), one of the best is "The Latest Scandal" (701), by Mr. Seymour Lucas; an interior of a coffee-house in the *Spectator* days, where a party of persons of a somewhat vulgar class, one or two of whom remind us of heads in some of Hogarth's pictures, are retelling a story in reference to one or other of a couple of young gentlemen of fashion, one of them super in a long crimson tunic, who stand apart with dignity, but not without consciousness and annoyance. Mr. Marks's study of Penguins with partially human expressions and actions is a pretty bit of humour under the title "Dominicans in Feathers" (276). Mr. Briton Riviere's "Jilted" (253) is an admirable little work, the point of which is in the lively action and sympathy of a fine black and tan terrier; the whole is very well painted, but it is putting the cart before the horse to paint a picture of a man in distress merely for the purpose of painting a dog as his companion. Mr. Riviere's larger work, "Au

Old World Wanderer" (76), is really an elaborate study of sea birds, also admirably painted, but it is vexatious to have these misleading titles given to pictures; the figure introduced is of no interest whatever, and the quotation appended has no point; far better to leave out the figure and put a title conveying the real subject of the picture. Mr. Arthur Hughes has a strange little work, "In the Forest of Arden" (940), which seems to afford great amusement to the average Philistine; Audrey or some one of her type is sleeping with her crook under a tree; there is a magical sunlight streaming through the boughs and on to the carpet of moss on the ground; but the execution is not consistent; the texture of most things in the picture is minutely shown, except that of the dress of the figure, great part of which is left, after Mr. Hughes's manner with drapery, a mere flat surface of paint, conveying the idea that the painting is unfinished.

Mr. Crofts's "Napoleon Leaving Moscow" (548), is one of the prominent works of the exhibition; he has hardly realised the accounts given of that extraordinary cavalcade, with its mixture of every sort of conveyance, from a gilded carriage to an ammunition-wagon; the figures are well studied, especially some of the Old Guard on the right, and the figure of Napoleon himself, which seems, however, rather inspired by Meissonier's famous painting of the same figure under the same circumstances. The action of the Emperor's white horse seems open to question; the position of his legs looks awkward and unnatural, at all events.

Another military picture, "The Garrison Marching out with the Honours of War, Lille, A.D. 1708" (504), by Mr. A. C. Gow, has a special character and interest. Mr. Melton Fisher's "First Communion" (923) is a kind of work that will be popular, but is, to our thinking, very superficial both in sentiment and execution; the faces and features are so coarse they might have been painted with a besom, but there is a certain effectiveness in it as a whole.

In singling out what seem the most notable works of the year, we should be wrong if we omitted mention of Mr. Herbert's one contribution, with the suggestive and historic title, "The New World in the West for Spain or for England?" (691),—a work which, in itself, will certainly repay a visit to the room in which it is hung.

#### NOTES.

**T**HE Report of Amendments stage of the Railway and Canal Traffic Bill was reached in the House of Lords on Friday, the 28th ult., the proceedings on that occasion being chiefly noticeable for the persistent attempts of the representatives of the railway interest to thrust upon the House amendments which it had already rejected. Thus, Lord Grimthorpe again endeavoured to secure the insertion of a clause extending the right of appeal to questions of fact as well as of law; but the House affirmed its previous decision on this point, rejecting the motion by a majority of twenty-two. An amendment, introduced by the Earl of Crawford and Balcarres on the subject of terminals, was not pressed, Lord Stanley of Preston also bringing forward an amendment on the same subject, to which the House agreed. This provides that, in determining the amount of a terminal charge, the expenditure considered reasonably necessary for the accommodation in question is to be taken into account, not the actual outlay. With regard to "undue preference," the Government are evidently impressed with the necessity of improving the measure in this respect; for Lord Salisbury, although contending that the provisions of the Bill formed an adequate safeguard to the public, intimated that he was disposed to consider the advisability of introducing a further amendment to remedy the grievances complained of by the home producer. The interests of the latter class were ably championed, as before, by the Earl of Jersey, and Lord Salisbury declared that he did not in the least differ from him as to the

injustice involved in the present state of things. His lordship's defence of the clause, as it at present stands, was anything but convincing, and this question will certainly have to be dealt with in a more satisfactory way before the Bill is approved of by the country at large. The clause relating to the publication of charges, as finally revised, enacts that the classification tables shall be open for inspection, and that copies be sold. A new clause, relating to the appointment of an additional Judge of the High Court (which the operation of the Act would probably necessitate) was adopted; and, as thus amended, the Bill will come before the House of Commons for their consideration, unless the Upper House should use their privilege of raising further points upon the third reading.

**T**HE lecture "On the Rolling Contact of Bodies" delivered at the Royal Institution on April 29th, by Professor Hele Shaw, dealt with a subject of much interest in a manner a little disappointing. The demonstration that the contact of any point on the periphery of a circular rolling body with any point on a plane surface on which it is rolling takes place in a direction vertical or normal to the said plane, and leaves it in the same direction, was clearly given by the aid of models and of a diagram of the cycloidal curve, and the effect of a harder rolling body on a plane of softer texture (as iron on wood) was illustrated by a diagram,\* as at Fig. 1, where it is shown (in a highly-exaggerated form, of course) how the harder



Fig. 1.



Fig. 2.

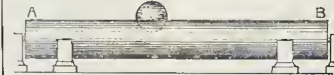


Fig. 3.

rolling body is driving up the substance of the plane before it into a ridge, and leaving a following ridge behind it. A reverse process took place when a softer body was rolled on a harder plane, the rolling body itself being subject to a continued distortion in each portion of its periphery as it came in contact with the plane. The important practical point in connexion with this part of the subject was that the hard body rolling on a softer plane suffered retardation, while the soft body rolling on a harder plane developed a slight creeping motion in advance of what would be its normal rate of onward progress if its periphery could remain perfectly rigid. The relative difference in the cycloidal curves formed by some hard or soft substances rolling on harder or softer planes respectively was illustrated by a diagram, showing the true cycloid curve slightly shortened in the former instance, and slightly extended in the latter. This aspect of the subject may perhaps have some practical bearing on the railway question of elastic wheel and rigid rail *versus* rigid wheel and elastic rail, which has been debated from time to time. The remainder of the lecture was mainly devoted to some further illustrations derived from the action of a rolling spherical body on the surfaces of two parallel cylinders (Figs. 2, 3), one of which was free to turn on its axis. As shown by a multiplying indicator dial, the rolling of the sphere, in whichever direction, produced a slow rolling of the free cylinder on its axis in the direction of the arrow, fig. 2. This was explained as another form of the creeping action of the surface rolled on, in this case, not a fixed plane but a rotating cylinder. According to the previously expressed theory, the lecturer said, a softer sphere rolled along the cylinders should have set up a creeping action in the reverse direction, turning the cylinder outward instead of inward;

\* These are not facsimiles of Professor Shaw's diagrams, but merely sketches from memory to render the description intelligible.

but this, as he showed by experiment, was not the case. The explanation was that this contact of the soft body with the cylinder was really a different problem; that the motion set up by the compression and consequent expansion of the soft spherical roller on its advancing side, which descended vertically on the point of contact, was assisted, not neutralised, by the action on its receding side, which rose vertically while contracting. We should say that in this far-fetched explanation the lecturer had neglected the simple element of the weight of the rolling sphere acting on the inner surface of the cylinder. He showed afterwards by experiment how a disc revolving between the two cylinders, as in fig. 4, gradually worked its way along in the direction of a weight C, not

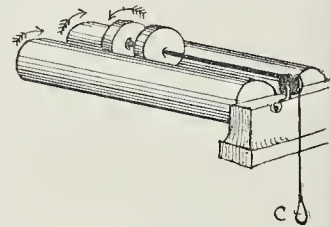


Fig. 4.

sufficient to drag it along when not revolving; in the other experiment the gravitation of the spherical body is surely the weight, dragging down the cylindrical surface where in contact with the sphere. That Professor Hele Shaw is a little disposed to look for mysteries where none exist, seems apparent from his drawing, the attention of his audience to the fact that whether the sphere in fig. 3 were rolled from A to B or from B to A, the rotating motion of the cylinder was in the same direction. Could any one possessed of common sense expect it to be otherwise?

**A**T a recent meeting of the German Archaeological Institute, at Rome, Dr. Studniczka read an interesting paper on the sculptures of the Temple of Zeus at Olympia. If we believe Pausanias, the sculptures of the pediments were the work of the two later contemporaries of Pheidias,—Pronios and Alkamenes. If we judge from the style of the sculptures themselves they belong to the archaic-transitional manner, *i.e.*, are distinctly pre-Parthenon; further, we have definite evidence that the temple itself was complete soon after 460 B.C. We possess no certain work from the hand of Alkamenes, but fortunately we have the Olympian Nike, an undisputed work of Pronios; this proclaims him to be, if not a pupil, at least a successor of Pheidias. Further, as the temple was built by a local architect, Lihon, and as the Olympians took the trouble to send to Athens for the illustrious sculptor, Pheidias, to make the statue of Zeus, is it likely that they would import at the same time too young and presumably almost unknown sculptors, Pronios and Alkamenes, to execute the pediment sculptures? Such are the difficulties Dr. Studniczka raises,—difficulties which have indeed been severally long felt by all critics. He proposes to cut the knot by the simple expedient of supposing that Pausanias blundered. Probably the traveller's informants, or he himself, had misunderstood the Nike inscription. Released from the bondage of the statement of Pausanias, we have to consider, from internal evidence alone, who made the sculptures. Dr. Studniczka thinks they are undoubtedly the work of Peloponnesian sculptors. Those who are acquainted with his interesting book on Greek dress ("Beiträge zur Geschichte d. altgriechischen Tracht") will not be surprised to find his arguments turn mainly on an analysis of the draped figures. The women of the pediments, with the single exception of the bride, Hipodameia, wear the Doric chiton,—a fashion which no Athenian sculptor would have inserted. Dr. Studniczka promises a fuller discussion of the subject, which is of high interest for the history of Greek art.

A LARGE piece of granite work has just been completed in the City, in the front of Messrs. Lloyds, Barnetts, & Bosanquet's bank in Lombard-street. The lower portion of the front is chiefly composed of granite from Messrs. Freeman's quarries in Cornwall. The granite is of bluish-grey colour, and, unlike the great majority of Cornish granites, is comparatively fine-grained and not porphyritic. It is composed of orthoclase felspar, a little anorthite, smoky-coloured quartz, both black and white micæ, and schorl. In places in the building the rock may be seen to have a tendency to foliate, but its general appearance is homogeneous, denoting an even texture. There are eight polished columns, four on either side of the main entrance, each being a monolith, 14 ft. 6 in. in height, and about 3 ft. in diameter. These were turned in a Brunton's lathe, the caps being slightly ornamented. The carving over the main entrance to the building represents the arms of London and Birmingham blended together with a beehive in the centre. It is one of the most elaborate pieces of workmanship that has ever yet been attempted in Cornish granite. If it had been carved in sandstone or limestone there would be no occasion for special comment, but the execution of such work in granite is a considerable effort of skill and patience. The great wreaths carved over the entrance to the passages on either side are also very fine pieces of work, and well designed. The carvings are unpolished, and present an unusual tone and surface, which gains in effectiveness, perhaps, from contrast with the quantity of polished granite in the columns and sills, &c. We are strongly inclined to think, however, that the total effect would have been better had all the granite been left unpolished; the glitter of polished granite in such large masses is a somewhat vulgar form of display, not in the best architectural taste. The carved work in the unpolished granite, however, is worth notice as a novelty, and may, perhaps, lead to further attempts in the decorative use of this durable material. A fine-grained granite, free from dark patches, is necessary, however, for a successful result in this kind of work.\*

**SIGNOR FERDINANDO ONGANIA,** the Venetian publisher, is about to bring out a brochure entitled "A Glance at the Historical Documents relating to the Church of St. Mark at Venice," by Mr. Wm. Scott, who some of our readers may remember was the winner of the Institute of Architects' Travelling Studentship some years ago. The subject of the restorations at St. Mark's has led to considerable discussion in Italy and in this country, and it has been felt that some authoritative work is wanted to serve as a guide for any future alterations which may be undertaken, or as a record of features which may at any moment be destroyed through mistaken zeal, or by other unforeseen circumstances. During the Austrian occupation of the Venetian provinces, a large illustrated work on the basilica was commenced by Messrs. Kreutz, but, although largely subsidised by the Government, the work was never completed. Signor Ongania has, however, undertaken the task of completing the work, and after ten years of unremitting labour, the work is now practically finished, the text and a few plates of minor importance alone remaining to be issued. In conjunction with the text, there will be produced a large quarto volume, consisting of copies and extracts from ancient documents relating to the basilica, many of them being the official records of the churchwardens, reproductions in heliotype of interesting documents, plans, inscriptions, and details of every description. This important work is published in a limited edition of only 600 copies, and is only issued to subscribers. The publisher has thought that it might be acceptable to English readers to have placed before them a general outline of this important publication, and has commissioned Mr. Scott to prepare the abridgment to which we have referred at the head of this Note.

\* The carving alluded to has been executed by Messrs. Freeman, except the keystones over Pope's Head and Change alleys, which are the work of Messrs. Brindley & Farmer.

IT has long been well-known that on a certain number of Greek vases scenes from comic plays are represented. This class of vases have, however, received scant attention in large measure, no doubt, because from the artistic point of view they are not attractive. Dr. Heydemann, in the last issue of the *Jahrbuch* of the German Archaeological Institute (Band I. viertes Heft, 1887), makes them the subject of an interesting monograph. As eleven out of the twenty-six instances he brings together are in the British Museum his paper should have special interest for English readers. Literary notices of the Phylakes, the comic actors at Dionysiac festivals in Magna Græcia, are scanty: so it is fortunate we have these vases to refer to. Those interested in the ancient comic stage must refer to Dr. Heydemann's paper, which is abundantly illustrated, but we may briefly note the following points:—1. As to the "provenance" of these comic vases. With two exceptions found in Sicily, they all came from Magna Græcia. The largest number were found in Apullo. Ruvo comes next. The only signed vase among them bears the name of the well-known Magna Græcia potter, Asstes. 2. As to the shape. With very rare exceptions, they belong to the class of bell-shaped Krater,—five omochois have been found. 3. As to style, all the vases may confidently be dated at the beginning of the third century B.C. The drawing is uniformly coarse, with a strong leaning, as one would expect at that date, towards the pictorial. 4. As to the costumes represented. They are, of course, governed by the principle *γελούον χάριον*. The figures wear almost uniformly grotesque masks. Another constant element of adornment was a huge pillow fastened either in front or behind. This was worn by both male and female actors, and, to judge from the vase paintings, had much the same effect as the piece of mechanism known to modern dressmakers as an "improver."

TO the same number of the *Jahrbuch*, Dr. Kalkmann contributes a monograph on the connexion between Aphrodite and the Swan, which throws new light on the beautiful Aphrodite Camirus vase in the British Museum. It will be remembered that in this matchless bit of vase-painting the goddess is represented as flying through the air seated on a swan. Dr. Kalkmann rightly asks, Why the swan? The swan is in no way symbolic of Aphrodite, but rather of Apollo. If we may trust Sappho and Mr. Swinburne, doves, not swans, were yoked to her chariot. The difficulty is cleared up in the main by a relief found at Kertsch; the relief is headed by a pediment-shaped ornament, within which is the figure of a goddess on a flying swan; on each side of the pediment is a Nike standing on a ship. The inscription shows the slab was dedicated to Aphrodite Urania, who rules over the Bosphorus. The swan, the white shining bird, is, in fact, the symbol of Aphrodite, but only in her capacity of Ourania, the light goddess, the heaven ruling the sea. As such she appears in a beautiful lekythos in the Berlin Museum, with gold stars in the background behind her, and gold stars on her raiment and on her swan, a very image of the stary heavens. As such she rides her swan on the Camirus vase; as such she received from her winged messenger (*alos equus*) the lock of Berenice,—

"Isque per ætherias me tollens, avolat umbras  
Et Venereis casto colloca in gremio."

AMIDST many, sometimes unavoidable, desecrations of houses and sites that have a history, we have to record one instance in which the reverence for the associations of a great name has prevailed over considerations of mere lucre. Upon the outbreak of the Great Plague in 1665, Milton moved from his home in Artillery-walk, leading to Bunhill-fields, to what he has termed a "pretty box" at Chalfont St. Giles, a village in Buckinghamshire, on the road to Aylesbury. The cottage, for it is nothing more, had been taken for the blind poet by his friend Elwood, the Quaker, who first saw there a completed transcript of the labour of ten years,—*"Paradise Lost."*

With the exception of the gabled porch, which has fallen into decay, the house remains nearly as it was in Milton's time. The parishioners of Chalfont St. Giles, disregarding an offer on the part of an enterprising American for purchase, have, to their great honour, resolved to buy the house themselves, and to devote it to the purposes of a local reading-room and museum. The owners are prepared to sell this cottage and the one adjoining at a fair price. So a committee and trustees are appointed; and it is hoped that a sum of from four to five hundred pounds may be subscribed to the local Jubilee Milton Memorial Fund for the purchase and maintenance of the two cottages. At the same time, we learn that a traditionary home of Sir Walter Raleigh is about to be pulled down, and its site given over to the builders. This is Raleigh House, lying between Brixton Rise and Lower Tulse-hill.

CARSHALTON HOUSE, Surrey, is about to be put up for auction. Standing in beautiful grounds of about twenty-five acres, that are well watered with springs and a tributary of the Wandie, erewhile famous for trout, this fine old mansion, in the real Queen Anne style, of red brick, was rebuilt by Sir John Fellowes, a governor of the South Sea Company, in 1719. Its site had been that of the house built by the celebrated Dr. John Radcliffe, who called his seat the Montpelier of England. Here he collected the books which were afterwards presented to Oxford University. He further bequeathed 40,000*l.* for building the Library there, with endowments for maintenance. The library at Carshalton extended to the entire depth of the house; it was afterwards sub-divided, and part of it formed into a hall. Here Radcliffe died on November 1st, 1714, his end having been hastened, it is said, by the reproaches that were heaped upon him for refusing to attend Queen Anne in her last illness, he himself at the time being tortured by gout.

THE collection of drawings by Mrs. Allingham, under the title "In the Country," which is on view at the Fine Art Society's Gallery, is one of the most beautiful and most thoroughly satisfactory exhibitions which it is possible to visit. The subjects Mrs. Allingham illustrates are such as form, perhaps, the purest and most unalloyed source of human pleasure,—the beauty of flowers and trees and skies far out in the country, unsoiled by the neighbourhood of town. The art with which she treats her subjects is of the highest kind; truthful, unpretending, showing mastery of the material of water-colour without the faintest obtrusion of "cleverness." Indeed, the mingling of breadth of effect with minute accuracy in detail, without the slightest hardness, is a marvel in many of these works. We look at a scene with the trees treated in broad feathery masses, the distant landscape stretching away, seen in a mere peep between the middle distance trees; a child and a kitten, perhaps, at the gate of the cottage; nothing is obtrusive, all the details fall into their place; but, if we look close, the little head of the kitten, no larger on the paper than a good-sized pin's head, is completely finished as far as the scale will allow, and looks as if it would bear the inspection of a magnifying glass. The same with the foreground flowers in the drawings. There are other painters of landscape who will give us this kind of minute detail, but not with the capacity of combining largeness and breadth and atmospheric softness with it. Every drawing is worth looking at: among those which struck us with particular pleasure we may name the delicate little study of "Mountain Ash" (13), the little child called "Tottie" (22); "Banacle from Gray's Wood" (43); "Evening" (49); "An Old Surrey Cottage" (53), with its tall sunflowers; "Corcorus Japonica" (55), really a cottage scene with a sweet little child figure standing out against the darkness of the doorway; "Midsummer" (58), a wealth of bright flowers in a corner of an old English garden; "Haslemere Church" (60), with a belt of purple woods (a little too purple?) stretching across the middle distance;

"Underwood's" (61), a village home; "Cottage at Brading, Isle of Wight" (65).—Mrs. Allingham does not seem to know that this was the dwelling of "Jane, the young Cottager," or she would surely have added that point of interest in the catalogue; "At Abinger Hammer" (67). This last, where two girls talk to each other over the cottage gate, reminds us to remark on the happy manner in which the artist introduces her little figures in the scenes; they are only figures thrown in as incidents in what are really landscape paintings; but they always have their own point and meaning, their distinct relation to each other; they are never "doing nothing"; they are interested about something that is going on; we can almost imagine their conversation. If water-colour will only last like oil, what a great name Mrs. Allingham will have when she becomes an old master (or mistress), and how her little gems of work will be run after and "run up" at the "Christie's" of future generations.

WE observe that among the attractions at the Crystal Palace for the ensuing season is to be a large model of the Tower Bridge, erected over the South Fountain basin, from drawings furnished by the Corporation.

LORD SALISBURY, in his speech at the Academy dinner, observed that the Academy might, perhaps, be felicitated on having escaped active State patronage or interference. "The State," he said, "had been a patron of sculpture and architecture; it had built sundry buildings and erected various statues;" but when we considered what the fate of statuary and architecture had been at the hands of the State, the benefit of its patronage, he implied, was more than doubtful. This is certainly the case lately in regard to architecture, in which the Government seem to have been doing all in their power to spoil both ancient and modern buildings over which they exercise any jurisdiction.

ARCHITECTS who are in good conceit with themselves and their art, and happily conscious of its importance to the world, may obtain a healthy reaction by remaining a little while in the vicinity of the door of the Architectural Room at the Royal Academy. They cannot fail to be interested by what they will hear there. Many persons who come to the door simply stop and turn back as if they had run against an invisible bar. From others may be heard a scornful laugh, "Oh, I don't want to go there." "Architectural drawings," exclaims another, "Oh, let us go out again; I don't care for them." "What on earth is this?" exclaims a lady with a look of bewilderment, and almost as if the room were not a proper one to come into. Then enter two young "Johnnies" in irreproachable costume. "Ah! just sort o' thing, don't yer know, that you see in an estate agent's window, don't yer know?" This latter speech, we assure the outraged architectural exhibitor, is a fact; it is not our wicked invention. Certainly, waiting at the door of the Architectural Room is a very good way for an architect to get reminded that he is mortal.

#### ARCHITECTURE AT THE ROYAL ACADEMY.—II.

THE list of drawings at the Academy this year leads off with

1583, "Head Office, Commercial Bank of Scotland, Glasgow," Mr. Sidney Mitchell. This is hung too high for the details to be seen; it appears a solid-looking block of building at the angle of a street, this portion being accentuated by an octagonal hock with quoins at the angles, and rising into a cupola above.

1584, "House at Westgate-on-Sea," Mr. G. Sherrin. Over-acted simplicity, all the lines of the window frames crooked to give it the look of an old house; a nice pen drawing, but nothing to call "design" in it.

1585, "Welsh Chapel, Shaftesbury Avenue," Mr. John Cubitt. Interesting as the first important example of Shaftesbury Avenue architecture; also as showing to what æsthetic heights the Welsh Methodists are soaring. A solid-looking design in a kind of Romanesque; Early English capitals and shafts, but round arches; an octagon cupola above and a porch with a pyramidal roof on each side of the front. The best point in the front is the triplets of windows under deep semicircular arches; the method of finishing the octagon at the angles of the parapet is very ugly, as also the bits of buttresses stuck on here and there for no obvious reason, and then sliced off abruptly. Good general design; bad details.

1586, "West Kensington Congregational Church: Interior looking South," Messrs. James Cubitt and J. M. Brydon. A Gothic interior of early geometrical type, but with a special treatment of the roof; a brick or stone solid arch, pointed, but with a flat soffit, carried over at each bay where the roof principal should come; on these ribs, and on squinch arches at the angle they make with the wall, a wooden octagon dome is erected over each bay, a kind of translation of the roofing of St. Front, Perigueux, into a cheap form suitable for a modern contractor to estimate for. Clever and original, but what about acoustics? The drawing scratchy and careless in execution.

1587, "Sunningdale Parish Church," Mr. J. Oldrid Scott. A very pretty bit of modern Gothic, not without original touches; the aisles lighted by triplet windows under relieving arches which spring from the buttresses and bridge over the intermediate spaces: the octagonal turret in the middle of the north transept is picturesquely placed, but would stop out light from the windows; the tower with a slate spire has some novelty of treatment, with coupled wall arches near the angles, and a small circular tracery window in the centre of each face, where one would expect the clock-face to occur if there were one; the cornice lines of the tower are not quite true in perspective with the set off lines on the stage below, which is an annoyance to the eye; otherwise a very good pen drawing, accurate, and yet free in touch. The author has subjoined a plan; there are so few in this exhibition that this is a certain credit in itself.

1588, "Trinity College, Oxford," new Quadrangle and House for the President, Mr. T. G. Jackson. A very pretty sepia drawing; the *genius loci* has been duly considered; dormers with semicircular shell finials and pyramid pinnacles, columns in attic resting on cornels and projected out from the face of the work, engaged pilasters on the ground floor with mullioned windows between them. The prettiest bit of the design is the way in which, on the first floor level, the mullion "order" so to speak, is carried right across between the projecting wings, with niches in the solid wall spaces between the windows, a cornice over, and a stretch of plain wall below. There is hardly anything in the detail which is not repetition of old work, but the whole is exceedingly refined architecture of its type. The space in the sky occupied by a title-shield, and armorial bearings would have been more suitably and usefully occupied by a small plan of the building.

1590, "A Town House," Mr. F. E. Littler. Apparently a study to give some picturesque effect to an upright town house. The author has rather over-mullioned it, giving the whole a somewhat too gridiron appearance; it wants contrast in the various stories.

1591, "Lady Rogers's School, Ivybridge," Mr. C. H. M. Mitcham. A neat-looking house, shown in a neat drawing, and a good advertisement for Lady Rogers's school; but hardly with architectural claims to a place.

1592, "Design for St. Paul's Church, Vicarage Gate, Kensington," Mr. Jas. Brooks. A fine, solid-looking, spacious interior, in early Gothic style, of course treated with entire knowledge of the style, hut, alas! with a wooden imitation vault. We cannot understand how any Gothic architect of Mr. Brooks's calibre can do this. There is no attempt to disguise it; the disagreeable seam made in the springers of the vault, where the wooden mouldings join the stone ones, is honestly brought out in the shading. But that is all the stronger argument against such an illogical process as this. If we were ordered, "on compulsion," as Falstaff said, to make a wooden vaulted roof, we would at least treat

the stone springers as separate features, and not try to make their mouldings look continuous with those of the wood. But even then what is a wooden-ripped vault? A complete sham, a treatment of wood in a manner and in a form generated out of stone-arched construction, and with which timber construction has nothing whatever to do. What is the pleasure of having such a weak-looking cradle of timber over a church? Vault a church in stone or brick whenever there are funds for it, by all means; if there are not, let it alone. A picturesquely-framed timber roof constructed according to the principles of carpentry is a far better architectural feature than the most carefully made wooden imitation of a vault.

1593, "Parish Church, Haydock," the late George Smith. A remarkably simple Gothic design, only noticeable for the pleasant treatment of the low square western tower, with its pannelled and battlemented angles. The rest is very weak, and the place of the drawing on the line not quite comprehensible.

1594, "Proposed Vestry Hall and Parish Offices, Fulham," Messrs. H. Cheston and J. C. Peikin. A geometrical elevation, very neatly executed, of a picturesque Elizabethan front with mullioned windows and high gable with scrolls up the sides—apparently a design submitted in the scandalously-conducted competition for Fulham Vestry Hall.

1595, "View of the Hastings, St. Leonards, and East Sussex Hospital"; Messrs. H. Hall and K. D. Young. The plan is not given; it is exhibited, we presume, as an example of an attempt to give something like picturesque effect to a hospital in accordance with attention to appropriate plan and sanitary conditions. In securing picturesque effect it is quite successful, the circular wards planted on at the ends of the building, with the open arcades connecting them with the ohlong central block, form a pleasing architectural group, without any such attempt at decorative effect as would be out of place in a hospital; and the design arises naturally out of the practical arrangement of the various sections of the hospital.

1576, "Girton College, Cambridge," Mr. A. Waterhouse, R.A. A water-colour view with a high horizon, though not quite what is generally called a "bird's eye" view, showing in a very pleasing manner the hocks of red brick houses with their black and white gables, the gate-tower, the lawns, and the trees which form the opposite boundaries to the lawns or quads. This is completely a piece of college architecture, quiet and half domestic in its effect, and it is a capital specimen of architectural water-colour drawing, both in the treatment of the buildings and of the lawns and trees and stretch of country beyond. We believe the author makes his own drawings for exhibition, thereby setting an example to some other exhibitors, whose names go in the catalogue to drawings which everyone knows they could not produce themselves. When this is the case, the draughtsman's name should at least be given. We could wish Mr. Waterhouse would have set another wholesome example in adding a plan of his building.

1597, "Competition design for Coats Memorial Church, Paisley," Messrs. John Burnet, Son, & Campbell. A large and finely-executed pen drawing showing a perspective view of a large church in Early English style mainly, with an imposing tower crowned by a short spire issuing from between massive octagonal broach turrets. The treatment of the west end, with its solid flanking masses and turrets, tall triplet of windows, and gable over, is fine; the tower would have had more force and effect if it had been treated in a more bold and unbroken manner in the portion below the principal window stage; as it is, its effect is rather weakened by successions of window openings of different sizes, which seem to have no special object except to fill up space. The aisles, judging from the exterior treatment, are apparently narrow aisles for passage only, but no plan is given to show how this is arranged. The design is a striking one, however, and would have made a fine building if executed.

Manchester.—We understand that Messrs. Defries & Sons, of London, were commissioned to decorate the principal streets in Manchester for the Royal visit to open the Exhibition. Venetian masts, banners, and trophies of flags were largely introduced in Albert-square and other important thoroughfares.



## THE GROSVENOR GALLERY.

The exhibition this year contains some remarkable works, though in regard to a great proportion of its contents it might be spoken of as the gallery of affectations; affectations of pose and costume in portraiture; affectations of the styles of other times in imaginary figures and landscape. What, for example, is the meaning to modern eyes and modern feelings of such a painting as Mr. Burne Jones's "Garden of Pan" (66)? It seems to show that the painter can imitate the figures and the flesh colouring of a Venetian artist in the pre-Titianesque period, and can paint a landscape with tufts of trees over it as if it were made of worsted work. We know well enough that Mr. Burne Jones can do this, and yet we are not happy: it is a mere trick of imitation, appealing to a fashion of the day for sham-antiques. The same with Mr. Strindberg's "Love Story" (67), a charming missal painting. Another serious point is that artists who paint in one way for the Academy paint in another way for the Grosvenor. Look at Mr. P. R. Morris's "Girls gathering Oysters" (28), and compare it with any of his works in the Academy and it will be evident that the artist paints to suit the *genius loci*; and the same may be observed in other cases.

The exhibition contains some remarkable works, however, foremost of which we place Mr. Watts's "Judgment of Paris" (57). It will be understood at once, by those who comprehend Mr. Watts's genius and artistic tendencies, that he does not paint

"The three that on Mount Ida naked strove,"

with any idea of exhibiting personal beauty of the voluptuous order. The three figures, two of which, Heré and Pallas, are partially draped, or at least concealed by drapery, are studies of contrasts of sentiment rather than of physical beauty; the latter quality is even perhaps too much neglected; the Aphrodite is too thin and straightened to meet the idea of that goddess. Heré stands midmost, a majestic figure with her face partly shaded by her hand, and the herapery held above her head, and with an impassive expression. Pallas, on her right, is of a spiritual type of beauty; a face, shown in profile, of great earnestness and feeling, as befits the goddess of wisdom. Venus, on the other side, is a personage of far less character, but she is a comparative failure; she is merely a nonentity, she has nothing of the subtle and hewitching aspect attributed by the ancients to the goddess of love. Otherwise the work is a very fine one; a new reading of an old myth, for to the Greek mind the strife of the goddesses, we may be sure, was one about personal charms simply. Mr. Watts and Lord Tennyson\* have read into it a deeper and a moral meaning.

Mr. Burne Jones exhibits a remarkable work in "The Baleful Head" (75), showing how Perseus showed Andromeda the Medusa's head, without harm to herself, in a mirror of water. The two, who are quite Gothic personages, not Greek, bend over the basin of a kind of font. Perseus holds the Medusa head above theirs, and lays his strong hand on Andromeda's wrist as if to remind her to be careful of his injunction not to look up at the dread mask of the Gorgon. The three faces are seen inverted in the water. The colour is rich and fine; the figures are relieved against a dark background of foliage, of course of a very conventional type. This is a remarkable and unusual work; but why did not the artist endeavour to depict something of the freezing character of the Gorgon head? He has evaded this difficulty, and painted a mere ordinary dead face. Another remarkable painting by the same artist is the "Portrait" (98), that of a young lady in a purple dress with her head backed by a circular convex mirror, which forms a kind of mirror with its reflected lights, reflecting also the back of her head. The figure is somewhat stiff and deficient in life, but the colouring is very fine, and the effect of the whole picture such that at least it is impossible to pass it by.

Mr. Collier's "Lilith" (24), who (if the reader does not happen to know) was Adam's first wife, before he wedded Eve, and first who was, in fact, a demon, is represented in a ballad of Rossetti's as the rival of Eve, and conspiring with the snake to work her ruin. In the picture, she stands with her cold snake wound round her body and laying his head on her bosom, Lilith hending hers

seductively towards it, her hair falling in a mass behind her right shoulder. It is an example of the artist's painting of the nude, of course, and a fine and firm piece of painting in that respect, duly set off by the hues and texture of the snake in juxtaposition; but there is not a trace of the weird and terrible fancy of the legend. Mr. Collier had much better have called it "Woman and Snake," the title would have answered to the picture then. It is unpardonable of painters to take a poetic legend and laboriously reduce it to prose to exhibit their technical ability. That is not what the art of painting is for. Mr. Arthur Hacker has made a great success with another nude study, "Pelagia and Philammon" (9), a subject from Kingsley's "Hypatia"; the incident in that sensational romance we do not now remember, but the painting represents a young woman lying on the sand either dead or sleeping, with a slight halo hovering over her recumbent head, and watched by an old woman wrapped in a cloak which is drawn over her head and shadows her face. The drawing and colouring of the recumbent figure are excellent; but the full-blooded and healthy appearance of the figure is hardly what we should expect to find in a young woman evidently in a state of misery if not dying, and lying naked on the sands in the middle of a desert. Mr. Calderon contributes another of the small paintings, of which he has had several at the Grosvenor, at different times, in which the nude figure is combined or contrasted with landscape; in this work "In Forest Deeps Unseen" (52), the figure is stretching a rather lengthy leg from a bank into a stream, as about to bathe; her blonde head shines out against a background of dark forest. The effect is pretty, and what people call "sentimental."

Of Mr. Holman Hunt's two contributions, "Amaryllis" (119) and "Master Hilary" (208) one might say much, but not in a pleasant vein. The latter, which is the portrait of a hoy occupied in making a tracing of a drawing held up against a window-pane, has a sturdy force about it, and the matter-of-fact manner of painting is not out of keeping with the subject. "Amaryllis," supposed to illustrate a charming verse of Herrick, is a painting, from this point of view at least, painful to contemplate, considering the care which has evidently been bestowed upon it. Mr. Lathangue's large painting, "The Runaway" (189), does not tell its story; it is a pleasing sketch of the impressionist order, which might better have been carried out on a small scale than with all this waste of canvas. Mr. Jacob-Hood exhibits a grey *fantasie* which he calls "Spring" (83), and a half-length of a plain and common-looking girl drawing back a curtain which is dignified by the name of "Jessica" (18). We always thought of Jessica as a young beauty, but the modern *chic* in painting is to make everything ugly and repelling. Mr. Padgett's "Dreaming and Drifting" (179) is a kind of thing the exhibition of which is an impertinence; the canvas is covered with blue paint, which we are invited to regard as the sea, and a boat with a ghost is stuck in the middle of it. We could all be painters if this were all the technique required.

Mr. W. B. Richmond's large figure of "Icarus" (101) preparing to start from a high rock with his wings, is effective in composition, the wings slanting across the picture in a bold manner, and the method of attaching them is scientifically conveyed, but the picture is not interesting nor showing any great power of imagination. Among smaller works is a very pretty one by Mr. Poynter, "A Corner of the Market-place" (62), two women seated amid different-coloured marbles and a mass of flowers, a vendor and purchaser; a naked child on the ground among the flowers laughs merrily at them. Mr. Leslie's "The Post-horse" (85) contains some pretty figures, a pleasant cool effect, and a very badly-painted brick wall. Bricks are worth painting better than that, and it is our duty to stand up for them. In this connexion Mr. John O'Connor's architectural paintings, "The Ghetto, Rome" (117), and "Edinburgh" (281), a frame of studies of Edinburgh architecture, may be quoted with approval. Mrs. Swynerton's "The Dreamer" (91), a head and shoulders of a woman with a collection of cottages in the background, does not explain its title, but is a clever piece of work in a peculiar manner.

Portraits abound more largely than is pleasing to the Grosvenor *habitud* or *habitude*, who (the

latter especially) grumbles andibly at finding so much space taken up by paintings which do not appeal to the aesthetic or intense imagination. Sir John Millais's portraits "Mr. C. Stuart Wortley" (51) and "Lord Esber" (58) are very brilliantly-painted pictures, which are simply highly-finished portraits and nothing more; that of Lord Esber is especially fine; both the face and all the details, the elaborate gown of office and the chain, are given with the painter's well-known and extraordinary power of realism. Like his large Academy picture, however, they impress one as somewhat hard, and suggest the idea that Sir John is changing his manner of working. This idea is, perhaps, emphasised the more by the near neighbourhood of Mr. W. Carter's portrait of "Sir Richard Brooke" (72), which is palpably an imitation of Sir John Millais in the broader and apparently rougher manner which has characterised many of his portraits. Mr. W. B. Richmond's portraits are, as usual, too obviously studies of special effect. That of the "Earl of Pembroke" (32) is a kind of made-up Titianesque portrait; that of Mrs. David Little, with untidy hair and an orange scarf thrown round her shoulders, is another portrait painted for effect rather than with the true view of portraiture,—that of realising the personality and character of the sitter. There is an agreeable contrast in Mr. Collier's portrait of "Mrs. Horne" (108), a half-length, which is simply and frankly a portrait, and makes no pretence at being Titianesque or anything-else. Mr. Frank Holl's portrait of "Lord Harlech" (54) is a portrait pure and simple, also with a great deal of energy and expression in it. How much of this is the sitter's and how much the artist's of course it is not easy to say; there is a little too much of that contrivance of flashing a strong light on the face which is, perhaps, the one drawback in Mr. Holl's manner of portrait painting.

Landscape is never predominant at the Grosvenor, but there are generally two or three fine examples, and this year's exhibition is no exception in that respect. "Going Westward" (48), by Mr. Alfred Parsons, is a romantic landscape seen in the light of a glowing sunset, and painted in a very broad and powerful style. One is interested to find also that Mr. Mark Fisher can paint something else besides those highly-wrought but cold Spring pictures which have become too much of a manner with him; he has actually an "Evening" scene (142), a thing which we never remember to have seen from him before; and which also leads us to hope that an artist who started with such high promise will not allow himself to relapse into a mere painter of one effect. Mr. J. W. North sends a large landscape in his well-known manner, "An Upland Water-Meadow, Somerset"—"Morning" (185), one of the finest things he has done; a charming translation of Nature into the artistic language of Mr. North; that is the correct description of the work; it is not Nature, but it is a very delicate and charming play of the materials afforded by Nature, and shows, at all events, much more real art than Mr. Halswelle's easily-achieved sublimity of slanting cliffs and steeply water in "The Pass of Brander, Loch Awe" (193). Mr. Alfred Hunt's "Rose-red Village in the Twilight Time" (198) is apparently the same scene which he has painted from the opposite point of view in his picture at the Royal Academy; it is not equal to the Academy picture, but contains many beauties, more apparent in study than at a first glance. Among other landscapes Mr. Corbett's "Evening on the Arno" (102) is well worth looking at.

The sculpture includes nothing of much note. The largest work, "The Fallen Angel," by Mr. Waldo Story, in the West Gallery, is not a production of much power. There is a good marble bust of the late Abbé Liszt, by Mr. Boehm; a bronze mask, rather than bust, of Mr. Robert Browning by his son, in the corridor,—a good likeness, but a little too thin in the proportions of the face; a pretty marble group, small scale, by Mr. Mullius, "Morn waked by the Circling Hours," in the East Gallery; and various other portrait busts. A curiosity of the Exhibition (as the Grosvenor always has one or two curiosities) is a decorative panel by Mr. Burne-Jones, in the corridor (and not in the catalogue apparently), representing a coloured peacock, in relief, on a gold ground between pilasters, with a Latin inscription referring to the Resurrection,—a curious but effective bit of originality in decorative design.

\* Vide "Edmond."

## LETTER FROM PARIS.

THE fêtes at the Hôtel de Ville, which we mentioned in our last letter, have served to inaugurate the electric light in the municipal rooms. The trial, which has been a complete success, has encouraged many of our local authorities to undertake the organisation of a complete system of electric lighting for the city, besides suggesting the application of electric force in several ways, for both public and private uses.

The question, which has been submitted to a committee of experts for examination, will shortly come to the front and will be seriously discussed. After the vain efforts which have been made for the last ten years to lower the price of gas, and the systematic contempt with which the powerful Parisian Lighting Company have treated all the complaints brought against it, the proposition now made is a most important one, and will be the turning-point of a radical transformation in the lighting of Paris, and one which will be forced upon us in a more or less distant future.

In speaking of the fêtes at the Hôtel de Ville we confine ourselves to those things which are of special interest to our readers, such as the furniture and the magnificent tapestries in the Grand Salle de Fêtes, which the public were able to admire for the first time last April. These hangings, in old gold silk, have been executed at Lyons after the designs of the lamented Bain. They are set off by rich borders of deep blue, on which are embroidered in *appliqué* the arms of Paris, supported by dolphins and cornucopias. These designs, which are original and most harmoniously arranged (though, perhaps, a little heavy), were the work of the architect M. Formigné, under the direction of the late M. Ballu. It is also the latter who designed the chairs and the Renaissance couches, which are now in the new Hôtel de Ville, and which are really remarkable for their purity of style and ornamentation.

On the 8th May, that is to say, in a few days, the capital will have a new corporation, decided by the votes of the Parisian electors. After having been three years in office, the powers that be are showing a great interest in art. One of their last acts has been the restoration of the tower of the Dukes of Burgundy, and they have certainly merited the thanks of the artistic world, in protecting the tapestries which are the property of the city, and which are very valuable. The collection, which dates from the time of Louis XIV., and has survived the vandalism of the four revolutions, consists of 104 pieces, some of them very beautiful, copies from the cartoons of Sébastien Bourdon, Lesueur, Lebrun, Philippe de Champaigne, and Casanova. There are also some magnificent specimens of Gobelins, Beauvais, Aubusson, and Flanders tapestries. For several years these works of art have been spoiling in a damp underground place, or have been stupidly mutilated. The Council have at last been roused, and, after having voted the sum necessary for their restoration, they appointed a committee of artists to examine the works, which are certainly as fine as those in the State collection of furniture.

One of the last acts of the Council has been to vote a certain sum of money to be expended on the great Exhibition. A pavilion of 3,000 square metres in extent is to be erected in the Champ de Mars, and the total cost of this branch of the Exhibition will be about 900,000 francs. The portion assigned to architecture is very important, and, besides the many plans, sections, elevations, and photographs of the buildings that have been erected in Paris since 1878, there are models in relief of the Sorbonne, the new Collège de Médecine, and the Villeneuve Hospital. We shall, at a future date, mention in detail all the particulars of this most interesting exhibition, which shows us what has been accomplished in architecture during the last ten years.

On the eve of the opening of the Salon artistic interest was centred in the preparations at the Palais de l'Industrie, and the artists were feverishly occupied in electing their jurymen. We will mention only the architects, amongst whom are MM. Vaudremer, Garnier, Questel, Bailly, Raullin, Pascal, Daumet, Coqart, André, Ginain, Mayeux, Diet, besides two extra jurymen, M. Sédille and M. Guadet.

The following are also the names of the jury-

men appointed to the architectural section of the great exhibition:—

1st. Members of the Institute:—MM. André, Bailly, Daumet, Diet, Garnier, Ginain, and Questel.

2nd. Members chosen by the Government:—MM. de Bandot, Boeswilwald, Guillaume, Juste Lisch, Moyaux, Rupprecht Robert, Poulin, late Director of Public Buildings, and Jules Comte, present Director of the same service.

As for the Exhibition itself, the Eiffel Tower is giving plenty of work. In order to come upon a sufficiently solid bed, the foundations have to be carried down to the depth of six metres below the level of the river. Trial holes are being made at four points simultaneously, the men working under shields filled with compressed air, and lighted by electric light.

We have arrived at an important point for the young pupils of the Ecole de Beaux-Arts, as the recipients of the Prix de Rome are being chosen. The section of Painting has already made its choice, and the Institute has entered M. Charpentier, pupil of Bongerreau; M. Bastel, pupil of Cahanel; M. Danger, pupil of Gérôme; M. Sinibaldi, pupil of Cahanel; M. M. Lenoir and Marioton, both pupils of Bongerreau; M. Lavalley, joint pupil of MM. Cahanel and Maillet; besides MM. Buffet, Jouve, and Tollet, all pupils of Cahanel.

We cannot at present give the names of the competitors for the Architectural Section.

We must make mention of an important competition which has just been held for the new Town Hall that is to be built at Vincennes. Of the seventy-five competitors who entered the lists, M. Eugène Caland has come out first; the second prize has been carried off by M. Jouanny and M. Besnard; and the third by M. Paul Wallon. Honourable mention has been accorded to MM. Cordonnier, Jaffieux, Taisne, Borgeaud-Marin, Bréson, Loviat, Deglane, and Rouger.

A propos of competitions in general, we must mention a new series which the Central Union of Decorative Arts has just instituted. They are to take place between July and September. The first is to be for painters, the second for sculptors, and the third for architects. In a few days a new Panorama is to be opened in Paris, following the one of Champigny. It will require all the talent of M. Detaille and his old fellow-worker, the late M. de Neuville, to overcome the public indifference to this kind of exhibition, which has really had its day. The Panorama of Reischaffen has long since joined the shades of the departed; that of the Champs Elysées is fast sinking; the old Panorama of the Château d'Eau, where Castellani used to describe the events of the second siege of Paris, is now going to be turned into a "labour market." But in M. Detaille's Gallery, Rue de Berry, the illusion and realism are such, and the artists have shown so much ability, that the new work has every prospect of being a success. In fact, this Panorama is, undoubtedly, the finest that has ever been opened to the Parisian public. As to the labour market referred to just now, it is a place open to labourers without work, and intended to facilitate the transactions between employers and workmen. The Town Council are about to expend about a million francs on this piece of democratic work.

It is stated that M. Jean Paul Laurens is to be commissioned to paint a ceiling for the Odéon Theatre. M. G. Duhufe has been also chosen by the Ministry to decorate the foyer of the Opéra Comique. This is a more considerable piece of work, and includes fourteen pictures of 3 or 4 metres square each. M. Duhufe is quite a young man, a favourite of fortune, and who has the advantage of being the bearer of an eminent name. In spite of these titles to the Governmental favour, it seems rather odd that the less important commission should be given to an artist like M. Laurens, as conscientious as he is eminent, and who has a long experience and an acknowledged reputation.

It is unfortunately the case in France, that often people only begin to render homage to talent after the owner of it is dead.\* Thus François Millet, who lived nearly unknown and died in want, is to have a monument erected to him shortly, thanks to a public subscription which will augment the sum already raised by the exhibition of his collected works. Alfred de Musset is to have a statue in Paris (he, at all events, is not one of the geniuses who lived

\* We can assure our esteemed French correspondent that the case is just the same in England.—Ed.

unknown and unrecognised); and M. Chapu is preparing the model for a memorial to the "romanticist" Gustave Flaubert. The same sculptor is completing a statue of Cardinal Dupanloup, which we shall come across in the Salon in a few days. The statue is intended for Orleans Cathedral.

This month, the Congrès d'Assises of the Seine department has been sitting on the case of Baffier, the artist who, apparently under some aberration of brain, attempted to stab one of the deputies. The jury considered themselves bound to acquit Baffier on the evidence as to his state of mind. It is to be hoped that some months of "prevention" passed in the sombre Mazas prison will not have further turned the brain and equilibrium of this excitable artist, whose works give evidence enough of the savage energy of his character. A strange contrast between this garbled and twisted artistic nature, and the calm and repose of temper of the late aged but always young sculptor, Oudiné, who is just dead at the age of seventy-eight, after a long life filled with work. His name was well known, and almost all the coins and commemorative medals made in France for fifty years back bear his signature. A pupil of Andrew Calle, he obtained the Grand Prix de Rome in 1831, and received medals in 1839, 1843, 1848 and 1855, and was "decoré" in 1857. On his return from Rome, Oudiné was attached to the Direction des Monnaies. His works as sculptor and engraver of medals are innumerable; among the latter the most celebrated are those of the Exposition Universelle, that of the annexation of Savoy, and the medal representing the apotheosis of Napoleon I., after the celebrated ceiling painted by Ingres in the old Hôtel de Ville.

The death of a landscape-painter of talent is also announced, M. Eugène Devé, pupil of Fiers, born at Ronen in 1826, and who was the friend and constant companion of Corot.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.  
THE NEW COUNCIL.

The following gentlemen constitute the new Council of the Institute, having been elected elected at the annual meeting on Monday evening last, viz.—

President.—Mr. Edward P. Anson, F.G.S.  
Vice-Presidents.—Mr. Alfred Waterhouse, R.A.; Mr. Thomas Worthington (Manchester); and Mr. Arthur William Blomfield, M.A., F.S.A.  
Ordinary Members of Council.—Professor George Aitchison, B.A., A.R.A.; Mr. Arthur Cotes; Mr. Henry Curry; Mr. Robert William Edis, F.S.A.; Mr. William Emerson; Mr. William Milner Fawcett, M.A., F.S.A. (Cambridge); Mr. Charles Fowler; Mr. John Alfred Gotch, President of the Architectural Association; Mr. Alexander Graham; Mr. Edward Angustus Gruning; Mr. Octavius Hansard; Mr. John Slater, B.A.; Professor Thomas Roger Smith; and Mr. Aston Webb.  
Honorary Secretary.—Mr. John Macvicar Anderson.

Secretary.—Mr. William Henry White.  
Auditors.—Messrs. Edwin T. Hall (Fellow), and Roger T. Conder (Associate).

The Railway and Canal Traffic Bill.

—At a special meeting of the Council of the Railway and Canal Traders' Association, held at the offices of the Association, Eastcheap, a few days since, the Railway and Canal Traffic Bill, as amended in committee, was considered, and the following resolutions, among others, were adopted:—

"That the Council reaffirm their previous resolution with respect to clause 15 (clause 17 of the original Bill), to the effect that only one appeal should lie from decisions of the Railway Commissioners, and that by leave of the Commissioners, such leave to be obtained when judgment is delivered; and that every effort be made to obtain an amendment of this clause in the House of Commons.

"That the Council views with dismay the proposal to legalise charges for 'terminals' (stations, wharves, sidings, cleavage, &c.), to be made in addition to the maximum rates, and determines to use its best efforts to strenuously oppose this provision in the House of Commons.

"That, in the opinion of this Council, sub-section 2 of clause 23 (clause 25 in the original Bill), which in effect seeks to repeal the existing law prohibiting undue preference, would, if passed, be fatal to the agricultural and manufacturing interests of the country; and the Council will therefore, by all the means in their power, oppose this provision in the House of Commons.

"That a public meeting be convened, after the introduction of the Bill in the House of Commons, to consider the provisions of the Bill."

THE SURVEYORS' INSTITUTION EXAMINATIONS.

The Council announce that the following candidates, whose names appear in alphabetical order, have passed the Professional Examinations, 1887:—

Student Candidates for the Professional Association.

|                             |                              |
|-----------------------------|------------------------------|
| Adkin, Benajah Whitley.     | Parry, Richard.              |
| Austin, Richard, jun.       | Peterson, Herbert.           |
| Bateman, Arthur Charles.    | Phillips, William Dearlove.  |
| East, Fleetwood George W.   | Robinson, Alfred Whitmore.   |
| Cave, Basil Shillito.       | Salt, Reginald Nowall.       |
| Eve, Herbert Trustram.      | Varley, Thomas Ernest.       |
| Oreen, Thomas John.         | Warton, Willred.             |
| Harding, Frederick Alcroft. | Whalley, Frederick Herbert.  |
| Jonas, Harry Marshall.      | Wheeler, Chas. Trevor Ogile. |
| Melrose, Frank.             | Wilson, William Edward.      |

Of these candidates, Harry Marshall Jonas having obtained the highest number of marks of any student candidate, receives the Institution Prize of fifteen guineas; and William Dearlove Phillips the Special Prize of the value of ten guineas, being second in order of merit.

Non-Student Candidates for the Qualifying Examination for the Professional Association.

|                            |                       |
|----------------------------|-----------------------|
| Ansoomb, Ernest.           | Johnston, Walter H.   |
| Booth, John Frederick.     | King, Alfred.         |
| Brown, William Edward.     | Millward, Isaac.      |
| Bushell, Henry.            | Sayers, Frank.        |
| Carter, Alfred Presley.    | Shaw, Arthur.         |
| Collingham, J. Cyril Lees. | Sweetnam, Henry.      |
| Done, John James.          | Wade, Henry.          |
| Furber, Percy Norman.      | Wight, Norman.        |
| Hansell, Reginald G.       | Worthington, James S. |
| Hooper, Cecil Henry.       |                       |

Of these, John James Done, having obtained the highest aggregate of marks of any non-student candidate, receives the "Driver Prize" of the value of fifteen guineas.

Candidates for the Fellowship.

The following Professional Associates have passed the Qualifying Examination for the Fellowship of the Institution:—

|                            |                        |
|----------------------------|------------------------|
| Arch, Arthur Joseph Edwin. | Oihh, William Pashley. |
| Buckland, Alfred Virgoe.   | Roads, Alfred.         |
| Burrows, Alfred John.      | Tiften, John Henry.    |

RAFFAELLE REPRODUCTIONS EXHIBITION, LIVERPOOL.

The Exhibition of Reproductions of the works of Raffaele, now exhibiting at the Walker Art Gallery, Liverpool, is one of very considerable interest. The reproductions consist of antotypes, engravings, and lithographs. The works have been arranged, we are informed by the catalogue, in approximately chronological order, and they certainly afford as a whole some idea of the vast life-long labours of the great artist.

The catalogue includes 623 examples, the whole of which, however, are not on the walls, the present collection embracing about three-fourths of the whole, the remainder not yet having been photographed, or, if photographed, are not yet published.

The photographs, as might be expected, are not all uniformly successful in clearness of definition, but, on the whole, they are good, some of them particularly so. In the first series, called "The Umbrian period," the principal photographs are those of "The Solly Madonna," "The Madonna, with St. Francis and St. Jerome," "The Nativity," "The Adoration of the Magi," "The Dudley Crucifixion," "The Trinity," "The Formation of Eve," "The Marriage of the Virgin," "The Annunciation," and a few others; but intermixed with these are numerous studies in pen and ink, black or red chalk, silver point, often heightened with white, and others shadowed in brown umber and sometimes in Indian ink, of various groups, single figures, heads, limbs, &c., drawn with great vigour; and these constitute, not only in number, but also in interest, an important part of the exhibits of this as of the succeeding periods.

The Florentine period comes next, in which we may notice a most excellent photograph of a portrait of "Angiolo Doni," "Portrait of a Lady"; a somewhat cloudy one of "Raffaele, painted by himself," and a very successful reproduction of "The Madonna del Gran' Dnea," "The Madonna with the Beardless Joseph," "The Knight's Dream," "The Bella Giardiniera" (a very good photograph), "The Madonna del Baldacchino," said to have been painted for the Dei Family, and finished by Fra Bartolommeo, "The Entombment," &c. Interspersed with these are many more fine groups, and portions of each picture, evidently carefully studied apart, in relation to their

fitness in combination with the entire composition.

In the Roman period, which forms the third division of the chronological order, some of the most important exhibits are photographs of "The Judgment of Solomon," "The Fall of Man," "Theology," "Poetry," "Philosophy," "Disputa del Sacramento," "School of Athens," and other frescoes from the ceilings of the Vatican and elsewhere. The well-known portrait of Julius II. in our National Gallery, and beside it the chalk cartoon from which it was prepared, are interesting, and show an almost exact resemblance in point of outline and attitude in every respect to one another. There is also a very fine photograph of the Garvagh or Aldobrandini Madonna, from our National Gallery. "The Expulsion of Heliodorus," and that of the "Madonna della Seggiola," both said to have been painted about the same time, are both very perfect, the former in particular being a very fine specimen of the photographer's art. There are also reproductions of the whole series of the designs for the tapestry cartoons, and "The Fornarina" may be mentioned as perhaps one of the very best of the antotypes.

The general view of the Loggia de Farnesina Palace is one of the few architectural bits, but there are several fac-similes of the spandrel frescoes, among them that of "Psyche being conducted by Mercury to Olympus," a most charming composition. This is among the designs for the Farnesina decorations. The exhibition occupies two large rooms of the gallery. Some of the photographs are on a considerable scale, one for instance, that of "Venus and Cupid before the Court of the Gods" (a ceiling fresco of the Farnesina series), occupying three sheets of paper. It is a very bold and successful one. Among the numerous and most interesting studies of heads, feet, drapery, &c., are some drawn upon paper prepared in squares, as if for the use of the engraver.

No one can view this collection without being impressed not only with a sense of the genius and power of the artist, but also with admiration for the untiring industry with which he seems to have worked. Raffaele knew no royal road to success in his profession, but apparently studied every detail of his compositions with a care and patience which affords an excellent example for the imitation of his modern successors in every branch of the fine arts.

**Building Estates at Harold Wood and Walthamstow.**—Last year there were several sales of building sites on the Oakleigh Park Estate, the Queen's Park Estate, and the Avenue Road Estate, situated close to the Harold Wood Station of the Great Eastern Railway, all of which have been laid out for building purposes. The whole of the Oakleigh Park Estate, containing between four and five hundred sites, has been disposed of, and building is now actively proceeding. Another property immediately adjoining, known as the Bransmead Estate, has just been similarly laid out, and on Wednesday last the first portion of the estate, consisting of 112 lots, was offered for sale by Messrs. Baker & Sons. The particulars stated that, in addition to drainage, the mains of the Grays Waterworks Company had been laid down on the estate. In addition to villas and other private houses, the property submitted included several sites for shops, and also a large hotel plot. Most of the sites have frontages of 15 ft. and depths of 100 ft. and on being put up there was an exceedingly active demand, the whole of the sites being sold at prices varying from £6 to £10 each, and several of the purchasers taking as many as eight and ten lots each. The hotel plot, containing a total frontage of 140 ft., was sold, after a severe competition, for £43. The sale of the remaining portions of the Queen's Park Estate, and the Avenue Road Estate, containing 46 lots, was next proceeded with, when all the lots were sold, the entire proceeds of the day's sale amounting to upwards of £2,000.—Last week Messrs. W. & F. Houghton offered for sale a building estate of four acres in extent, situated at Hoe-street, Walthamstow. It was sold for £4,600, being at the rate of nearly £1,200 an acre.

**Margate Clock Tower Competition.**—Our space is so much occupied this week that we must defer till next week a notice of the designs submitted.

SANITARY LEGISLATION CONFERENCE.

The second meeting of this Conference was held at the rooms of the Sanitary Assurance Association, 5, Argyle-place, Regent-street, W., on Monday afternoon, when the following Institutions were represented:—the Sanitary Assurance Association, Royal Institute of British Architects, Public Health Medical Society, London Sanitary Protection Association, Association of Municipal and Sanitary Engineers and Surveyors, and Royal Institute of Architects of Ireland. Sir Joseph Fayrer, President of the Conference, occupied the chair.

After confirmation of the minutes of the previous meetings, and the reading of minutes, the meeting proceeded to consider the details of the Sanitary Registration of Buildings Bill, of which the principle had been unanimously approved at the meeting held on April 4th. The Bill consists of seventeen sections and a schedule of forms. The first section gives the title of the Bill, and this was approved. The second section proposes to limit the operation of the Bill to places of 2,000 inhabitants and upwards, but after discussion this section was amended to read as follows:—"From and after January 1st, 1888, the provisions of this Act shall come into operation throughout the United Kingdom." Section 3 was agreed to, with a verbal alteration, making it read:—

3. The Corporation, Local Board of Health, or other Local Authority charged with the administration of the Public Health Acts shall become Sanitary Registration Authorities under this Act for their respective areas, towns or districts, and in every district where there be no Local Authority under the Public Health Acts, or where there may be more than one Local Authority under the said Acts, the Local Government Board in England and Wales, and the corresponding Authority in other parts of the United Kingdom shall decide under what Authority this Act shall be administered.

On Section 4 considerable discussion took place, in which the Chairman, Dr. J. C. Cooney, Mr. Charles Jones, A.Inst.C.E.; Mr. Mark H. Edge, A.R.I.B.A.; Dr. W. R. Smith, Mr. E. B. Elice Clark, M.Inst.C.E.; Mr. Lewis Angell, M.Inst.C.E.; Mr. Andrew Stirling, General Sir Peter Lumsden, C.S.I.; Mr. E. C. Robins, F.R.I.B.A., and others took part. This clause is as follows:—

4. Each Sanitary Registration Authority constituted by this Act shall appoint its Clerk or some other person as Sanitary Registrar, who shall, under the direction of the Sanitary Registration Authority, issue notices and certificates as required by this Act, and as given in the Schedule hereto annexed, and keep a record of the same in appropriate books to be supplied by the Local Government Board, and make such returns to the Local Government Board from time to time on approved forms as such Board may direct.

An amendment, to strike out the making of returns to the Local Government Board, was rejected, and ultimately the section was agreed to. A long discussion also took place on section 5, but it was agreed to as in the Bill, namely:—

5. Previous to June 1, 1888, each Sanitary Registration Authority constituted by this Act shall cause notice to be sent to the Owner, Lessee, Sub-Lessee, or Occupier of every building occupied or intended to be occupied, either permanently or temporarily, within the area of its jurisdiction, informing the said Owner, Lessee, Sub-Lessee, or Occupier, of the provisions of this Act (in the manner set forth in Form A in the Schedule hereto annexed).

On section 6, Dr. Cooney proposed to make the Bill compulsory with regard to all buildings. This was seconded by Mr. Joseph Smith, and supported by Mr. Jones. Mr. Timothy Holmes, F.R.A.S., Professor Roger Smith, F.R.I.B.A., and others spoke in support of the permissive part of this section. The amendment was lost, and the section agreed to as follows, subject to modification in the latter part if subsequent sections render it necessary:—

6. After the passing of this Act the Owner, Lessee, Sub-Lessee, or Occupier of every building used, or intended to be used, as a School, College, Hospital, Asylum, Work-house, Factory, Workshop, Hotel, or Lodging House, shall, and the Owner, Lessee, Sub-Lessee, or Occupier of every other building may, cause to be deposited with the Sanitary Registration Authority (in the manner set forth in Form B in the Schedule hereto annexed) a Sanitary Certificate, signed and sealed by a Licentiate in Sanitary Practice, that is to say, a person or Corporation duly licensed by the Local Government Board or corresponding Authority, in accordance with this Act.

Section 7 deals with the persons who are to become under the Act Licentiates in Sanitary Practice. It provides, among others, that members of the Royal Institute of British Architects, members of the Institution of Civil Engineers, and members of the Institute of Architects of Ireland, should, after examination, be registered as qualified to certify under the Act. A long discussion took place upon

this part of the section, and after deciding to add to the institutions named the Association of Municipal and Sanitary Engineers and Surveyors the Conference adjourned at a quarter to five, the next meeting being fixed for the 16th of May.

#### THE SANITARY REGISTRATION OF BUILDINGS BILL.

Sir,—Will you be kind enough to allow me to say a few words on the provisions of this Bill, which, if it becomes law, will so seriously affect the interests of those named in its compulsory clauses,—namely, the occupiers of asylums, hotels, hospitals, schools, colleges, and lodging-houses?

For the information of those who have not seen the Bill, I may state shortly that the occupiers of buildings used for any of the above purposes are required by the Bill to obtain within a given time a certificate that the building they occupy complies with certain sanitary regulations named in the Bill, which in themselves are by no means excessive, but which a good many buildings would not at present comply with. Without such certificate the building would not be permitted to be used for any of the purposes named above.

It is probable that the sanitary registration of houses would, if it can be carried out in a simple and efficacious manner, and without too much expense, be advantageous; but I do not think the Bill, as at present drafted, and as laid before Parliament, would be either simple or effective, while some of its provisions are open to grave objections. If the Bill be, as seems the intention, a measure for enforced registration in certain cases, and of voluntary registration in others, while the actual work of inspection and execution of alterations is to be carried out by private enterprise, surely the registration should be done by those who are simply registrars and no more, and who have neither the power nor the ability to interfere with the carrying out of the requirements of the Act.

The cost of carrying out the requirements of the Act will, apparently, fall in the generality of cases, on the occupier, who has no expense should, in my opinion, fall. The provisions for the examination of licentiates in sanitary practice are clumsy and unnecessarily elaborate. The schedule of requirements, which every building must fulfil, seems to me to be loose and not sufficiently considered.

The penal clauses providing for the punishment of licentiates who may grant and sign misleading or false certificates are severe, but their usefulness is entirely nullified by the introduction of the word "corporations" in the Bill, it being absurd to provide for the punishment of a corporation for misdemeanour; thus it would necessarily follow either that this clause would become a dead letter, which is the same thing as saying that the Bill would be useless and an incubation, or that no licentiate could practice unless he had a corporation behind him who could, without danger to themselves, bear the burden of his errors; or if this be taking rather a strained view of the case, it is, at any rate, certain that the licensed corporation would be in a position to ignore the penal clauses to a considerable extent, and would, therefore, have an undue advantage as compared with licentiates in private practice, to the injury of the public; for however anxious each may be to do the best, he who knows that he cannot grant a certificate with safety to himself unless certain provisions are complied with, has the law to back him, and knows that what he refuses his fellow will refuse; therefore he can and will maintain his point, be his client never so disinclined to exhaust money.

The word "corporation" should certainly be entirely removed from the Bill, and licences should only be granted to individuals who intend themselves to practise in sanitary work, and who alone should be authorised to sign and seal sanitary certificates. The above are by no means the only points which, in my opinion, require careful consideration and amendment; but they are, I believe, sufficient to call attention to the grave nature of the alterations which it is proposed to make in the law, and I hope it may induce others to look into the matter carefully, and to express their opinions where they may have the greatest weight.

SANITATION.

#### OBITUARY.

Mr. J. R. Watson.—The Leeds Mercury of the 29th ult. announces the death of Mr. J. R. Watson, which occurred on the previous day, at his house in Blandell-terrace, Leeds. A native of Damfries, Mr. Watson served some time there in the Ordnance Survey Office, leaving Scotland for Leeds in 1859, when he was nineteen years of age. He then entered the office of Mr. G. Corson, with whom he continued to be engaged until about two years ago, acting during the greater part of that period as Mr. Corson's principal assistant. Having given a great deal of attention to the arrangement and construction of theatres, Mr. Watson was enabled to afford Mr. Corson material aid in the building of the Grand Theatre, Leeds; and when the Municipal Buildings and School Board Offices were in course of erection he superintended the work on behalf of Mr. Corson, and acted as that gentleman's deputy in his absence. Latterly Mr. Watson had been in feeble health, and some time ago he went to Florida in the hope of improving his physical condition. He returned to England quite recently. He leaves a widow and three children.

#### Illustrations.

##### CHURCH OF THE HOLY REDEEMER, CLERKENWELL.

THIS church, of which we give an interior view, is to be built upon the site of the Spa-fields Chapel, in Exmouth-street, now pulled down, as mentioned in our columns some little time since. The design, by Mr. J. D. Sedding, we presume has been partially inspired, as to the interior treatment, by the character of some of Wren's London church interiors, though not, like too many of those, in plaster or cement detail. The banded columns give a special character, however, to this otherwise classic colonnade. The style and arrangement of the interior are admirably suited for a modern church.

The drawing from which the illustration is taken is in the Architectural Room at the Royal Academy.

##### OFFICES, WOOLWICH.

We give a view this week of Messrs. G. E. Arnold & Co.'s new offices, erected on what was part of the old Woolwich Dockyard, formerly belonging to H.M.'s Government, and now the timber and slate wharf of the above-named firm.

The offices are faced with Erith red bricks, and the stonework is of Corsham Down.

The ground plan is devoted to the clerical branch, and contains ledger and day-book clerks', travellers', and cashier's offices, also a private and general waiting-room, under which is the strong-room.

The first floor comprises Mr. Arnold's private office and private suite of rooms, and draughtsman's office.

The second floor comprises store-rooms and a house-keeper's suite of apartments.

The mezzanine building is exclusively devoted to the sanitary arrangements, which are constructed upon the external principle.

From the north side of the building a splendid view of the river is obtained.

The building is built over spacious cellars, with a clear head room of 6 ft.

The work has been carried out by Mr. Stebbing, builder, of Sidcup, from the designs and under the superintendence of the architect, Mr. Percival Brown.

##### THE HOTEL BOURGTHÉROLDE, ROUEN.

This sketch of a portion of this well-known example of late French Gothic, by Mr. Ernest O. Lee, is an example of the use of crayon in architectural sketching, by which Mr. Lee suggested that the effect of a building could be represented with more force and much less labour than pencil would accomplish. Architectural sketchers may take the hint and try the experiment.

The sketch from which it is taken is hung (rather high, unfortunately) in the Architectural Room at the Royal Academy.

##### SCULPTURE AT THE ROYAL ACADEMY.

We give this week phototype illustrations of four of the works in sculpture now exhibited at the Royal Academy; two ideal figures, "Ladas," by Mr. Armstead; and "Peace," by Mr. E. Onslow Ford; and two portrait statues, the model of a statue to Gordon for Trafalgar-square, by Mr. Thornycroft, and the portrait statuette of "Mr. Wyndham as David Garrick" (at the moment when he is introduced to Ada Ingot by her father), by Mr. C. B. Birch.

Mr. Thornycroft's design includes a carefully designed pedestal, of which only a portion is shown, as the pedestal and statue combined could not be successfully got into one photograph illustration. The treatment of the figure is dignified and simple, such as Gordon might have approved, if anything could have induced him to tolerate a statue of himself, which we should think more than doubtful.

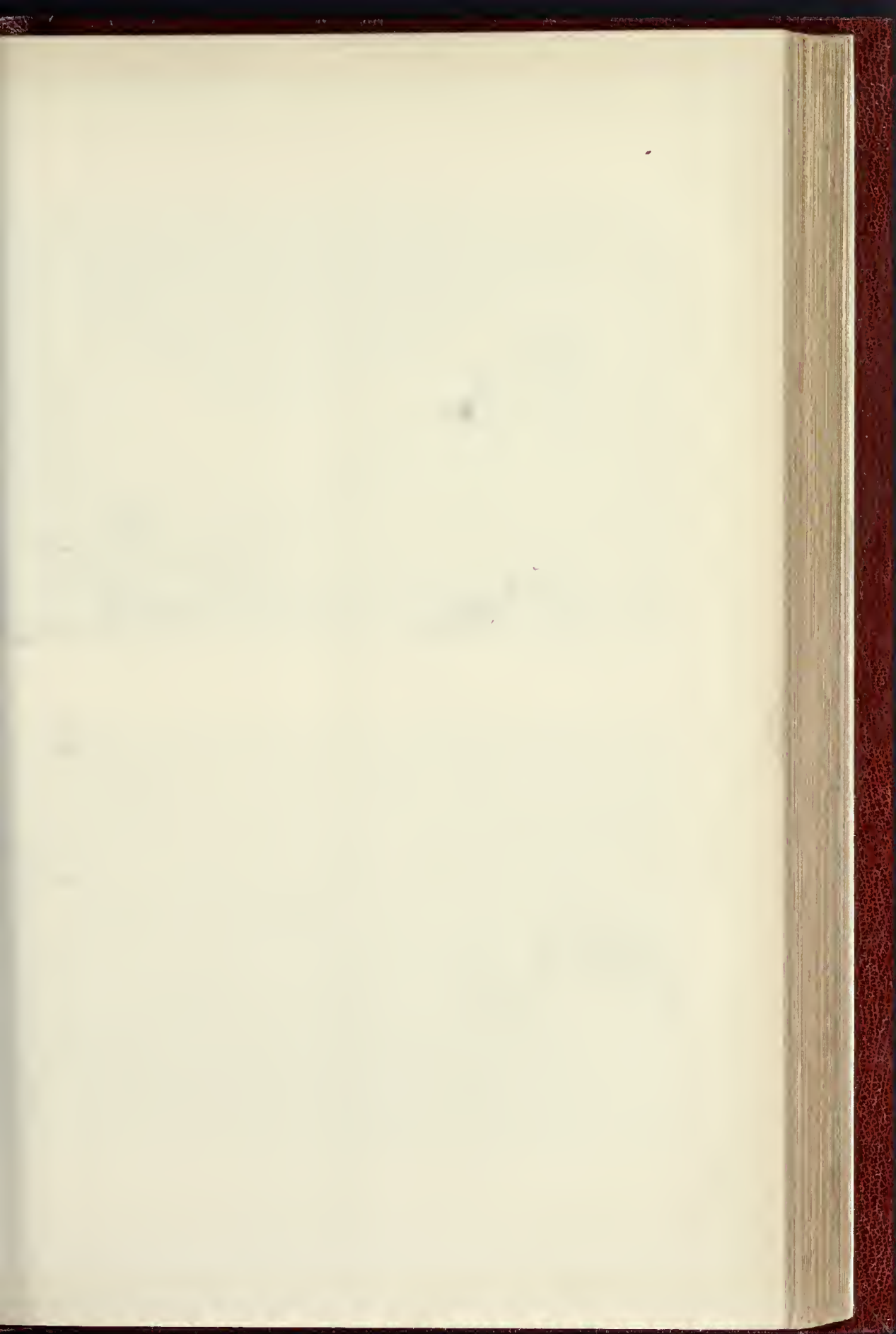
About Ladas, the Spartan runner, Mr. Armstead observes:—

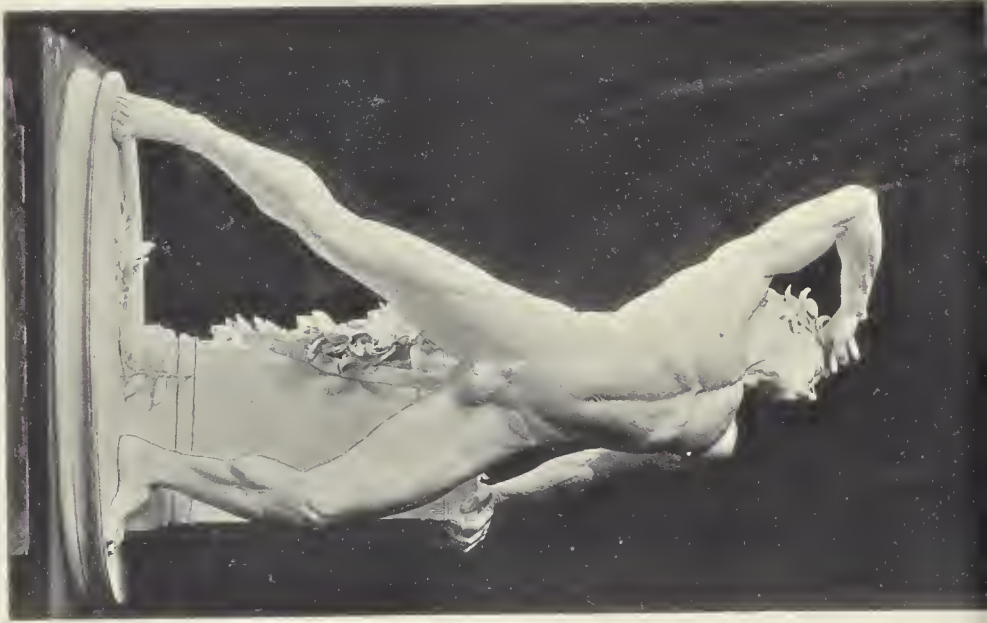
"He was thrice victor in the long course, which required not only swiftness, but endurance. His last victory cost him his life. The subject,—stained effort for the victor's wreath until the end,—appeared to me worthy of record, and of lasting interest, taking it out of the ordinary run of subjects selected for the nude."

Mr. Onslow Ford's very charming figure of "Peace," a bronzed figure, conspicuous in the lecture-room, and holding up emblems of peace, the dove and the palm branch, speaks for itself. It is also an illustration of the appropriate use of the nude figure in sculpture to express an abstract poetic idea through human form.

**Society of Engineers.**—At a meeting of this Society, held on Monday evening last, at the Westminster Town Hall, Professor Henry Robinson, President, in the chair, a paper was read on "Refrigerating Machinery on Board Ship," by Mr. T. B. Lightfoot, M. Inst. C.E. After mentioning early applications of refrigerating machines, the author pointed out that at the present time the only machinery in use on board ship for refrigerating purposes was that in which heat is eliminated by the successive compression, cooling when under compression, and subsequent expansion of ordinary atmospheric air. Though apparatus on this principle was at work as early as the year 1845, it is only since 1870 that it has received much attention. The theory of air-refrigerating machines was briefly explained, showing, first, how a perfect gas behaves during compression, cooling, and expansion; and, secondly, the effect of aqueous vapour mixed with such gas. These principles were then applied, and the construction of cold-air machines described, after which a short historical résumé was given, commencing with Dr. Gorrie's machine, which was at work in New Orleans in 1845 and in London in 1856, and referring to Siemens' invention of the interchanger, Windhausen's and Niehrlich's improvements, Giffard's separate exhaust-valve for the expansion cylinder, and Bell-Coleman's duplicate machine with interchanger. The author's machines for use on board ship, as manufactured by Messrs. Siebe, Gorvan, & Co., were described at length by the aid of diagrams. These machines have no interchanger, and the reason for this was given. The largest sizes generally have compound surface condensing steam-engines, but sometimes the condenser is made separate, as in the case of the installation for the *N. Fifehire*, now being specially built for the New Zealand meat trade by Messrs. Turnbull, Martin, & Co., of Glasgow. The smaller machines are combined with ordinary steam-engines, and are made both of the horizontal and vertical type, the latter, however, being specially suited for ship-work on account of the small space occupied.

**Strike of Brickmakers.**—The brickmoulders and gangs throughout what is known as the Cowley district turned out on strike on April 18 for an increase of wages. The masters resist any advance on the ground that bricks manufacturers have been making no profits for some years past, but in many cases heavy losses. The strike will, it is feared, delay very considerably this season's bricks from coming on the market, and will also reduce the output, and as the stock held by most of the manufacturers is said to be very small, a steady rise in the price of Cowley bricks must be looked for.





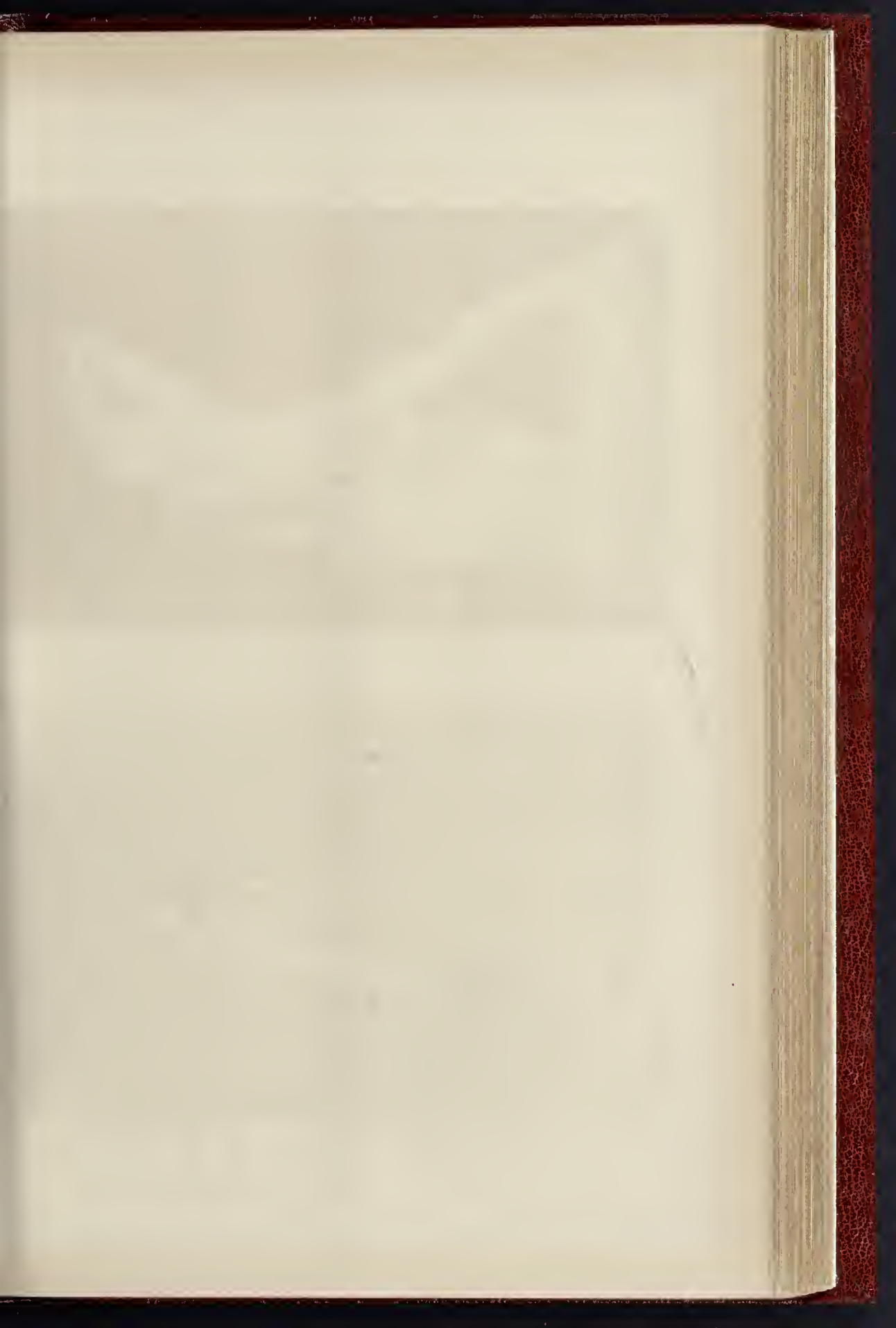
LADAS, THE SPARTAN RUNNER, DYING AT THE GOAL.  
 Mr. H. H. Austin, R.A., Sculptor.

SCULPTURE AT THE ROYAL ACADEMY.



"PHEGEUS" Mr. E. O'SHEW, R.O.M., Sculptor.

The Photochrome Co., 20, Strand, London.

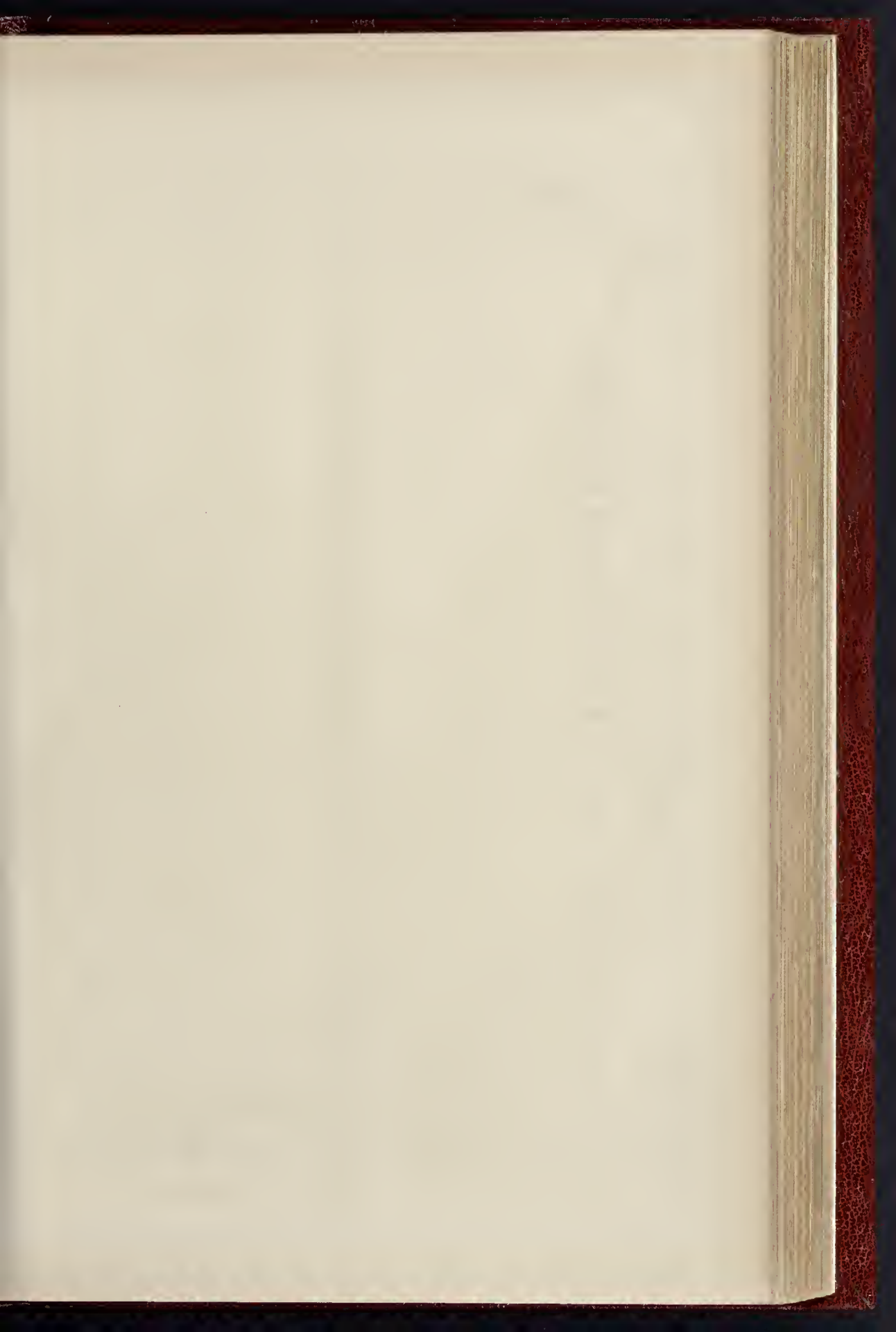




Architect, Messrs. G. & J. Mansel Pleydell, 57, Holborn, London, E.C.1.

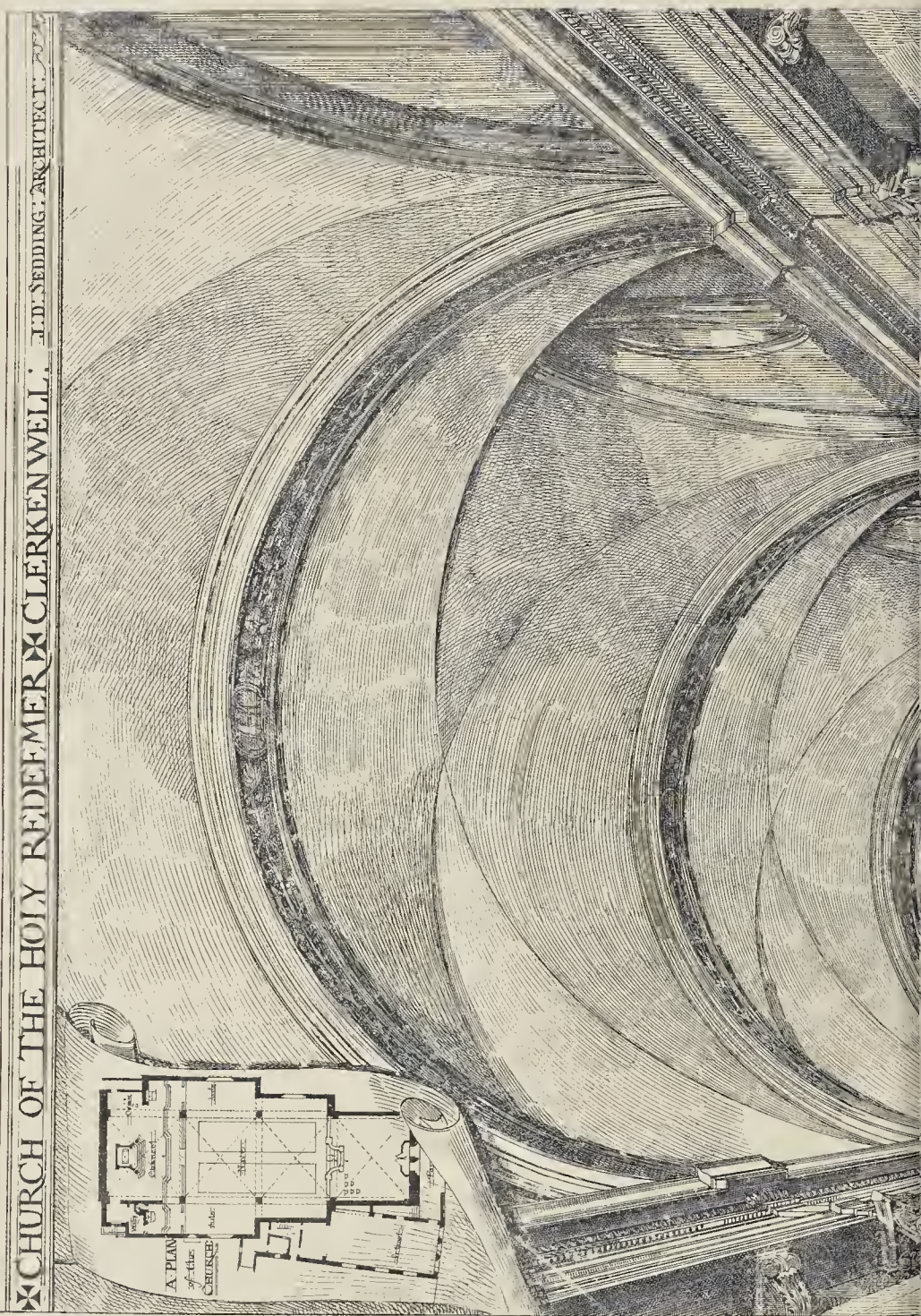
THE HOTEL BOURGHEROLDE, ROUEN.—FROM A CRAYON DRAWING BY MR. E. C. LEE, F.R.I.B.A.





THE BUILDING OF THE CHURCH OF THE HOLY TRINITY

THE BUILDER, MAY 7, 1887.



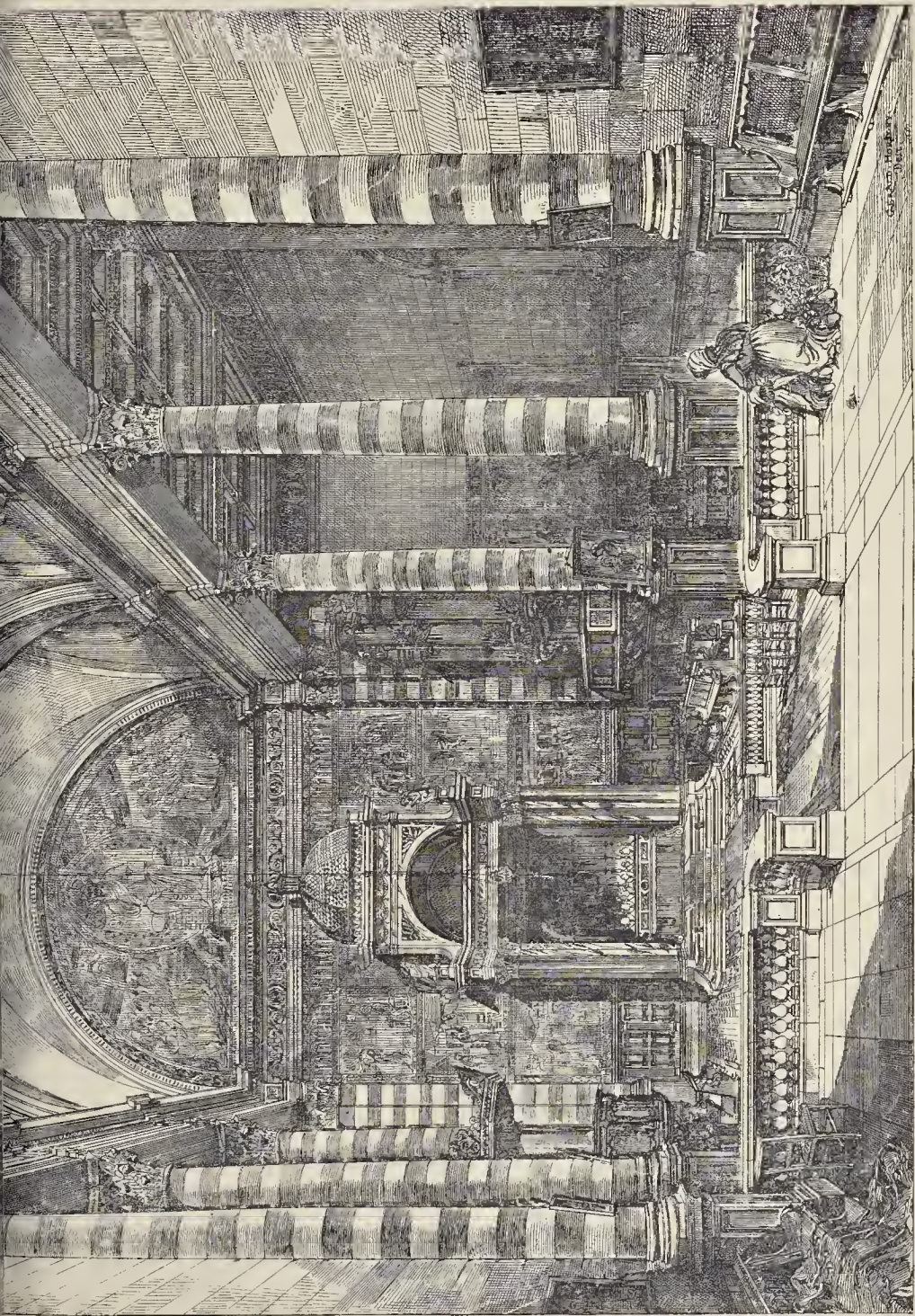
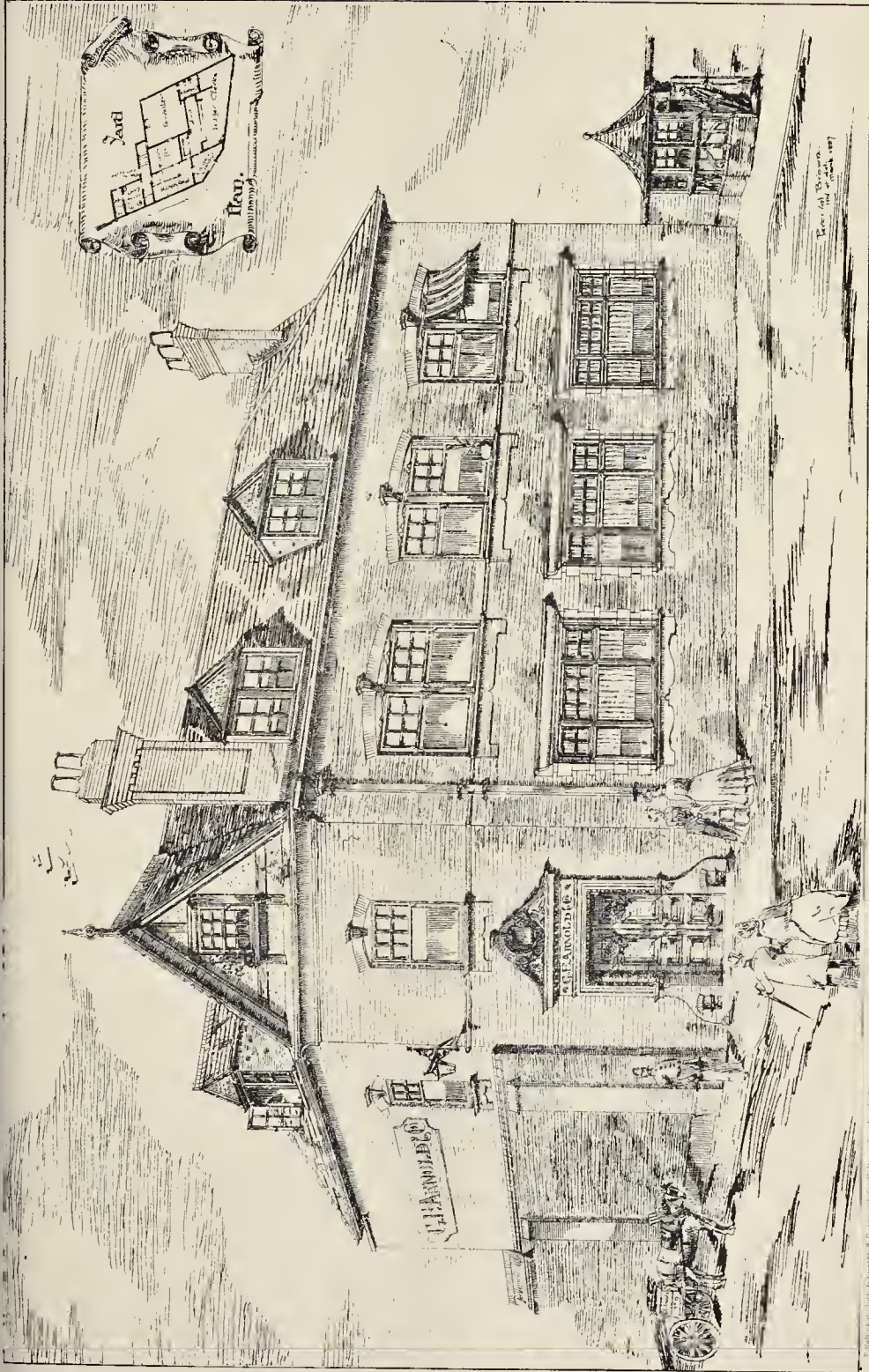


PHOTO LITHO. BRIDGEMAN & CO. 22, MARK LANE, LONDON, E.C. 4.

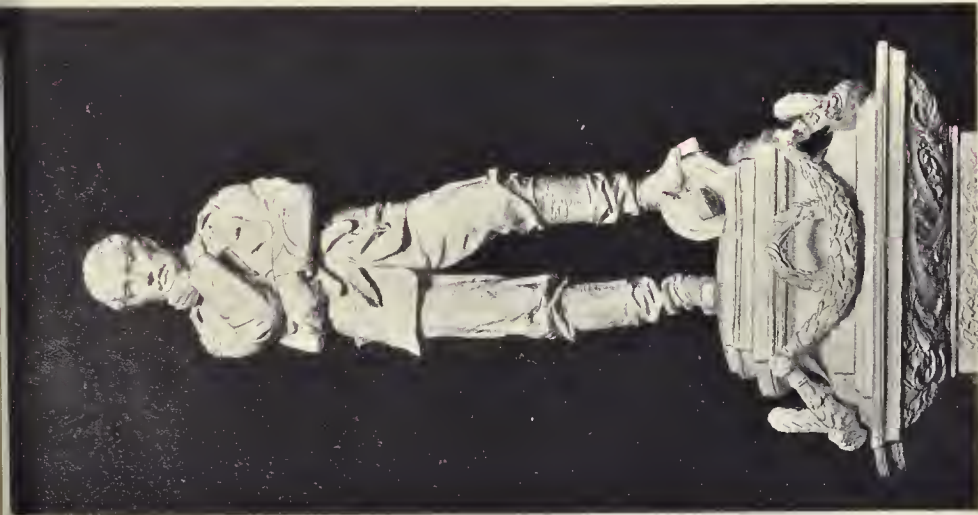
Printed and Published by the Author



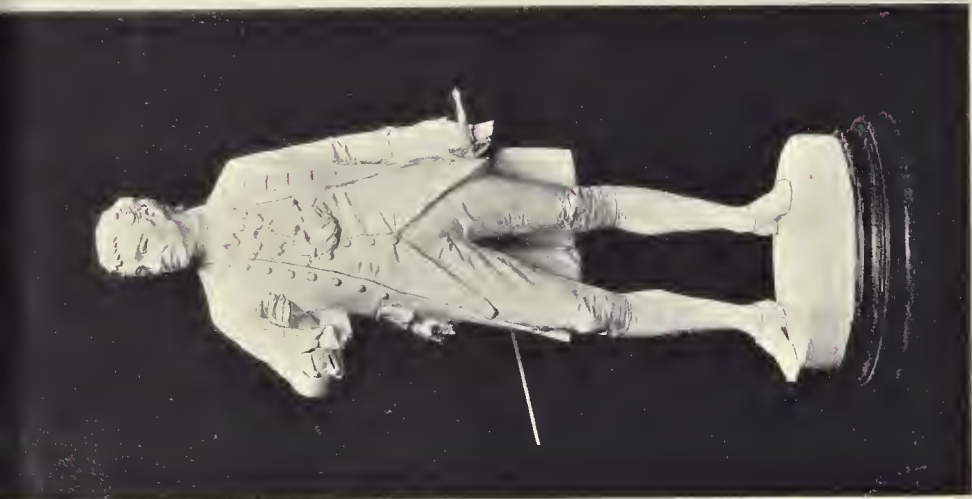
OFFICES, WOOLWICH.—MR. PERCIVAL BROWN, ARCHITECT.

Engraved by J. G. & F. W. G. & Co. from the original design by Mr. Percival Brown.





THE LATE GENERAL GORDON: Model of Memorial to be placed in Trafalgar Square. Mr. HANS THORSCHLOFF, A.R.A., Sculptor.



The Phototype Co., 303, Strand, London  
MR. C. WYNDHAM AS DAVID GARRICK.  
MR. C. B. BIRCH, A.R.A., Sculptor.

SCULPTURE AT THE ROYAL ACADEMY.





“THE RELATIONS OF ARCHITECTURE AND THE HANDICRAFTS.”

GENERAL CONFERENCE OF ARCHITECTS.

In the large Supplement which we this week devote to the proceedings of the General Conference of Architects, we print Mr. J. D. Sedding's paper on this subject.

The Chairman (Mr. Alfred Waterhouse, R.A.), in inviting discussion, said they had listened to a paper which must make them all thoughtful and somewhat melancholy. At the same time, they could not help agreeing with it more or less, and yet undoubtedly there was something to be said for the other side of the question. He therefore hoped they might have a very interesting discussion on Mr. Sedding's paper. He saw before him Mr. Brett, who, although not an architect, had a good feeling for the profession, and he hoped that gentleman would, therefore, favour the meeting with a few words.

Mr. John Brett said he had felt rather disappointed to hear Mr. Sedding take so desponding a view of circumstances, for he thought that if there was one thing remarkable in connection with the rising generation, it was the taste for craftsmanship. He scarcely knew a boy who did not long either to be an architect or an engineer, and who did not desire to know how to use tools, work wood, and chip stones. Therefore, on the whole, there was a splendid prospect for the rise of craftsmanship in England. In his own department they had seen the commencement of it, and his craft had begun to learn from the foundation. Before coming to this meeting, he asked the librarian at the Athenæum if he could see any book there on Italian domestic architecture. The librarian inquired whether he desired to know something about the internal construction of the Italian villa, to which he replied that that was what he wanted. “Then,” said the librarian, after turning over the pages of the index, “you know the word ‘architecture’ applies to the outside of a building, and not to the inside?” (laughter). This was a most interesting commentary on Mr. Sedding's contention that the paper designer was not the man that was wanted,—at all events not in connection with domestic architecture, which, he believed, would be the architecture of the future. The churches were likely to last a long time, and very beautiful they were; but the wealth of this country was great and increasing, and what he would like to say to the Conference was that the manner in which the wealthier classes were housed did not do them credit. “The stately homes of England” had been celebrated by poets; but if he were asked what was their style, he would reply that it was the rabbit-hutch style. To make a rabbit-hutch it was merely necessary to get some tea-chests, and to nail in the fronts, so that the rabbit might be able to look out, and that the attendant might pass his food through. The tea-chests were then stacked in the smallest possible compass, and then they arrived at the external arrangement of the houses of the wealthier classes in Britain (laughter). The business of the architect was to provide an outside to the tea-chest; he was required to produce a kind of tank in stone or brick, or some other material, such as marble, which should enshrine them beautifully. Now this arrangement provided certain peculiarities of structure; one was that there was nothing to see within; another, that there was no light to see by; another, that it stank horribly; and again, that disease and toil prevailed within. The master was a mere minor figure, and the chief question in the production of the house was to afford accommodation for a herd of menials kept at a large expense to poke the owner's face through the grating (laughter). Now these things ought not to be, and he had two suggestions to offer. The first was that, as the climate of this country was rather a depressing one, and as there was not much to be seen on the outside, it was of importance in domestic architecture that the properties of the owner should be well seen. His second suggestion was that the occupants should be able to breathe well, viz., that the lighting and ventilation of a domestic structure were the principal considerations for the owner. The time would come when the sculptor would be the architect's right-hand man; but at present that was not the case, and there seemed to be no immediate prospect of it. When men were found willing to give 9,500 guineas for one picture, it showed that, in spite of the hardness of the times,

there was still sufficient incentive to spend large sums upon art. In domestic architecture there was one common defect, which militated against pictures being properly seen, and that was cross-lighting. Another defect in modern houses was the absence of vistas, such as were seen even in Italian villas.

The Chairman at this point drew Mr. Brett's attention to the fact that the Conference had met to discuss Mr. Sedding's paper on architecture in connexion with the handicrafts; therefore, Mr. Brett was not quite in order in discussing the question of cross-lights.

Mr. Brett explained that he merely referred to the question of cross-lighting as having some bearing on the proper exhibition of examples of one particular handicraft, viz., that of the painter.

Professor Kerr said he rose to propose a vote of thanks to Mr. Sedding, who was one of those delightful essayists who did not expect people to agree with them. At the same time, they could not but feel there was a great deal in the paper which provoked reflection. Mr. Sedding's paper had a very wide range, although it was professedly confined to a narrow issue, and seeing as he did around him so many young architects, he had no doubt that a large number of them would not fail to remember that evening, in after life, as an occasion upon which they had received considerable,—although not always direct,—instruction. He proposed to offer his contribution to the discussion that evening by making a few remarks, not in contradiction to Mr. Sedding, for it was his rule never to contradict anybody (laughter). It was poor criticism which could only contradict. True criticism, on the other hand, was that which selected those truths which were prominent in discussion, and dwelt upon them with still greater profit to the audience. But before proceeding to criticise the paper he would like to refer to what had been said by their eminent visitor, Mr. Brett. Mr. Brett was not justified in saying that the English country-houses were collections of rabbit-hutches. He knew one or two intimately which he could not allow to be called a collection of tea-chests, and he believed he knew some in which a picture by Mr. Brett would be displayed to the utmost possible advantage. He also knew a hook, although he could not cite the page in it, giving the rule that architects had to follow in providing for pictures. Now, with regard to Mr. Sedding, the scope of his paper had been this,—that he seriously mourned over the decadence of English architectural art and identified it with the neglect of the craftsman. They could clearly understand and thoroughly grasp the strength and the truth of the idea, and could all agree with him in the abstract. But whether it was possible to combine with the conditions of the present day, which were unalterable, and for which they were not responsible, as they were historical conditions, the results of ages that could not be varied—whether it was by any means possible to combine the conditions under which they were now happily living with the peculiar circumstances Mr. Sedding had referred to, was a question which was not to be lightly disposed of. They must not follow Mr. Sedding seriously in the view that it was desirable to restore in the nineteenth century the social conditions of the sixteenth. In the first place, the young men might try to do so as hard as they pleased, but they would never succeed; and in the second place, if they were to succeed, they would not thank God for success. Mr. Sedding dwelt upon what he spoke of as the Gothic and Renaissance revivals. There had been no Renaissance revival. The Renaissance had gone on uninterruptedly, and it was the Gothic which had been revived, to the great credit of English architects. And in spite of what Mr. Sedding might think, it had resulted in the administration of a tonic to English art which had been immensely beneficial, and from which that art, whatever turn it might take in future, had inevitably derived great and signal advantage. He was not a Gothic man, and never should be one, but the revival of the Gothic was, properly speaking, a local English revival, arising especially out of the peculiar conditions of England at the present day, having its origin in the Oxford movement, proceeding and progressing with that movement, and falling now with it. The idea which Mr. Sedding appeared to have of architecture getting back into the hands of the

craftsman would, if it could be managed, be welcomed by the craftsman. The craftsman would say to Mr. Sedding:—“If you will be content to live on 35s. a week I shall be highly pleased with the arrangement.” But Mr. Sedding did not intend to do that, very far from it, and he could not go to the craftsman and say:—“I will give you a thousand a year.” This was a short and pungent illustration of a fallacy which seemed to run through Mr. Sedding's paper. The conditions of the present day tended to separate the architect, and the designer generally, from the handicraftsman more and more. He agreed very much with Mr. Sedding on the question of design, and had been trying for years to disparage mere paper design. He spoke of it disrespectfully for the moment, because Mr. Sedding had done so,—not that he (the speaker) liked to speak of anything disrespectfully (laughter). What the younger members of the profession had to be told was, not to depend too much on draughtsmanship (hear, hear). He admired the draughtsmen and their wonderful productions of the present day; indeed, the drawings they saw in the illustrated journals were wonderful as regarded quality, but at the same time there was greater necessity for not relying upon that which was so facile. Let them look at the red brick buildings scattered over the country, and remember how charming these appeared upon paper, and yet how ugly many of them were in reality (laughter). They had heard that a great many people did not like Victorian art, and no doubt many tried to persuade themselves of this. They did not know what they really wanted, and they did not like what they had. Victorian art was the product of a long process of inevitable development, and out of which they could not and would not wish to get. The arts at the present moment in England were most prosperous and promising; the number of men who were making a living by the practice of design was increasing every day, and it was a pity to discourage the rising generation in regard to their hopes and expectations. The subsidiary arts connected with architecture were springing up into bloom and blossom, into flower and fruit, in England in a way that was most creditable to the intellect and intelligence of the country, and he was disposed to say again, as he had said before, that the next generation and the generation following would see English art predominant on this globe (oh, oh!). He had no doubt of it whatever. He was told by a friend the other day that he had walked into the schools in Vienna and found English specimens as the typical examples of art which the children were to be taught. Now, Vienna was a long way off, and lay to the eastward, where imagination was perhaps a little brighter even than in the cloudy skies of the west. Mr. Sedding had said that architects were out of touch with the trades. That was so, but Mr. Lawrence Harvey was very laudably trying to bring them into touch, and a good many others were doing the same. Looking down the list of studies going on in the Architectural Association, he was pleasantly surprised to find that great efforts were being made to bring architects into touch with the crafts through that excellent institution. Therefore, they were not in such a hopeless state as had been depicted; and he believed that when Mr. Sedding had slept and reflected on what he heard that evening he would take heart and go forward with more hope, and with a determination to make the best of what was not a bad job but really a good one. Mr. Sedding lastly said that things should be got back to their normal condition. He could not agree with that contention at all. “Through the ages one increasing purpose runs,” and they were only at their own point of the course. The generation that followed would be ahead; the generation that followed that would be still further ahead, and, therefore, what they had to do was not to go back now, but to look forward for the best. (Applause.)

Mr. E. C. Robins, F.S.A., in seconding the vote of thanks, remarked that what they had heard had been most inspiring. There was no doubt much need for a closer approximation to the handicrafts from their standpoint as architects. The spread of technical education was a matter of much gratification, and even the great universities were now introducing the study of such things as chemistry and physics. People were beginning to see the necessity for using their hands as well as their heads in the

development of every kind of knowledge. That being so, architects ought to feel that a closer association with the workman was a good suggestion. He believed, with Professor Kerr, that the present condition of things had grown out of circumstances over which they had no control; but a time was coming when they would have more control, and it would be necessary to show themselves in advance of those who were so well taught in the various institutions. He need only refer to Mr. Brophy, at the Finsbury Technical Institution, to show what an excellent training was within the reach of the craftsman of to-day. At the same time, the difference between the architect and workman must remain, for they could never change places. The mere individuality of the workman would not do much for him, but there was a feeling abroad that something should be done for the craftsman, and he would gladly see him receiving higher wages.

Mr. Walter Crane said he was sorry he had come in somewhat late, but from his knowledge of Mr. Sedding's views on this great subject he felt sure that he should be able to support the generality of the paper. He felt that it was only by working in a contrary direction to turning the whole force of education into a kind of professional machine that they could get back to the condition of things that had existed in the past. A revival was going on, but it was a movement more or less fostered by the spirit of the age, and was really built up on the wreckage of the museums. Mr. Brett had made rather a large assertion when he said that the dwellings of the wealthier classes did them no credit. They might rather get a little lower and find a good deal more for discreditable reflection in the buildings not occupied by the wealthier classes. Professor Kerr seemed perfectly confident as to the condition of things, and that they were occupying their places, in much the same way as the bricks made up a wall; but he should not lose sight of the fact that the wall might be thrown down at any moment, and it was impossible to look back upon history without feeling that such confidence might be much shaken. Art had gone through periods of development and perfection the same as the growths of nature, and it was very hard to kill. This sort of protest against the things that were was an indication of some great change, and it was in that hope that he looked forward.

Mr. William White, F.S.A., added a few words of thanks to Mr. Sedding for his interesting and amusing paper. He felt with Mr. Sedding that there ought to be a strong bond of interest between the architect and the handicraftsman. That it was not so in the present day was evident. He believed the principles of art and design alone,—apart from the practical questions,—had enormously advanced within the last fifty years ago. In old days the connexion between architect and handicraftsman was one of gradual development. He could not altogether agree with Mr. Sedding in his view of the omnipotent peasant handicraftsman bringing forth his intuitive perceptions to such perfection as they were told he did in Mediaeval art. What were his intuitive perceptions or scientific knowledge apart from that which was brought to him by the guilds and confraternities who visited him? No doubt an amount of art feeling did reach every village in the kingdom, but he could not believe it was indigenous. It was the product of oral tradition and of the development of art by those who had education and literature and a perfect bond of union amongst themselves, working in the same direction wherever they came together. There was much hopeful promise in the establishment of the rising technical schools and in the mode in which they were being conducted, and that was the only direction, he believed, to which they could look for obtaining any sort of sympathetic union between two classes that were so entirely separated. He might mention that in his younger days he had tried to instil into village country smiths a little of the knowledge of what had gone before in the early art-work of iron, and he was glad to say that they took hold of and valued his instruction. Such instruction, however, which was of an isolated kind, could be of little use.

The Chairman, before putting the vote of thanks, said they were much indebted to Mr. Sedding for his very suggestive paper, and for the interesting remarks it had elicited. He

would like to make one little suggestion on the subject, and that was that while lamenting the divorce between architecture and the handicrafts, he ventured to think it might be traced to the way in which archaeology governed all their art procedure. Whilst they were archaeologists they must be more or less learned architects, and therefore they must dictate the different features of the building to the handicraftsmen. When they left archaeology and returned to tradition in architecture there would be some hope for the handicraftsman.

The vote of thanks was then put to the meeting and carried by acclamation.

Mr. Sedding, in replying, said that like Professor Kerr he never contradicted any one, though he was very much inclined to do so during that gentleman's speech (laughter). Professor Kerr had spoken of Victorian art, and of how much they were indebted to it, but he wished to know what Victorian art was? Professor Kerr had also done a little bit of special pleading in the interests of the designer, when speaking with such satisfaction of the numbers of designers; and the pity of it was that he appeared to prefer the interests of the designer to those of the architect. His (Mr. Sedding's) point of view was the interest of the architect and of the handicraftsman, and he had merely alluded to South Kensington as something from which they had much to learn. Mr. Sparkes had compiled in an interesting book almost the whole history of South Kensington, and its different stages of growth. One was delighted to find a little common sense in connexion with South Kensington, and to learn that one man really thought it a mistake to encourage paper designers. He wished to speak kindly of architectural draughtsmen, who were their good friends, but at the same time he must say that he preferred the future of architecture and of the handicrafts to that of the designer. It had been said that at Vienna they were studying English design; but though that might be complimentary to us, it should be remembered that "evil communications corrupt good manners." (Laughter.) Mr. Sedding next dealt with Mr. White's remarks. He remembered a country parson saying that Mr. Butterfield had done many ugly things, and never a pretty thing, but that he was a master because he had actually on one occasion shown a workman how to drive in a nail! Now Mr. White, in this nineteenth century, had actually taught a "dear old smith" a thing or two which he ought to have already known.

Votes of thanks were passed to the architects of the several buildings visited during the day, and the Conference adjourned.

THE ART-UNION OF LONDON:  
ANNUAL MEETING AND PRIZE DISTRIBUTION.

The fifty-first annual meeting of this Association took place on Tuesday last in the Adelphi Theatre (kindly granted for the occasion by Messrs. A. & S. Gatti). The Right Hon. the Earl of Derby (President) occupied the chair.

Mr. J. A. Hallett then read the Report, from which we quote the following passages:—

"The continued depression in trade prevailing both in this country and the Colonies fully accounts for the decline in the amount of subscriptions for the year which the Council have to announce to-day, and this has been greatly increased by the demand on spare funds made by subscriptions for the celebration of Her Majesty's Jubilee. The total amount is 7,073 17s.

The accounts of the year have been audited by Messrs. J. A. Hallett and W. Wright.

The amount to be expended on prizes will be thus allotted:—

The original oil-painting, 'Streetsley-on-Thames,' by B. W. Leader, R.A., 300l.; 1 work at 100l.; 1 work at 75l.; 1 work at 50l.; 2 works at 45l. each; 2 works at 40l. each; 4 works at 35l. each; 4 works at 30l. each; 3 works at 25l. each; 9 works at 20l. each; 18 works at 15l. each; 18 works at 10l. each; 3 framed drawings from original designs in the Westminster Palace, by C. W. Cone, R.A.; 4 sets of original drawings, by H. O. Selous, illustrating Kingsley's 'Hereward the Wake'; 30 silver and 40 bronze Jubilee medals; 80 sets of designs from English history, making, with the prizes given to unsuccessful members, 421 prizes.

The following is a brief summary of the receipts and expenditure; a detailed account will, as usual, be printed in the report.

|                                                                                   |             |
|-----------------------------------------------------------------------------------|-------------|
| Amount of subscriptions .....                                                     | 27,073 17 0 |
| Unallocated prizes .....                                                          | 25,625 10 0 |
| Set apart towards providing works of art for accumulations .....                  | 465 17 0    |
| For prints of the year, exhibition, report, and reserve .....                     | 1,914 14 5  |
| Agents' commission and charges, advertisements, printing, postage, rent, &c. .... | 2,650 18 7  |
|                                                                                   | 27,073 17 0 |

We have to record the death of one or two individuals connected with the Art-Union, and some well-known artists, during the past year.

On the eve of the last annual meeting, the Council were deprived by the death of the valuable aid of Mr. Anthonis, who had been a member of their body since the year 1853. In the year 1874 he was elected to succeed, as Honorary Secretary, Mr. Geo. Godwin, who then retired and was elected Vice-President, having devoted himself heart and soul to the advancement of the society since the day of its inauguration in 1836.

Mr. Anthonis was most punctual and painstaking in discharging his duties, always present at the meetings of Council, and generally calling once or twice a week to look into the business of the office. His genial and urban character deservedly endeared him to his colleagues, and his clear common sense often intervened to solve difficult questions. He was especially active and judicious in carrying out the duty of selecting works for prize-holders, much of which fell on the Prize-Selection Committee, both from the delegated privilege of prize-holders, and from the necessity of selecting works for those in distant lands, with whom there is no opportunity of communicating before the close of the Exhibitions.

In the autumn of last year, Mr. Arthur Grote was taken from us. Mr. Grote had for ten years been a very active and useful member of your Council.

Mr. Thomas Webster, one of the very oldest members of the Royal Academy, died on the 22nd September last, in his eighty-seventh year. His contributions to the exhibitions of the Royal Academy ranged over half a century. He was elected an A.R.A. in 1840, in which year he painted the 'Panorama of the Pyramids,' 'The Smiles,' and 'The Frown,' by which, perhaps, he is best known to the present generation, through two engravings by Messrs. C. W. Sharp and W. D. Taylor, produced by the 'Panorama of the Pyramids,' which some 11,000 impressions had been distributed. In 1846 he became R.A., and from that time all his principal pictures were to be seen on the walls of the Academy. One of his last contributions was a portrait of himself in 1874.

Mr. Lilwellin Jewitt, F.S.A., died on the 6th June last, at his residence in Duffield, Derbyshire, in his seventieth year. He was born at Kimbolton, near Rotham, the youngest son of a country gentleman, and a distinguished writer. He was appointed Chief Librarian of the Plymouth Public Library. He greatly assisted, by his pencil, the admirable labours of his brother Orlando Jewitt, the eminent architectural engraver, in Parker's 'Glossary of Architecture,' and many other works.

Mr. Geo. Thomas Doo, R.A., F.R.S., the well-known engraver, died on the 14th November last, at Sutton, Surrey, in his eighty-seventh year.

On the 15th March last died Mr. W. Collingwood Smith, at the age of seventy-one,—one of the oldest and most respected members of the Royal Society of Painters in Water-Colours. He succeeded Mr. E. Macdonald as treasurer of the Society, and held that office continuously for upwards of twenty years.

The death has been lately recorded of Mr. Frederick Bacon, engraver,—who was a pupil of the Findaus. He was for some time a student at the Royal Academy, under Fuseli. He was extensively employed on illustrations for the 'Waverley Novels,' 'Heath's Annals,' &c. He engraved for the Art-Union the 'Prisoner of Olsors,' after Wehnert.

The art of mezzotint-engraving has suffered a great loss by the death of Mr. C. W. Campbell,—an artist hitherto not widely known, but among a select few it was discovered that he had devoted high technical power, choice taste, and indomitable perseverance to his art. A most delicate plate of 'The Birth of Osakates,' after Mr. E. Burne Jones, first drew attention to his power. Another remarkable work was his 'Pan and Psyche,' after the same painter; and he had with the delicacy, finish, and firmness of a gem-cutter, engraved 'Ophelia,' after his own design. A portrait of Miss Ellen Terry was another triumph of his, and he left unfinished several works which would have placed him very high in the rank of mezzotint engravers.

After a reference to the Royal Holloway College at Egham, and its pictures, the report proceeded:—

"The duty of 30 per cent. imposed on all pictures imported into the United States, and 45 per cent. on all works of statutory, tends to keep down the amount of pictures which the Art Union receives from the States and the Continent. Last year the total subscription from the States amounted to 174 guineas, while from Australia we gathered 1,107. A decision of considerable importance to American purchasers of European works of art was passed in October last. What effect the high rate of duty has had on American art in the picture-market and on the morality of dealers and importers can be easily imagined. It has reduced the purchasing power of the dollar, in the only markets where the goods could be bought, by just one-third. It has starved the American collections, public and private, and sent young Americans over in crowds in Paris to study art in the ateliers, and to take back with them what has often proved to be a curiously hybrid style. It has led to the creation of a complete system of evasion and mystification on the part of those who deal in works of art, as regards the American Customs, the Customs officers, and there are few such men who are not of the opinion of the eminent diplomatist who declared he believed smuggling, in such a case, to be a moral duty. There is nothing of which it is so difficult to fix the rate, as to a work of art; nothing which requires such keen discrimination and such large experience. The dealer has these gifts, the Custom's officer has not, and the former has naturally placed a game of skill against the latter, in which he will often bring them to an end.

Of all these drawbacks and scandals the United States Government has long been aware, and it is a healthy sign that at last one of their members has taken an effective step towards bringing them to an end.

Mr. H. Marquand is an American amateur who is well known in Europe for his fine taste. He is forming a collection, of the advantages of which, it is believed, that his country will one day get a large share; and as is necessary, he buys his works of art in Europe. Of his transactions in modern art nothing need be said; but lately he purchased in England four pictures by Vanderkemp, Massacio, and Luca Van Leyden. Naturally he was anxious to transfer them to his home without having to pay the fine of some 4,000l., which would have been inflicted according to the old interpretation of the tariff, and he left the pictures in the hands of the British Treasury on the subject. His contention was that the pictures were antiquities, and, as such, that it was impossible they could come into competition with the works

of the home artists, in whose interest the tax was held to be levied. Antiquities, whatever the term may mean, are free of duty, and it is thus clearly to the interest of the collector of old pictures to have them classed as 'antiquities.' To this plea the Customs officers turned deaf ears, and for a long time Mr. Marquand could not get a hearing at the Treasury. At last the Under-Secretary, Mr. Fairchild, wrote to him that the Customs House agreed that old pictures were to be considered as Mr. Marquand had wished them to be considered. But in interpreting a tariff, which is an artificial arrangement full of snarls and pitfalls, it is necessary to draw a line somewhere, and in this particular case the under-secretary fixed it at the year 1700. By his receipt all pictures painted before that time are 'antiquities'; all painted later are 'works of art.' The distinction sounds flattering to the eighteenth and nineteenth centuries,—to Sir Joshua Reynolds and Messieurs, to Alms Tadiema and Sir John Millais,—though we suspect that the moderns would be very glad to dispense with the compliment if they could be relieved of the duty.

But the reformers and collectors must be thankful for small mercies, and accept as an instalment the boon which allows them to import, without a special penalty, the works of the great Italian and Spanish schools, of Vasquez and Murillo, and of the schools of Flanders and Holland.

The change that we are recording is one that has been effected by simple administrative order. No law has been passed or repealed, the Gaston House under the prompting of the Secretary of State, has merely said "such and such articles shall be taken out of one category and put into another"—consequently there is no principle involved, and any restriction which has been drawn has been shown to be faulty, it will be easily shifted. No school of painting is more in favour just now with collectors, on both sides of the Atlantic, than the English and French schools of the nineteenth century, and it will be impossible for the United States Treasury long to maintain that pictures of these schools are to be chargeable with the duty. The best of the American artists have always been ashamed of the restriction which the very nature puts them in an inferior position; their pride revolts at the notion that they cannot compete with English and French artists unless the latter are heavily handicapped. The picture-trade of the present day is a restriction which brands the pictures that they buy as inferior to their foreign rivals. In spite, then, of the general antipathy to Free Trade which is felt by the majority of Americans, there is good reason to hope that the exception now made in favour of an art-master will shortly be extended to their modern successors. When pictures and prints are as easy to buy in New York as in London, there will be a better chance than there now is for the education of American taste, and it is quite certain that the introduction of such facilities will immensely increase the sphere of the operations of the Art Union in the States.

The report next went on to refer to the controversy which arose last autumn as to the permanence of water-colour paintings; and after mentioning with commendation Mr. Gambier Parry's recent book on "The Ministry of Fine Art to the Happiness of Life," concluded by announcing that as the engraving for the coming year the Council have provided a figure-subject of moderate dimensions, "The Spanish Letter Writer," engraved by Mr. Lumb Stocks, R.A., from the painting by Mr. J. B. Burgess, A.R.A.

The Earl of Derby, in moving the adoption of the report, said that nothing was gained by refusing to look facts in the face. It was useless to deny that the position of the Art Union, as compared with that which it had held in former years, was not altogether one of prosperity. There had been a large falling-off in the subscriptions, as compared with some years ago, though, he believed there had been next to no falling-off as between the present year and the last. They had no reason, however, to blame themselves or the management for so unsatisfactory a result, nor had they any reason to think that less interest in art was felt than formerly. That interest had never been so great as in the present day. Every year, as the Hanging Committee of the Royal Academy well knew, produced an increasing number of pictures for exhibition; and, outside the Academy, new galleries had to be opened for the reception of works not hung in that and in the other exhibitions. There seemed also to be no falling-off in the average quality, and when they heard of sums of 6,000l., 9,000l., and upwards being given for single pictures, and 1,000l. for a single engraving, it showed that, whatever art might suffer, it would not suffer from want of pecuniary encouragement. It might be that this Art-Union had received some injury as a consequence of its success. Its object was half a century ago to popularise art, and that object had been accomplished in a very great degree. The result was that other agencies were now doing similar work, and the Art-Union had no longer the almost monopoly it possessed at the first start. They might be losers by that state of things, but they could hardly complain of it. Bad times and the shrinkage of people's incomes had also, doubtless, affected them, but that was a state of things which would pass away in course of time. If, therefore, they continued to deserve success, he believed it would come to them in future, as it had come in the past. Meanwhile they had no debt or liability, but possessed some property available

in case of need; therefore, while they could hope and trust for the best, they had nothing to fear from the very worst that could happen. He cordially agreed with the warning given in the report, both to artists and buyers, as to the avoidance of works on which perishable colours had been used. It was really a fraud on the public, if the artist knew what he was doing, and, if he did not, it was a clear proof of his ignorance. In purchasing a picture, whether in oil or water-colours, people believed they were acquiring a permanent possession, and, if there should be a general distrust in the permanence of artistic work, a considerable falling-off in the demand for such work would ensue. He hoped for better things, and, by the nature of the case, artists were the very last persons who should be indifferent to the permanence of their work.

Mr. George Godwin, F.R.S., in seconding the adoption of the report, said that the falling-off in receipts was stated to be due to the result of bad times, not merely in England but also in the colonies. For instance, Adelaide, which had subscribed 700 guineas on more than one occasion had only sent 96 guineas last year; yet that colony, according to the newspapers, had paid 2,700 guineas for a charming picture by Mr. Orchardson. Then there were the instances the Chairman had alluded to of the Gainsborough fetching 9,500 guineas and the Turner 7,500 guineas, while scores of artists were complaining of the very bad times. Only a few of the artists were able to command those large prices, and younger members of the profession had still to look to the Art-Union and similar bodies for assistance. It was too much the practice of the present day to forget what the Art-Union had done. This was distressing to those who had bad worked in it for many years, and who had remembered how painters like Maclise, Frith, Copley Fielding, and others, were at one time most anxious for the aid of the Art-Union though they had since attained to the top of the profession. Only lately a lecture was given by an eminent man on medal die engraving, without any reference being made to what had been done in this direction by the Art-Union, but for whom medal die engraving would have died out. The Art-Union Council had persisted every year in producing a medal in honour of British artists, and this had kept alive the small body of medal-die-engravers, a body who were now on the increase. He was happy to find, however, that the Art-Union was not always forgotten. He had the honour to propose the health of the late Lord Idlesleigh not long before his death at one of the Artists' Fund Dinners, and he took occasion to remind the noble lord of the opposition with which he had met their endeavours, many years ago, to obtain an Act of Parliament and a Charter. Lord Idlesleigh, instead of maintaining his former position, then said he remembered the circumstance perfectly well, and had always felt gratified that he had been beaten upon that occasion, for he had watched the progress of the Art Union, and had seen the great good it had done in spreading a knowledge of art and enabling large bodies of persons to possess works of art they could not otherwise have obtained. In selecting prizes it was well to aid rising talent, and they would find that by doing that they would at the same time be benefiting themselves.

The motion was then put and carried unanimously.

Votes of thanks were accorded to the Hon. Sec., Mr. Zouch Troughton (on the motion of the Chairman, seconded by Mr. James Hoggood); to Messrs. A. & S. Gatti, for kindly granting the use of the Adelphi Theatre; to Miss Matthews and Miss Dobson for assisting in the prize-drawing; and to the Chairman (on the motion of Mr. Francis Bennock, who incidentally referred to the way in which, some years ago, "Old Masters" were fabricated in Paris for exportation to the United States of America).

In the prize-drawing, the principal prize, the oil painting of "Strentley-on-Thames," by Mr. B. W. Leader, A.R.A., fell to Mr. A. Wildsen, of Brecknock-road, London.

**Truro.**—A new Wesleyan chapel at Lemon, Truro, has been commenced. It will cost about 1,000l. Mr. Silvanus Trevail is the architect. The contractors for the work are Mr. M. Clemens (mason) and Mr. W. Battersbill (carpenter).

LIME IN SEWAGE.

STR.—In the description of the process adopted at Hendon Sewage Works, in your issue of the 30th ult., it is said\* that "it is only dissolved lime, or that in solution, which is effectual" in sewage treatment. Further, that owing to the presence of carbonic acid in sewage, lime particles cannot be dissolved therein, as the acid combining with the lime forms an insoluble coating on their outside. In order, therefore, to get the lime dissolved before setting it to work in the sewage, one-sixth part of the sewage is withdrawn and mixed with 90 grains of lime per gallon, added in the form of milk of lime. The "lime is thoroughly dissolved, and the lime-water so obtained is added to the remaining five parts of raw sewage," equal to 15 grains per gallon in the latter. This curious proceeding seems in need of some explanation. Here we have learned that lime is insoluble in sewage, but that when put in sewage "in a continuous mixing-vessel" it "is thoroughly dissolved." Are we to understand from this that lime in the proportion of 90 grains per gallon is enough to overcome the malign influence of the carbonic acid, and also leave certain particles still uncoated, and therefore soluble? If so, what proportion do the effectual hear to the ineffectual particles? and would it not be more economical to dissolve that effectual proportion in clean water and save the ineffectual right off? There is plenty of clean water at Hendon Sewage Works. Or, why withdraw one-sixth of the sewage, and add lime enough to overcome its carbonic acid, with a residue of soluble lime for the other five-sixths of the sewage? Why not add the milk of lime to the sewage direct, as other people with a limo process do, with very decent results? The same lime would produce the same results thus, as when added in one-sixth of the flow first, and the whole flow afterwards. The Hendon process is like the illogical housewife's. She imagined that two lumps of sugar per cup of tea were insoluble when put in the cups separately, but soluble when she added the whole sugar for a tea-party in one-sixth of the tea; and, therefore, when she made tea for six, she put twelve lumps of sugar in one cup of tea, and then mixed up the resulting syrup in the tea-pot for the company. Truly the researches of the chemical advisors of the Metropolitan Board of Works are leading to strange practices amongst the unsophisticated rural authorities, and Mr. Gladstone, with what his enemies call his constitutional predilection for an *ovis fatuus*, has solemnly pronounced his benediction on one of the strangest yet recorded.

JOSEPH HETHERINGTON.

Chiswick Sewage Works, W.  
May 3, 1887.

The Student's Column.

FIELD WORK AND INSTRUMENTS.—XIX.

Leveling Instruments.

III.—THE LEVEL IN THE FIELD.

**I**N order to avoid straining the parallel plate-screws, the instrument is first set up as nearly level as possible by working one of the legs of the tripod stand and then finally adjusting the longitudinal bubble by means of the parallel plate-screws. Move the telescope till it lies in the direction of two opposite plate-screws, as shown in fig. 1, and then select the most convenient leg of the tripod to work with. If the leg marked as No. 2 be chosen and the legs marked as No. 1 and No. 3 be regarded as fixed on the ground, notice the end to which the bubble retires and lift the leg marked as No. 2 just clear of the ground, so as to be able to shift it either to the right or the left hand in the direction of the curved arrows, until the bubble appears approximately in the centre of its run. Then twist the telescope a quarter round until it assumes the position shown in fig. 2 over the other two parallel plate-screws, and shift the same leg (No. 2) in a line approximately at right angles to the direction in which it was moved in fig. 1, as indicated by the straight arrows, until the bubble appears in the centre of its run or nearly so in this direction. Turn the telescope back to the position shown in fig. 1 and repeat the adjustment indicated by the curved arrows. Then complete the correction by the parallel plate-screws with the telescope in both positions (figs. 1 and 2).

The level is set up in the most convenient position, and, as far as the situation will permit, midway between the first and last sights to be taken with the instrument in any single position. The place of the staff is localised, not the place of the level. Upon side-long ground it is well to keep upon the high side of the line along which levels are being taken, the height of the instrument above the ground being

\* Not by us. We only reported the confession of faith of the engineers of the Hendon Works, prefacing them by "it is considered," &c.—Ed.

THE LEVEL

FIGURE 1

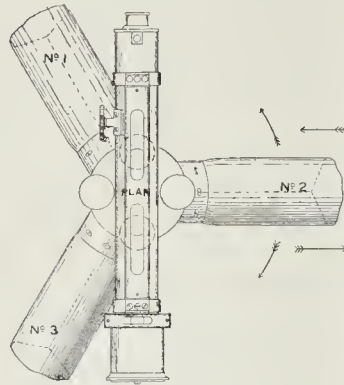


FIGURE 2

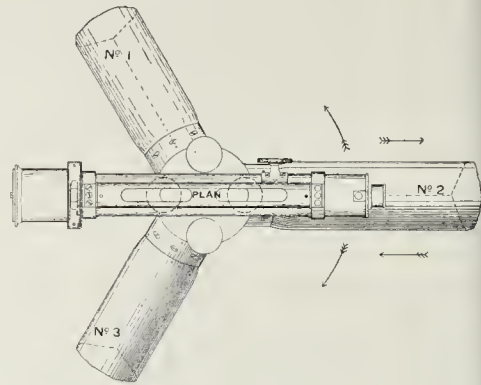


FIGURE 4

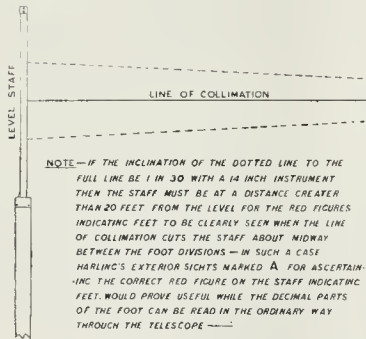
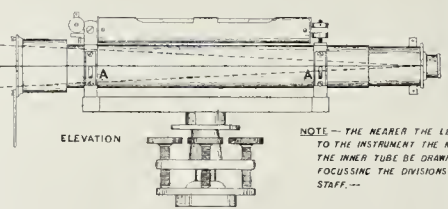


FIGURE 3



IRON FOOT PLATE FOR LEVEL STAFF

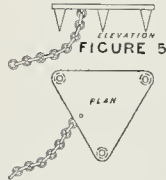
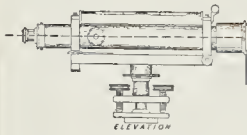


FIGURE 6



IRON PEG FOR LEVEL STAFF

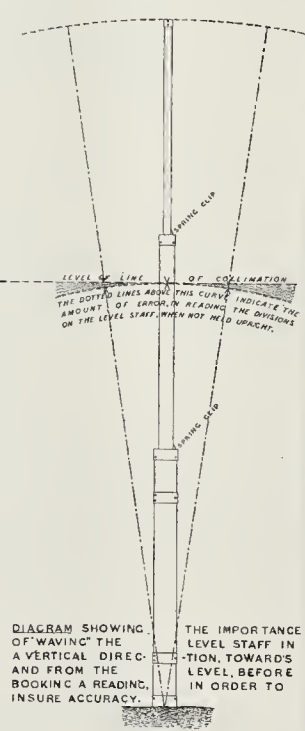
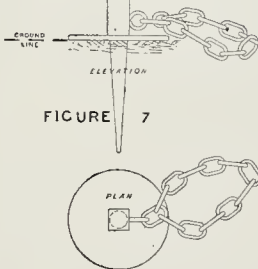


DIAGRAM SHOWING OF "WAVING" THE LEVEL STAFF IN A VERTICAL DIRECTION, TOWARDS THE LEVEL, BEFORE IN ORDER TO INSURE ACCURACY.

limited by the length of the tripod legs, whereas the length of the level staff usually provides a limit of at least three times that length. The height at which the level itself is set up does not affect the result, but care must be taken that the line of sight does not range above the top of the level staff, or cut the ground below its foot.

The lower end of the staff is shod with brass. It is important in continuous levelling that the staff should be held over the same spot before and after changing the position of the level. Upon hard ground a small metal-plate, as shown in fig. 5, is generally employed for this purpose, the chain which is attached to it being for the convenience of the staffholder in lifting it from the ground and carrying it from one change station to another. Upon soft ground, the form of iron peg shown in fig. 7 is preferable, the peg being put into the ground by the staff-holder, and then made firm by pressing the flat plate with his foot. The square top of this station peg forms a very reliable temporary bench mark for securing accuracy in the position in which the staff is held. When the telescope of a level is directed towards the staff, it is first adjusted to focus by means of the draw tube worked by the rack and pinion motion, and the longitudinal bubble is next observed and set accurately in the centre of its run by working (if necessary) the two opposite parallel plate-screws which come nearest in the direction of the telescope. If the adjustment for reversion is correct, no more than a very slight movement of these screws should be necessary when the instrument has been properly set up. If the line of collimation is truly horizontal the number of feet and decimals of a foot at which the horizontal cross hair of the diaphragm appears to cross the inverted readings on the face of the level staff will show the height of the line of collimation above the point on which the staff is held; but in order that this amount may accurately furnish the

vertical depth of the point upon which the lower end of the staff stands, it is necessary for the staff-holder to wave the staff towards and from the instrument over this vertical line as shown in fig. 6. The shortest reading will then express the amount to be booked. When the line of sight cuts across a division upon the staff and the surveyor is in doubt which subdivision to book, it will be by experience that the most accurate final results are obtained by booking the shortest reading.

Books.

*Lawn's Builders' Price-Book for 1887.* Seventieth Edition. London: Kelly & Co. and Simpkin, Marshall, & Co.

This old-established work, which reaches its seventieth edition this year, has many important alterations and additions. Several of the prices we noted last year as high have been reduced.

The digging, page 8, has been raised to 8d. per yard cube, and this was necessary; 7d. was very low, and far below the scale of prices kept through the largest part of the book. The next item of 9d. in gravel or stiff clay is not enough; the difference is worth more than 1d. The drain-pipes still keep at the gross list, while the prices for digging and laying are too low.

The prices of stock brickwork and grissel ditto are very fair for the best work and material, and the extras for raising on old walls are also fair and not at all excessive; the labour to openings in brickwork is one that surveyors do not generally take, although, of course, a large number of openings greatly increases the cost of work, as each reveal must be plumbed and the angles returned. Some of the materials in daywork have been lowered. The prices of glazed bricks, on page 33, should be given delivered at some London station, to be of use. The Carpenter and Joiner has been transposed to its proper position before the Plasterer. The memoranda seem to increase in value and quantity every year; the book is largely stocked with them.

We do not think the prices for labour only are of much use practically; to be of use these must be exceedingly close, and those given are not so. The prices for framed oak timber are increased; they were low in the 1886 edition. The prices of the joiners' work, as we pointed out before, are more than high in most cases. In the Ironmonger, the relacquering list is rather erratic.

In the Plasterer, prices are added for Johnson's patent rolled iron wire fireproof lathing, Hitchin's fireproof floor, and also Wilkinson's. In the Gasfitter, tubes are still kept at the gross list price; the prices for lead in the Plumber are a little high. A price-book should at no time be trusted for these, as lead varies so in price during a year.

There are some additional notes in sanitary work, and some few prices also added. Altogether this year's edition is a good one.

*How to Appeal against your Rates (outside the Metropolis), with Forms and Full Instructions.* By A. D. LAWRIE, Barrister-at-Law. Edinbrough Wilson & Co. 1887.

This is a very clear little book, and in the course of a few pages it gives the owner or occupier of property a clear notion of how and when to appeal against a poor-rate.

The author points out, for example, in considering the question of the rate itself, that "the actual rent paid is not necessarily conclusive of the value of any property for the purpose of assessment." It is a very common idea that the rent paid is, *ipso facto*, a measure of the rateable value. There are various little tabular forms which will assist the unprofessional reader, and much useful information in a small space. It is enough, however, when noticing a small work of this kind, to say that it can be confidently recommended to any one who desires a servicable handy book on this particular subject.

*The Law and Practice as to Paving Streets according to the Public Health Act, 1875; together with Digests of all Cases bearing on the Same.* By WILLIAM SPINKS, Assoc. M. Inst. C.E. London: E. & E. F. N. Spon. 1887.

This is a useful little work. The first part is essentially practical, and deals with the law as it now stands, and also contains suggestions for

its improvement. But while in a paper read at a meeting this treatment is satisfactory, we have some doubt whether it is so in a book, however small. The man of business does not wish to be troubled with questions of this sort that improvement in a book which is bought by him for use. The Appendix of Cases will be found useful, and the author has wisely given references in each case to the several current law reports.

*Street's Indian and Colonial Mercantile Directory, 1886-7.* London: Street & Co., 80, Cornhill.

THE Eleventh Issue of this admirable Directory is before us. It bears evidence of careful compilation, and increases in bulk year by year. In addition to the usual matter of a directory, it contains the trade returns, tariffs, populations, &c., together with concise descriptions of each country and town, with special reference to their products and requirements. The number of towns and cities has again been increased, and maps are given of all the principal countries, showing the positions of the chief towns and ports. These maps are very clear and distinct, and we are informed in the preface that they have been revised up to date. Tables of weights and measures and the value in English money of foreign coins are given. In some of the colonial cities—Sydney and Melbourne, for instance—architects and builders are mentioned; let us hope that they are all flourishing.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

MARCH 31.  
G. B. SMALLERICE.  
Basingstoke—Church-square, freehold house ..... £380  
Choke-street, freehold house ..... 490

APRIL 25.  
By RYNNOLDS & EASON.  
Limehouse—123, Eastfield street, freehold ..... 120  
Forest-gate—2, Hyattia Villas, freehold ..... 600  
By WOODS & SKELLING.  
Sidcup—Twenty freehold houses ..... 6,000  
Station-road, Fernwood House, freehold ..... 900  
Clifton Villa and Crombie Lodge, freehold ..... 1,550  
A plot of freehold land, la. 3r. 10p. .... 500

By G. F. FLOWER.  
Oakley-square—34, Charrington-street, 57 years, ground-rent, 7s. .... 620

By P. J. BIRLEY.  
Peckham—75, Peckham Park-road, 60 years, ground-rent 6s. .... 300  
Bermodesey—6 and 8, Major-road, 51 years, ground-rent 10s. .... 575

By FOSTER & CRANFIELD.  
Wood-green—13 to 17, Summerville-terrace, 66 years, ground-rent 22s. 10s. .... 310

APRIL 26.  
By H. A. HENDERSON.  
Hackney—183, Dalston lane, 11 years, ground-rent 7s. 10s. .... 205  
1 and 2, Gossway-road, 60 years, ground-rent 6s. .... 680  
Clapton—43, Downs Park-road, 75 years, ground-rent 6s. 10s. .... 405  
City—The lease of 5, Nicholas-lane, term 6 years. Kingston—The freehold residence, The Elms, and 4s. 3r. 6p. .... 3,700  
A strip of freehold land ..... 60

By F. LONG & SON.  
Cavendish-square—13, Upper Wimpole-street, 37 years, ground-rent 100s. .... 2,240

By G. NEWMAN.  
Woolwich—Freehold ground-rent of 5s. a year ..... 107  
2 and 3, Henley terrace, freehold ..... 480  
Hanley-terrace—Freehold rental of 50s., reversion in 79 years ..... 900  
Freehold ground-rent of 14s. a year ..... 305  
Pimsted—Freehold ground-rent of 10s., reversion in 98 years ..... 225

By W. & F. HUGHES.  
Walthamstow, Hos-street—Freehold residence and 4 acres ..... 4,600  
Leyton—Ground-rent of 110s., reversion in 71 years ..... 2,350  
4, 5, and 6, High-street, freehold ..... 1,005  
Shoreditch—36, 38, and 40, Church-street, and 4, 5, and 6, Chancery-street, 97 years, ground-rent 30s. .... 540

APRIL 27.  
By H. GRIFFIN.  
Battersea—106 and 110, Culvert-road, freehold ..... 600

By A. BOOTH.  
Holloway—189, Tufnell Park-road, 80 years, ground-rent 7s. .... 400

By A. ROBERTSON.  
Camberwell—36 to 92 even, Shenley-road, 89 years, ground-rent 24s. .... 1,370  
Mottingsham, Portland-road—Campbell Cottage, 84 years, ground-rent 3s. 17s. 6d. .... 145  
St. John's-wood—173, Adelaide-road, 65 years, ground-rent 12s. .... 630

By W. W. JENNISON.  
Lewisham—230 and 232, High-road, freehold ..... 2,000  
Becton—Two plots of freehold land, ca. ir. 12p. and 0s. 3r. 3p. .... 1,145  
2 to 20, Livingstone-street, 93 years, ground-rent 4s. .... 500  
13, 15, and 17, Livingstone-street, 93 years, ground-rent 12s. 10s. .... 150

APRIL 28.  
By FABERBERG, ELLIS, & CO.  
Kew, Licheid-road—The residence, Trewant, 90 years, ground-rent 12s. .... 670

By Messrs. CHANWICK.  
Paddington—2 and 4, Woodchester-street, 72 years, ground-rent 20s. .... £1,000  
6 to 18 even, Woodchester-street, 72 years, ground-rent 59s. 10s. .... 2,350  
Brompton, Fulham-road—Freehold building site ..... 1,610

By MORLEY & LEVINS.  
West Brompton—98, Lillie-road, and 5, Bramber-road, freehold ..... 1,450

By G. PEARCE & SONS.  
Turnham-green—35, Elliott-road, freehold ..... 310

By NORMAN & SNOYERS.  
Wandsworth—Ground-rent of 32s., reversion in 99 years ..... 670  
Islington—1 and 3, Blundell-street, 60 years, ground-rent 12s. .... 515

By C. C. & T. MOORE.  
Mile End—31 to 38, Alma-road, freehold ..... 2,140  
13 to 21, Salisbury-street, Freehold ..... 2,636  
Stratford—65, Gurney-road, Freehold ..... 360  
Bow—1, 3, and 5, Alfred-street, 15 years, no ground-rent ..... 705  
St. George's-in-East—14 and 18, Farclough-street, 32 years, ground-rent 6s. 6s. .... 200

By D. YOUNG.  
Peckham—62 and 64, Peckham-rye, 79 years, ground-rent 20s. .... 647  
Lambeth—334, South Lambeth-road, 53 years, ground-rent 12s. .... 900  
19 and 14, Devonshire-road, 47 years, ground-rent 11s. 8s. 8d. .... 670  
A plot of freehold land ..... 50

By E. BRIMSON.  
Peckham—109, Kirkwood-road, 70 years, ground-rent 5s. 10s. .... 450  
Mile End—Ground-rents of 15s. 8s. a year ..... 350  
Burdett-road—The Earl of Zetland beerhouse, freehold ..... 750  
Camberwell—12 and 13, Chatham-street, 77 years, ground-rent 10s. .... 400

By NEWBON & HARDING.  
Holloway—74, Parkhurst-road, 44 years, ground-rent 10s. .... 635  
Highbury—139, Gillespie-road, 94 years, ground-rent 5s. 5s. .... 160  
Canonbury—11, Canonbury Park South, 49 years, ground-rent 4s. .... 660  
19, Canonbury Park North, 60 years, ground-rent 9s. .... 650  
Hoxton—54, 55, and 56, Napier-street, 19 years, ground-rent 12s. 4s. .... 605  
31, 32, 33, and 35, Shaftesbury-street, 15 years, ground-rent 12s. .... 410  
42 to 47, Wimborne-street, 15 years, ground-rent 18s. .... 600  
24 and 25, Windsor-road, 7 years, ground-rent 7s. .... 106  
Kingsland-road—65 and 67, Pearson street, 16 years, ground-rent 5s. .... 350  
Stoke Newington—63, 65, and 67, Howard-road, freehold ..... 1,000

APRIL 29.  
By GREEN & SON.  
Westminster—2, 4, and 6, Romney-street, freehold, 1,220  
By HORNE, SON, & EVERFIELD.  
Tulse-hill—8, Probyn-road, 99 years, ground-rent 8s. .... 395

By R. BIRD.  
Soho—69 and 91, Wardour-street, and 1 to 9, Downs-place, freehold ..... 4,447  
2 and 3, Little Pulteney-street, freehold ..... 2,523

By HAKE & SONS.  
Wimbledon—6 to 12, Merton-terrace, 92 years, ground-rent 32s. 10s. .... 160  
Wandsworth-road, Gonsalvo-road—Freehold ground-rents of 25s. a year ..... 670  
Gonsalvo-road—Freehold ground-rents of 184s. a year ..... 4,160  
Portlade-road—Freehold ground-rents of 180s. a year ..... 3,390  
Gonsalvo-road—Freehold ground-rents of 179s. 8s. a year ..... 4,030

MEETINGS.

SATURDAY, MAY 7.

General Conference of Architects.—(Sixth day) Visit to the new Rooms of the National Gallery. 11 a.m. Visit to the Diploma Gallery of the Royal Academy, &c. 12 noon.  
Royal Institute of British Architects.—Members' Dinner, Freemasons' Tavern, 7 p.m.  
Architectural Association.—Visit to the National Liberal Club. 3 p.m.  
Association of Public Sanitary Inspectors.—Address by the President, Mr. Edwin Chadwick, C.B., F.R.S. 6 p.m.

MONDAY, MAY 9.

Surveyors' Institution.—Adjourned discussion on the papers read by Mr. Wheeler, Q.C., and Mr. P. E. Piddich on "Disapidations." 8 p.m.  
Society of Antiquaries of Scotland (Edinburgh).—3 p.m.

TUESDAY, MAY 10.

Society of Arts (Applied Art Section).—Mr. E. J. Tarrant, F.S.A., on "The Architecture of London Streets." 8 p.m.  
Institution of Civil Engineers.—Mr. L. H. Ramsome on "The Conversion of Timber by Circular and Band Saws in the Saginaw Valley, U.S.A." 8 p.m.  
Parkes Museum (Lectures for Sanitary Inspectors).—Dr. R. Thorne Thorne on "Infectious Diseases and Methods of Disinfection." 6 p.m.  
Royal Institution.—Professor W. E. Ayrton, F.R.S., on "Electricity." IV. 3 p.m.  
Glasgow Architectural Association.—Mr. John Kippie will read a paper on "A Tour in Italy."

WEDNESDAY, MAY 11.

Society of Arts.—Mrs. Ernest Hart on "Cottage Industries in Ireland." 6 p.m.  
Civil and Mechanical Engineers' Society.—General meeting. 7 p.m.

THURSDAY, MAY 12.

Society of Telegraph, Engineers and Electricians.—Paper by Professor W. E. Ayrton and Professor John Perry. 8 p.m.  
Edinburgh Architectural Association.—Annual general meeting. Closing address by the President, Mr. Hippolyte J. Blanc. 6 p.m.

FRIDAY, MAY 13.

*Parkers Museum Lectures for Sanitary Inspectors*.—Mr. J. F. J. Sykes, B.Sc., M.F.C.S., on "General Powers and Duties of Inspectors of Nuisances; Method of Inspection." 8 p.m.

SATURDAY, MAY 14.

*Edinburgh Architectural Association*.—Visit to Linlithgow Palace and St. Michael's Church.

Miscellaneous.

**Stoppage of Water Supply for Non-Payment.**—There can be no question as to the serious inconvenience occasioned in a household by the stoppage of its water supply. A frequent result of continued cold weather, and an occasional but not infrequent consequence of non-payment of dues, it is at any time a source of much annoyance, and, what is more important, of a train of diseases which are bred and fostered by uncleanness. We need not dwell on the connexion between sewer air and infectious fevers, on the absolute necessity of water, under our present system, for the removal of excreta, and for flushing freely and fully all waste-pipes, on its utility for cooking purposes, and its natural place as a beverage. All these are matters of common information. It is well to note, however, that the consequences of a want of water are not necessarily limited to the house which is primarily affected by it. If, for example, the sewage arrangements of that house be thrown out of working order, those of neighbouring buildings are not unlikely to become indirectly involved. Thus, one focus of disease readily becomes a parent of others. It is with a view to the prevention of such risks as these that certain members of the House of Commons have brought forward a proposal that water companies should be restrained in future from cutting off the water-supply of any house in default of payment of the water-rate, and should be allowed as compensation a preferential claim on the revenue derivable from the said house. The plan, as drafted on paper, seems as if it would work well, though perhaps it might be objected on behalf of the companies that it does not cover a number of cases where houses are let to a very poor class of tenants, whose payment of rent or of any dues whatever is a very precarious possibility. It may well be doubted, however, if their present power of stopping the supply is of much use to the companies in such cases. In so far as it is wont to be applied, the local authorities might perhaps be induced to meet them in the public interest on the question of payment, in order to prevent its application. At all events, the proposal to which we have referred is one worthy of consideration, and if it can be effectively carried out will do something to limit the spread of disease.—*The Lancet*.

**Presentation Key of the Royal Jubilee Exhibition, Manchester.**—The key presented to H.R.H. The Prince of Wales on the occasion of the opening of this Exhibition is thus described by the makers:—The column or stem is fluted as a Classic pillar, with composite capital, and small Lancaster roses in the achaes. An acanthus pliatum is the basis from which springs a heart-shaped head rising with an added circle round the Manchester globe and surmounted by the coronet of the Prince. On the obverse the full blazon of the arms of the City is given in enamel colours, with supporters, crest and motto, the sword of justice and civic mace being placed as correlative emblems in silhouette. The reverse of the key-head bears the plumes of H.R.H. The Prince of Wales, with a series of artistic and industrial emblems, besides the shield for inscription. All these emblems relate to the purpose of the Exhibition. The work was executed by Messrs. Chubb.

**Lambeth Palace Library.**—During the months of May, June, and July this library is open from 10 to 5 p.m. (Saturday excepted), at other times of the year from 10 to 4 p.m. The collection of pamphlets on monastic history continues to increase, and contributions are asked from writers who have made this a special study, in order that a complete series of papers on the conventual buildings of each county may be obtained. The pamphlets will thus form a valuable adjunct to the MSS. here on the religious houses of England, which are also described in the Archbishop's "Visitations" in the registers of the See of Canterbury, from Archbishop Peckham, 1279, to those of a comparatively modern date.

**Settlement of the Birmingham Building Trade Strike.**—The adjourned conference between the master builders and the representatives of the various branches of operatives in their employ was held on the afternoon of Thursday last week at the Grand Hotel, Colmore Row. Mr. J. Bowen, chairman of the Master Builders' Association, again presided, and the whole of the representatives who attended the previous meeting were present. The conference, which lasted four hours, was conducted with closed doors. According to the *Birmingham Gazette*, nearly the whole of the working rules were agreed to, with slight modifications, but a long discussion took place in regard to the rate of wages and the arbitration clause of the rules. The employers expressed their willingness to continue the present rate of wages if the operatives would consent to submit future disputes to arbitration. The whole of the operative delegates acquiesced in this proposal except those representing the bricklayers, who were disinclined to accept arbitration unless the prices of building contracts were ascertained by an inspection of the masters' books, which the employers strongly objected to. It was eventually decided to continue the existing rate of wages for a period of three years from the 1st inst., and it was resolved that the trade should be regulated by a Conciliation Board, composed of six representatives on each side, and that, failing an agreement between them, each side should appoint an arbitrator, and in the event of their still being unable to agree within a month a third person should be appointed as umpire, whose decision should be final. The result was received by the men with much satisfaction. The present rate of wages is 8d. an hour for the carpenters and plasterers, and 5d. for the plumbers and stonemasons.

**St. James's Church, Moss Side, Manchester.**—The foundation-stone of this church was laid on the 30th ult. The site is at the junction of Prince's-road and Great Western-street. The church consists of nave, 93 ft. by 33 ft. wide, with north and south aisles, each 93 ft. by 13 ft., divided from the nave by an arcade of six bays, supported on pillars of red granite, with moulded caps and bases. The chancel is 33 ft. by 27 ft., on the south side of which is a lofty organ chamber, and on the north, vestries for the clergy and choir, with lavatory attached. The principal entrances are from Great Western-street and Prince's-road. The style adopted is the Late Decorated period of Gothic architecture, the aisles being kept low, to give greater effect to the lofty clerestory. At the junction of Prince's-road and Great Western-street is a campanile 100 ft. high. The roof is open-timbered, with framed principals. The church externally will be faced with Ruabon red stock bricks and terra-cotta, with tracery of windows, and bands of stone. The seats will be of pitch pine, and afford accommodation for 800 persons, inclusive of the choir. Messrs. Robert Neill & Sons, of Strangeways, are the contractors for the whole of the works, involving an outlay of about £5,000, under the superintendence of the architect, Mr. John Lowe, of Manchester, whose design was selected in a limited competition.

**Oxford.**—The new buildings for Cutler Bouter's Medical Dispensary have just been completed. This building stands on the north side of a new street leading from Worcester-street to the Cattle Market, and contains a waiting-hall, with two lobbies for the patients desiring to see the medical officers or to obtain medicine. The wing of the building next Worcester-street contains two consulting-rooms for medical officers, and an office on the ground-floor, with committee-rooms on the first floor. Besides the entrance for patients, there is in Worcester-street a special entrance for medical officers, committee, &c., and staircase for the same. The style of the building is that known as Free Classic, with walls faced with pressed Ruabon red bricks, with plinth mouldings, cornices, arched heads, and other window dressings, pedimented door-heads, and copings of Bath stone. The roofs are covered with Broseley brindled tiles. The building was erected from the designs and under the superintendence of Mr. Edward G. Bruton, F.S.A., City and Diocesan Surveyor. The builder was Mr. Charles Curtis, of Oxford, and the fittings of the dispensers' shops were supplied by Messrs. Hawke & Son, of London. Mr. Jones was clerk of works.

**New Pier at Ventnor, Isle of Wight.**—This newly-constructed pier is rapidly approaching completion. Mr. F. Grace is in charge of the new works, managing for Messrs. Burleigh & Co., the contractors. The total cost will be about £15,000. There are landing-stages for passenger steamers, workable at most tides. The top of the pier is about forty feet from the clear line below. A large band stand is in the course of erection, but not yet finished. The raised platform on which the stand is to be built will hold about 4,000 people. The pier itself will find walking-room for 15,000 or 16,000 people at one time. The ironwork has been supplied from Glasgow, Newcastle, and Nine Elms, the timber and woodwork is now mostly from Poole and London; railed across the island. A tessellated floor entrance is now being laid. The pier will be ready for opening in about three weeks. The old one was washed away some few years ago.

**Lechlade Water Supply.**—On Thursday last week, Mr. S. Harding Terry, A.M., Inst. C.E., one of the inspectors of the Local Government Board, held an enquiry at Lechlade, Gloucestershire, with reference to an application by the Faringdon Rural Sanitary Authority, for a loan of £1,500 for a proposed water supply to the town of Lechlade. The scheme has been prepared, and was explained by Mr. F. H. Barfield, F.S.I., of Faringdon, Berks.

**Carving at Wimbledon and in Brook-street.**—Mr. Gilbert Seale, of Walworth, writes to say that he did all the stone and brick carving at the new buildings for the South Western Bank, Wimbledon, described in our last (p. 658). He adds that he also executed all the carving to frieze, capitals, &c., and the wainscot window-heads, to the new buildings, Brook-street, an illustration of which we gave in our last week's number.

**Drainage Experiments at Acton.**—We quote the following paragraph from the *Sanitary World* of April 29:—  
"We regret to find that the account of these experiments, which appeared in our issue of the 15th instant, was taken (without the knowledge of the Editor of this journal) from an article which appeared in the *Builder* of the 9th instant, and at the request of the proprietors of that journal we readily apologise for the omission on the part of our contributor to acknowledge the source from which the account was derived."

Depredations of this kind on our columns have been far too frequent of late.

**Whitby.**—The Whitby Harbour Trustees recently held a special meeting, at which the agreement whereby the Public Works Loan Commissioners grant a loan of 10,000l., for the purpose of harbour and sewerage improvement, the Local Board giving a guarantee on the rates, was submitted and duly signed and sealed.

**New Wesleyan Schools, in connexion with St. Mary's Chapel, Truro, have been commenced. They will cost 2,500l. The contract for the work has been let to Mr. John Farley (mason) and Mr. William Tippet (carpenter). The architect is Mr. Silvanus Trevail.**

PRICES CURRENT OF MATERIALS.

| TIMBER.                                    |                | £. s. d. | £. s. d. |    |    |
|--------------------------------------------|----------------|----------|----------|----|----|
| Greenheart, B.G.                           | .....ton       | 6        | 10       | 7  | 0  |
| Tek, E.I.                                  | .....load      | 9        | 0        | 14 | 0  |
| Sassaqua, U.S.                             | .....foot cube | 0        | 2        | 3  | 0  |
| Ash, Canada                                | .....load      | 3        | 0        | 4  | 0  |
| Birch                                      | .....          | 2        | 0        | 3  | 0  |
| Elm                                        | .....          | 3        | 10       | 4  | 0  |
| Fir, Dantsic, &c.                          | .....          | 1        | 10       | 4  | 0  |
| Oak                                        | .....          | 2        | 10       | 4  | 0  |
| Canada                                     | .....          | 3        | 0        | 6  | 0  |
| Pine, Canada red                           | .....          | 2        | 0        | 3  | 0  |
| " yellow                                   | .....          | 2        | 5        | 4  | 0  |
| Lath, Danteic                              | .....fathom    | 3        | 0        | 5  | 0  |
| St. Petersburg                             | .....          | 4        | 5        | 10 | 0  |
| Wainscot, Riga                             | .....          | 2        | 15       | 4  | 0  |
| " Odessa, crown                            | .....          | 2        | 15       | 3  | 0  |
| Deals, Finland, 2nd and 1st                | .....std.100   | 7        | 0        | 8  | 0  |
| " 4th and 3rd                              | .....          | 5        | 10       | 6  | 0  |
| Riga                                       | .....          | 5        | 10       | 7  | 0  |
| St. Petersburg, 1st yellow                 | .....          | 8        | 0        | 14 | 0  |
| " 2nd "                                    | .....          | 7        | 0        | 8  | 0  |
| " white                                    | .....          | 6        | 0        | 9  | 0  |
| Sweden                                     | .....          | 6        | 0        | 15 | 0  |
| White Sea                                  | .....          | 7        | 0        | 16 | 0  |
| Canada, Pine, 1st                          | .....          | 17       | 0        | 25 | 0  |
| " 2nd                                      | .....          | 11       | 0        | 18 | 0  |
| " 3rd, &c.                                 | .....          | 6        | 0        | 9  | 0  |
| " Spruce, 1st                              | .....          | 8        | 0        | 10 | 0  |
| " 3rd and 2nd                              | .....          | 5        | 0        | 7  | 0  |
| Deals, New Brunswick, &c.                  | .....          | 5        | 0        | 7  | 0  |
| Battens, all kinds                         | .....          | 4        | 0        | 11 | 0  |
| Flooring Boards, sq. 1 in, prepared, First | .....          | 0        | 8        | 0  | 11 |
| " Second                                   | .....          | 0        | 6        | 0  | 7  |
| Other qualities                            | .....          | 0        | 5        | 0  | 6  |
| Cedar, Cuba                                | .....foot      | 0        | 3        | 0  | 0  |
| Honduras, &c.                              | .....          | 0        | 2        | 0  | 0  |
| Australian                                 | .....          | 0        | 4        | 0  | 0  |
| Mahogany, Cuba                             | .....          | 0        | 4        | 0  | 0  |
| St. Domingo, cargo average                 | .....          | 0        | 4        | 0  | 0  |

TIMBER (continued). Table with columns: Item, £. s. d., £. s. d.

METALS (continued). Table with columns: Item, £. s. d., £. s. d.

LEICESTER.—For the construction of a ladies' swimming-bath at the Public Baths, Leicester. Quantities, specifications, and drawings, by Mr. J. Gordon, M.Inst. C.E., Borough Surrey.—

IRON.—Bar, Welsh in London, ton 4 7 6 4 15 0. Table with columns: Item, £. s. d., £. s. d.

GILLS. Table with columns: Item, £. s. d., £. s. d.

LONDON.—For painting and repairs to No. 7, Macklenburg-square, for Mr. E. Habershon.—

COPIES. Table with columns: Item, £. s. d., £. s. d.

TURPENTINE. Table with columns: Item, £. s. d., £. s. d.

LONDON.—For additions and alterations at the Bull's Head, 64, Charing-cross-road, for Mr. Adamson. Mr. R. W. Read, architect, Great Marlborough-street.—

COMPETITIONS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Table with columns: Nature of Work, By whom required, Premium, Designs to be delivered, Page.

CONTRACTS.

Table with columns: Nature of Work or Materials, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page.

LONDON.—For additions and alterations at Britanniarow, Islington, for Messrs. Lorimer & Co. Messrs. Alexander & Gibson, architects, Great James-street, Bedford-row. Quantities by Mr. Mark W. King, Fenchurch-avenue, E.C.—

LONDON.—For alterations at the Dolphin Public-house, Red Lion-street, W.C., for Mr. E. Hartshorn. Messrs. Alexander & Gibson, architects, Great James-street, Bedford-row.—

LONDON.—For alterations at the Tufnell Park Hotel, N., for Mr. Meadwell. Messrs. Alexander & Gibson, architects, Great James-street, Bedford-row.—

LUTON.—For alterations and additions to premises, Bata-street, for Messrs. Davis & Pinck. Mr. W. J. Pearson, architect. Quantities not supplied.—

MONTOOMERY.—For alterations and repairs to the Town-hall. Mr. John Barton, architect and surveyor, Welchpool.—

TENDERS

CARDIFF.—For building new school-chapel and classrooms, at Cathays, Cardiff, for the Primitive Methodist connexion.—

RENSINGTON.—For completing and finishing houses in Comersgh-road and Rostrevor-road, West Kensington, for Messrs. Hoare & Co. Messrs. Rogers, Chapman, & Thomas, engravers, Belgrave-road.—

CLEEKENWELL.—For erecting lecture-hall, &c., St. John's-square, Clerkenwell, for the London Wesleyan Mission. Mr. F. Boreham, architect. Quantities by Mr. C. W. Brooks.—

KETERING.—For the erection of two houses in Wellington-street, Kettering, for Mr. Wm. Hunt. Mr. H. A. Cooper, architect. Quantities supplied by the architect.—

FINCHLEY.—For building five shops and stables in High-street, North Finchley, for Messrs. W. A. Dell & T. Maltby.—

KETERING.—For the erection of three houses and corner shop, in Thorogate-street, Kettering, for the Kettering Co-operative Society. Mr. H. A. Cooper, architect. Quantities supplied by the architect.—

FOREST GATE.—For the erection of a villa (exclusive of internal fittings), in the Romford-road, Forest Gate, for Mr. Edward Witherspoon. Mr. Chas. E. Jackson, architect. Ground-rod, E. Quantities by Mr. S. E. Burrows.—

SANDWICH (Kent).—For building a pair of almshouses for the Trustees of St. Bartholomew's Charity. Mr. E. W. Fry, architect, Dover. Quantities by Mr. Alfred Broad, 58, George-street, Croydon.—

\* Credit for old metal. † Accepted.

RUSHDEN (Northants).—For the erection of two houses in Queen-street, Rushden, Northants, for Mr. J. T. Mackintosh. Mr. H. A. Cooper, architect.—

RUSHDEN (Northants).—For the erection of house in Queen-street, Rushden, Northants, for Mr. Wm. Shalford. Mr. H. A. Cooper, architect.—

SANDWICH (Kent).—For building a pair of almshouses for the Trustees of St. Bartholomew's Charity. Mr. E. W. Fry, architect, Dover. Quantities by Mr. Alfred Broad, 58, George-street, Croydon.—

SOUTHWARK.—For alterations and repairs at 69, Blackfriars-road. Mr. Robt. Reid, architect.—

SOUTHWARK.—For alterations, repairs, and other works to be done at the Grapes Public-house, London-road, Southwark, for Mr. A. Bryson. Mr. A. G. Olley, architect:—

Table with 2 columns: Name and Amount. Includes Aspell, Byham Bros, Mower, Ryde & Sons, Jackson & Todd, W. Crooke.

SPALDING.—For erecting new Wesleyan Schools, Spalding, Mr. F. Boreham, architect:—

Table with 2 columns: Name and Amount. Includes E. Bowman, Stamford, J. Holmes, Wainfleet (accepted).

STOCKBRIDGE (Hants).—For new tower and spire to Stockbridge Church, Hants. Messrs. Colcock & Son, architects:—

Table with 2 columns: Name and Amount. Includes Crook & Sons, Southampton\*.

STOKE NEWINGTON.—For the erection of a new school-house, &c., at Newington-green, E. Messrs. T. Chaffield Clarke & Son, architects, Bishopsgate-street Within:—

Table with 2 columns: Name and Amount. Includes Philips & Bisker, M. Masley, Kilby & Grayford, B. E. Nightingale, J. Morter, M. Marsland, Ashby Bros., C. Cox, E. Lawrance & Sons.

SYDENHAM.—For new house, "Sjverdale," South Sydenham Park, for Mr. Sydney Smith. Mr. A. G. Heoell, architect, Forest-hill:—

Table with 2 columns: Name and Amount. Includes A. Sykes, Catford, Geo. Masters, Anerby, Smith & Sons, Norwood, Holloway Bros., Battersea, Johnson, Wandsworth, James Waddington, Sydenham\*.

SYDENHAM.—For the erection of villa residence, Sydenham, for Mr. Lester Wright. Mr. Chas. Wisner, Architect, South Norwood:—

Table with 2 columns: Name and Amount. Includes A. Stuart, Norwood, Joseph Hobden, Sydenham, J. Barber, South Norwood.

TUNBRIDGE WELLS.—For villa residence, Prospect Lodge Estate, Tunbridge Wells. Mr. W. B. Hughes, architect. Quantities supplied:—

Table with 2 columns: Name and Amount. Includes Strange & Sons, Tonbridge Wells, Penn Bros, Pembury, Judd, Tunbridge Wells, T. Ryder, Tunbridge Wells, J. Jarvis, Tunbridge Wells, W. H. Coaty, Tunbridge Wells.

WALWORTH.—For alterations and additions to the Vicarage of St. Paul, Lorrimer-square, for the Rev. Mr. Simpkinson. Messrs. Frederic W. Fryer & Frank Golding, architects and surveyors, 2, Pancras-lane, E.C., and Beckenham. Quantities by the architects:—

Table with 2 columns: Name and Amount. Includes Downs, Hampton-street, Waddington, Tinsler (accepted).

Alterations, Horsey-road.—Messrs. R. D. Lowe & Sons write to say that there was an error in the list of tenders for the alterations and additions to premises, corner of Horsey and Fairbridge roads, which appeared in last week's Builder. The amount of their tender was 1,820*l.*, not 1,824*l.*, as published.

\* SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 48, Catherine-street, W.C., not later than 12 Noon on THURSDAYS.

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"THE BUILDER" is supplied direct from the Office to residents in any part of the United Kingdom at the rate of 10s. per annum. Foreign to all parts of Europe, America, Australia, and New Zealand, 26s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittance payable to DOUGLAS FOURDRINER, Publisher, No. 48, Catherine-street, W.C.

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TO CORRESPONDENTS.

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F. T. W. G. S. W. A. (four letter appears rather like an advertisement, unless the connection between your name and that of the firm referred to is only an accidental coincidence)—R. M. F. (thanks)—R. B. & Co.—H. H.—D. & Son.—C. B. (when we have room)—R. A. W.—P. E. P.—P. H. (it is not suitable)—L. D.—J. H. A. (thanks).

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

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors. We cannot undertake to return rejected communications. Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

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Doubling Free Stone For prices, &c., address S. & J. STAPLE HAM HILL STONE, Quarry Owners, Stone and Lime Merchants BLUE LIAS LIME Stoke-under-Ham (Ground or Lump), Ilminster. [ADVT.]

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# Supplement to The Builder,

MAY 7, 1887.

## GENERAL CONFERENCE OF ARCHITECTS.



THE EIGHTH\* General Conference of Architects, held under the auspices of the Royal Institute of British Architects, was formally opened on Monday evening last, when the President of the Institute, Mr. Edward P'Anson, F.G.S., and the Council, held a reception in the West Gallery on the ground-floor of No. 9, Conduit-street. On the walls of the Gallery were displayed an interesting exhibition of drawings of works by the late Mr. George Vallianny and the late Mr. Ambrose Poynter, as well as a series of rubbings of brasses lent by Mr. A. Oliver. The reception took place at half-past seven, and at eight o'clock the company proceeded upstairs to the rooms of the Institute, where the fifty-third annual meeting of that body was held. The annual report, of which we gave the salient passages in last week's *Builder* (p. 651, ante), was unanimously adopted, the new Council was elected, and other formal business transacted.

It may be mentioned that a few hours before the formal opening of the Conference, viz., at three o'clock on Monday afternoon, some two hundred members of the Conference visited the Stock Exchange, as enlarged and completed, where they were received and conducted over the building by the architect, Mr. J. J. Cole, and his son, Mr. Langton Cole. We will say a little more about this building next week.

On Tuesday morning a party of about 150 members of the Conference visited the New National Liberal Club-house, Victoria Embankment, under the guidance of the architect, Mr. Alfred Waterhouse, R.A. They next proceeded to the large block of residential mansions in flats adjoining the new Club-house, where they were received by Messrs. Archer & Green, the architects. Next, they visited the new Hotel Victoria, in Northumberland-avenue (istly known as "The Northumberland Avenue Hotel"). Here the visitors were met by Mr. H. L. Florence, of the firm of Isaacs & Florence, the architects of the building. Of all these buildings we shall have more to say next week. In the afternoon a party of about seventy-five members went by train from Waterloo to Egham, where they visited the Royal Holloway College, under the guidance of the architect, Mr. W. H. Crossland, who entertained the visitors at luncheon.

It was not until Tuesday evening that the Conference proper was actually commenced. The attendance, though large, was by no means so great as on some previous opening nights, owing, perhaps, to the numerous visits to buildings which preceded it. The programme, perhaps, was somewhat over-crowded in this respect, and those members who visited all the buildings named must have been tired out. The chair having been taken at 8 o'clock by Mr. Alfred Waterhouse, R.A.,

Mr. J. D. Sedding at once proceeded to read the following paper

### ON THE RELATIONS OF ARCHITECTURE AND THE HANDICRAFTS.

"Watchman, what of the night?"

ALTHOUGH the relations of design to the handicrafts is of deep concern to us, and is likely as time runs on to become the problem of problems, yet there is much in the present state of things to hide it from the sight of such as care not to confront it.

\* The first of these Conferences was held in 1871, the second in 1872, the third in 1874, the fourth in 1876, the fifth in 1878, the sixth in 1881, and the seventh in 1884. Copious notes of the proceedings will be found in the volumes of the *Builder* for the years named; and this year, as we did three years ago, we report the proceedings in special Supplements, of which this is the first. Our second Conference Supplement this year will be given next week.

So long as clever and interesting designs can be turned out, such as were seen in the photographs of modern buildings forwarded the other day to the Adelaide Exhibition; so long as historic art has the same enthralling interest for us, and for the young eagles we hatch that it has now; so long as her Majesty's mails afford us such cheap and ample facilities for keeping up our relations with the craftsmen who have the honour of more or less faithfully representing our ideas in the buildings we are rearing in various parts of the country; just so long may we evade this question if we will. It does not visibly obtrude itself in such peremptory fashion that we are bound to face it at once. We may keep our skeleton safe locked in the cupboard a little longer till we have more courage to face it.

The question is so new and unparalleled. We have kept it hitherto dark from the critics, who worm out most things; and there are possibly such ugly issues hanging to its tail that we are naturally disinclined to touch it. It is not that we are not a little uneasy about things at times. We cannot but feel that, with all its merits, our design fails to correspond in many vital points with all good art that ever was. There are two ways of drawing a horse,—one starting from the head and the other from the tail; and though the first is undoubtedly the right way, it is not ours. We know that the old ways of art and the old methods of producing art are not our ways and methods. We feel, too, at times that life under the present system of conducting design is an irksome business,—nay, that the stress and strain of it have sent some of our best men into an early grave. Yet to pause and quietly take stock of things seems scarcely possible,—matters move at such a pace nowadays. The mill of Victorian design has had to encounter such strange antics of veering winds, the wheels have had to run so fast, the grain we had to grind is of such various kinds, and the people outside were so mad to get at everything we have turned out,—even before it was properly sorted or bagged,—that, really, what with the hustle, the confusion, the uproar, and the dust, we have had no opportunity for calm reflection.

And yet I will be bound to say you have had your opportunities for realising the march of things. We are all diligent students of old art, and old art is never silent to those who will hear. Perhaps, the occasion came in the well-earned pauses of a day's diligent sketching, when, shut in with Nature and her twin sister Art, away from the sound of the grinding-mill, within the precincts of some sequestered old abbey buildings, the desire came upon us to learn somewhat of the secrets of the strength of the old work and somewhat of the secrets of the weakness of our own work. What,—we have then asked,—is that quality in the architecture of old days that stamps it with inherent nobleness? How came it with that inimitable touch that gives it this lasting human effectiveness? From whence did the old men get that subtle alchemy which, somehow or other, seems to have been infused into the dead stone and wood which makes these old walls resound with ever fresh human interest? What is that specific something which is ever present in old design and always absent from new design? What was there in the manner of the making of the old detail that ensures its success, and what in the manner of the making of the new detail that bars its success?

Now the answer to all these questions is, I think, contained within the four corners of our subject. And as to this subject let me say that without wishing to push the significance of our conference upon it to-night too far, I cannot but accept the permission so kindly accorded to me of bringing it before you as witness that

you consider it as timely a question as those other subjects down for conference of "Education," of "New Materials and Inventions," of "The Federation of Architects," of "The Registration of Architects."

Our relations with the handicrafts! Well, no one discusses his relations with his relations until matters are uncomfortable. No one chatters of the relations between the members of a family or of a body corporate unless old ties and interests are in danger. It were impossible to conceive of William of Wykeham or Alsn of Walsingham, or Christopher Wren, or, Inigo Jones, discussing the relation of architecture to the handicrafts, even though the two last-named worthies were often seen with ominous-looking portfolios under their arms. And why is the notion so preposterous? Is it not that the leaders of design in those days were in active touch with the trades,—the two first-named in closer touch than the other two,—because the architect and the craftsman were not, as now, twain, but one? "So they were not, both of them together."

Now, I am about to ask you to let me treat this subject in what may appear a roundabout fashion: anyhow, it is the fashion in which your roundabout studies of old art have led me to look at it. You see, I assume at once that we must judge of it from an historic standpoint. The past of art elucidates the present: "What has been shall be." The past of art is prophecy as well as history. So I shall hinge all that I have to say upon these four propositions.

1. English architecture is not what it was. 2. The architect is not what he was. 3. The handicraftsman is not what he was. 4. The relations of architectural designer and craftsman are not what they were. In our treatment of these propositions I hope we shall find the key to the situation which causes us uneasiness. Only let me say now, what I shall desire you to remember when I have finished, that this hastily-compiled paper lays no claim to completeness, and makes no pretence to adequacy.

1. English architecture is not what it was,—not simply as regards what we do, but how we do it,—not simply as to the types we have or want, but as regards the initiative and character of design. Architecture under the conditions of these days is becoming more and more a thing of schools and classes, of geometry, of lectures, of manuals of design, of book illustrations, of criticism, of draughtsmanship and sketching, of classification and demonstration. No one will, I think, contradict me when I say that so far as architecture is now conducted as an art and a profession it means design, not craftsmanship. Let me give an illustration to explain my meaning. Suppose that a Tory Government, desiring to exercise a little art-coercion, were to pass a Bill for the extermination of all architects and architects' assistants throughout the land! What would happen would be that English architecture would simply lie with the architects dead and buried in the same grave. And if the Bill were to apply "for ever and ever," such English architecture as we have initiated would cease from off the face of the earth. But suppose that some ruffianly monarch had tried the same game on the Innocents of old days, what would have happened? Why nothing would have happened. The effect upon English architecture would have been simply nil! because the handicrafts would have carried on things exactly as they had been before. You might as well expect to stamp out the English language by putting to death the professors at the Universities.

Old architecture is craftsmanship or it is nothing. The thews and sinews of old design were in the trades. Old architecture was not what modern architecture is, the creation of the architect's office; it was the creation of the workshop: the workshop was its home, the

tradesman's bench was its cradle, tradition was its foster-mother. The momentum of old art came through the trades. Its inspiration came direct from the heart of things, and there were no mediums in the shape of draughtsmen, with their *abracadabra* plans and sections, that prevent the night-watches of the honest British workman of to-day. Old architecture is not like the new, a fortuitous concourse of atoms; in spite of its wide range and free developments it was, in truth, a compact homogeneous whole, where nothing appears suddenly and without preparation, and nothing disappears until it has played out its part and fertilised the ground for that which takes its place. The style of old architecture is far-reaching tradition. It was nurtured on the sustained enthusiasm of successive generations of tradesmen. It was developed sympathetically and coincidentally by men who in their handling of things could maintain firm hold on the past, yet keep their developments so closely neck and neck as almost to suggest the existence of a sort of art-telephone by whose aid the schools of workmen far and near were made aware of the tune going on, so that all alike could be simultaneously working at the same theme or motif, yet without restraint to local genius, or prejudice to local necessities.

Old architecture was, above all things, local in its practice and development. Its strength was to sit still. It was not, as ours, an art of excursions,—an art carried out by architects always on the wing, who, like Ulysses, after his long roaming, can say,—

"I am a part of all that I have met."

Old detail was applied by the craftsman who invented it, and was not drawn out by a draughtsman situated, it may be, hundreds of miles from the building being erected, who could have nothing in common with the workman, and no other mode of communicating with him than her Majesty's mails supply.

Old detail was the product of a fertile field. It passed through the brain of a horny-handed workman, deep skilled in the lore of the trades, and rich with the mellowed harvests of bygone days. It did not, like modern detail, owe its origin and such charm as it possesses to the volunteer notions and precocious maturity of some masterful soft-handed occupant of an office-stool, whose practical knowledge may not always equal his aspirations.

In regard to this matter of the propagation of architecture by schools of workmen, I will trouble you with a few illustrations taken from British examples, as I wish to trace things home to ourselves to-day.

The effect of the old schools or gangs of workmen is seen in two ways,—1. By the distinct types or varieties of types that prevail within a given area; 2. By the recurrence of similar or identical details in distant structures, which marks the wanderings of gangs who carry along with them the mouldings or plans used by them at their last or previous jobs.

Mr. Street, in his masterly report upon Christ Church, Dublin, incidentally mentions an interesting example of this in the splendid abbeys of the counties of Cork, Limerick, Tipperary, Kilkenny, Wexford, Meath, and Down. He says, "It is not as works of art worthy of attentive study that they interest me so much, as the way they illustrate the manner in which art was carried from land to land in the Middle Ages. The feature in question is this,—I find in these buildings the most unmistakable marks of their having been erected by the same men who were engaged at the same time in England and Wales." Of Christ Church, Dublin, and St. Canice's, Kilkenny, Mr. Street observes, "These two churches possess certain features so peculiar and so exactly like what we see in St. David's, Llandaff, Wells Cathedral, and Glastonbury Abbey, that they must have been erected by the same troop of workmen, and from the designs of the same architect."

It was, I may remind you, to Mr. Street also that we are indebted for the discovery by internal evidence that Stone Church, Kent (which he handled so ably in his restoration) was the handiwork of masons from Westminster Abbey.

We must all, in the course of our studies or professional work, have come across instances of the same kind. I will give a few that have fallen under my own observation. To cap that of Mr. Street's, I may say that I find the handiwork of the builders of Sherborne Minster in Orewkerne Church. Again, Tideswell Church, Derbyshire, is a remarkable specimen of four-

teenth-century work. We can plainly trace the Tideswell arcades, windows, doors, and porches in Chesterfield Church, erected later on; and I can further run these identical features to ground at Tamworth, some long way off.

Of the repetition of the same designs and details in the same county, I may mention how the noble Perpendicular towers at Isle Abbots, Huish Episcopi, and Bishop's Lydeard, Somerset, are so exceedingly alike that, were it not for their different surroundings, you would not from your sketches of the three be able to tell "t'other from which."

Speaking of this county, I may recall to your recollection how a gang of Somersetshire workmen put up a completely typical Somersetshire tower at Llandaff Cathedral in the fifteenth century. Further, that another gang of Somersetshire masons built Wadham College, Oxford, in the seventeenth century.

Perhaps it may not be out of place if I here venture to give as my opinion that the vast majority of our parish churches were both designed and built by schools of workmen. To me they represent peasants' art. They are local, not only in regard to conformity to certain types, but local in the thought and character expressed in them. They are of the soil, and made by children of the soil. While the stone of which they are built was quarried in the field hard by, the ideas they clothe were quarried out of the no less home fields of the local peasants' brains. And, for my own part, I like to feel that just as the Gospel preached within the walls of our parish churches had its peasant apostles, so the art proclaimed in the walls had its peasant apostles; and I am no less the humble disciple of the one than of the other. What little I know of art I have mostly got at the feet of the humble, but immortal, peasant craftsman of olden times. The critic, who is "cute or nothing," tells us that the marks of irregular composition and crude handiwork found almost invariably in Gothic buildings are essential to the style, and that they are there because they were purposely put there, forgetting that these traits are but the accidents of the work which are found equally in Roman or in any other phase of art where the culture of the workman tallies with this case. It were best to drop such theories, and to see in the simple *naïveté* of these buildings, and in the unexpectedness of their composition, only the state of the handicrafts of the time. Art has its address as well as its full dress Academic costume, and here we have but the product of men whose invention was in their finger-ends, whose imaginative grasp was not great, whose ignorance of the rules of selection, and whose work,—delightful and elevating thought be,—has none of the distinction and the *Atticism* of fastidious times. Were architects employed to design our village churches? I doubt it. But if so, methinks that the British architect of the present day has something to learn from them of the beauty of simplicity, and of the value of restraint in design.

The strongly local flavour of old architecture is, I say, an indirect testimony to the community of effort and art-motive. The distribution of plants and birds in a locality is not more marked in England than the distribution of types of old-world design and handiwork. If the hotanist can tell us where to find the bee-orebis or the *Osmunda* fern, or the ornithologist can tell us where to find the stonechat or the turtle-dove, we architects can tell them where, and where only, certain architectural types are to be found. Nay, we can tell them the marks of borderland influences,—how differences exist, and yet the identity of the original types will still be preserved. We can tell them how a Sussex tower differs from an Oxford tower, and a Derbyshire tower from both. I remember tracing the likeness of the tower of St. John's, Cardiff, to the tower of Gloucester Cathedral, and I found afterwards that the living of the parish was still in the gift of the Gloucester Chapter; so that goes to support the theory that the same gang of masons built both.

Again, we can tell almost by the feel of an enriched hench-end whether it be the work of the tribes of Somerset, or Devon, or Cornwall. Show us an oak chest in Wardour-street, and we can tell in what county it was produced. We can tell at a glance whether the tracery and make of a church screen be of Welsh, Yorkshire, or Norfolk origin. I once went a long journey

in the wilds of Cornwall to see what Murray calls "an elaborate screen," and I remember my disgust as I pronounced at a glance that the thing was of Midland County origin. My instinct was right, but it was proved right in a manner I did not anticipate, for later on I broke blade after blade of my friend's knife over the tracery, which, though looking like oak, was in reality Brummagem cast-iron!

Here are a few other testimonies of local schools of art shown by the presence of one type and the absence of another. Thus the barrel roof is the only existing type of roof in Cornish churches. In Devon the type exists, but in a less degree; in Somerset it exists, but in a still less degree. In the churches of these three western counties there is, again, the same peculiar continuation of the nave aisles to the full extent of the chancel, and the aisles almost always have pitched roofs. There are only four instances of clearstories in Cornwall,—at Callington, Lostwithiel, Fowey, and North Petherwin. Again, in Cornwall, I know of only two chancel arches,—at Bodmin and at Towdnack.

And so with other features elsewhere. If you draw a line from Newmarket to Fen Stanton there is a preponderance of towers over spires in the proportion of nearly ten to one; while at that village the character changes, and there are a line drawn from thence through Huntingdonshire and Northants into Rutland, a tower would scarcely be found. From the same School of art influences Oxfordshire houses get their gables and Northamptonshire houses their special type of chimneys. Such methods of local developments of types conduced to the growth of individuality of character.

Another special phase of architecture is that, where local types are temporarily coloured by foreign influences. This phase is, of course, represented in a wholesale degree in Spain under the Moor, or in Flanders under the Spaniard, and oddly, too, in Spain when the Spaniards evacuated their diggings, but took Flemish tricks of building away with them. The Flemish stepped-gables, for instance, crop up in Spain. But we must not wander from England, and I will only note two examples here. There is the strong influence exerted over Norfolk and Suffolk art after the wealthy traders had imported Flemish craftsmen to those parts. Again, my rambles in Devonshire have enabled me to trace the work of a small gang of sixteenth-century Flemish carpenters over that part of the country that lies south-west of Kingsbridge-road Station. Their work is to be found in the screens of several churches in that neighbourhood. The "grand climac-teric" of the school was arrived at in the side-chancel screens at Holbeton, but I found their work also at Chivestone, Kingsbridge, and Ugborough. The work is singularly beautiful, and it loses none of its interest by the admixture of foreign and local characters.

2. The architect of to-day, I said, was not what he was. In touching upon this point I shall say as little as I may upon the vexed question of the functions of the architect in old days and to what extent he corresponded with ourselves. I am led to think that from whatever source the general scheme of a building came,—whether from patron-builder, architect-builder, or master-workman, whether the building were church, castle, country-house, monastery, or cathedral,—the details were left pretty much to the trades.

That the names of architects are not connected with the traditions of old English buildings does not necessarily imply that the people of the place were unconcerned about the history of their buildings, but it implies, I think, that their erection was a joint-stock affair. Even in Italy,—where one would suppose from hooks that art was the great business of life,—even there Vasari has to note to how few, especially of the notable earlier buildings, he can assign an architect's name. The reason he gives for this is the than modesty of the profession! He "cannot but marvel at the simplicity and indifference to glory exhibited by the men of that period." Now although one feels that for me to "differ" from Vasari almost parallels the old woman who "differed from Paul," yet in spite of this, and in spite of seeming to rob the profession of the merit of a virtue they can ill afford to lose, I do venture to think that Giorgio Vasari was on a wrong tack here. Is it not a singular fact that whenever a *foreigner* has anything to do with a building,—a man, that is, who is not of the

crowd of local craftsmen,—we are sure to hear of him? Thus we hear of Buschetto, "the Greek," at Pisa, of Master Harduin, at Bologna; of Wilhelm of Innsbruck, at Orvieto; of Maestro Jacopo the German, at Arezzo; and so forth.

But what I particularly desire to emphasise here is the little influence the foreign architect can exert when his sympathies run counter to those of the craftsmen. How different is it now! The ground-plans of the churches, their proportions, their roofs, and their traditional features remain as before, in spite of the foreign "boss." It is only in the window traceries and the form of the arches that he makes any appreciable mark. One swallow does not make a summer. And so Messers Giovanni and Tommaso and the rest of the brown-faced workmen complacently smile at the foreigner as he shakes his shaggy locks and rolls out his Germanic oaths: they know that the running is in their hands. Gothic is queer stuff to them, but they know that Gothic is not Gothic when smothered in Classic clothes from top to toe. And we know it too.

To revert to English work. I would, for the purposes of this paper, divide English design into three phases, each phase representing a different relationship or degree of relationship to the crafts. 1. There is the art which ranges from the earliest times down to the Classic Renaissance of the sixteenth century. 2nd. The art which ranges from the introduction of the Classic to the Gothic Renaissance of this century. 3rd. The art which represents the Renaissance of the Gothic and of the Renaissance now going on.

The first phase expresses more exactly than the second what is the true native style of the English people. I do not say that it is the better or the worse for that. The second phase is English enough, yet English with a difference. In the first, or Gothic phase, we have art as it sprang spontaneously into existence, fresh and untrammelled from the rock of the genius of the people, and here architects,—who in the history of English architecture have mostly been employed as translators,—were a superfluity, except in a big effort. There was no call for the translator in the development of the Gothic; it was the common people's language. In the second phase we have a certain interference with the methods of origination,—a certain tampering with the springs of design at their source. There are, as you know, two sorts of interference with deep-rooted design,—the accidental and the wilful. Interference like that of the Moor in Spain or the Spaniard in Flanders was accidental. But the interference that I now speak of was wilful,—and here, as was the case with the Gothic revival, it was carried out by "superior persons." Men travelled more, and discussed and desired to reproduce at home what they had seen abroad. The influences of travel and culture upset, as far as they could, the traditions of the workshops. Kings and courtiers, scholars and churchmen, cast their eyes about them abroad, and when they got home threw in all the weight of their wealth and patronage to prepare the new Classic. Naturally enough the situation demanded the professional services of masters of design, like Holbein and the ubiquitous John Thorpe. At first, I suppose, you could have counted "the profession" on the fingers of one hand. But there were brighter days in store. Gothic churches might be designed and built, as we have seen, by peasant tradesmen, but not so Elizabethan mansions. These must have some of the grace and elegance of the buildings from whence their *motif* came. You will, I think, agree with me that the Elizabethan and Jacobean styles need wealth to build, and refinement to design, or the quality of dignity essential to their proper representation is absent. They represent Academic art, courtly art, an art of distinction and selection. Renaissance art needs a well-furnished mind, learned in literature, apt at Classic allusion and at rendering antique symbolism. Here clearly is an art that demands the professional services of an architect.

Now, the point I am coming to is that, in spite of the difficulties of the situation as regards the character of the architectural design then needed, and in spite of the disparity of culture of the designer and the craftsman, their relations are entirely pleasant and friendly. The common workman is not ousted from his old place in relation to the initiative, or, at all events, to the development of design.

Design did not all at once begin, as it did with us at the time of the Gothic revival, to be *paper* development. Of course, you may explain the situation by reminding me of what I know already, that the designer then was only a specialist, and specialists are never up to much! You may say that the architect or the patron-architect knew precious little about details, and so left the workman to supply his deficiencies. But that does not cover the whole case. Even a specialist may be a master, too, occasionally.

What we may infer from observation of the Early Renaissance work is that, by some means or other, Tom, Dick, and Harry, who had "allers done Squire's work," were made acquainted with the round arch, pilasters, halustrades, and friezes, and they took kindly enough to them and worked "overtime" in the evenings, scheming fresh planes for "them tricky new-fangled mouldings." But the Classic imagery stumped them, as we see by our old country houses to this day. Here was clearly a case for calling in their betters.

But while things moved so sweetly in the yards, the "superior persons" who wrote about art were not content. We all know, and like no less, that dear old pedagogue John Evelyn's "Parallels," which, as you may remember, also contains the significant "Explanation of certain Terms particularly affected by Architects," which looks very like making architecture an exact science. In his Apology for ancient Architecture, Evelyn refers with something like scorn to the "simple workmen, whose trade dwells all upon their finger-ends only. But, says he, "we shall not appeal to such scribes as these; there are others to be found that, having their first studies well founded on the principles of geometry,"—we know the sort of thing that follows.

The architects of those days, however, were not going to be led by the nose by the "superior persons." They were not going to kill the goose that laid the golden eggs. The "simple workmen whose trade dwells all upon their finger-ends only" had an honored and a conspicuous place in the making of English Renaissance design. The architect did not swamp the craftsman or destroy his individuality, or play the masterful dictator by putting a clause into his specification to the effect that "No moulded work, or work involving the design of the architect, to be put in hand without previous application to him for, and supply by him of, the necessary full-size and detail drawings."

This piece of supreme folly and suicidal presumption it was left for the architect of the nineteenth century to inaugurate.

Time and your patience would fail me were I to go properly into this phase of the subject, or to show how even an old stickler like Thomas Tresham lets the workman work his will, as where, in the Triangular Lodge, he lets the local mason put in the local crocketed gables seen in Perpendicular work at Higham Ferrers; or, at Rothwell and Lyveden, the familiar Tudor features of angle staircases, ranged heraldry, bay windows, &c.

To see concisely and easily what were the relations of the architectural designers and craftsmen we cannot do better than go to Oxford. Take such work as Fox's at Corpus (1516), or Wadhams (1613), or Pembroke (1620), or the various phases of Renaissance at St. John's, including Inigo Jones's inner quad. (1635). And what I would ask you to specially notice is that all the work,—in spite of its Classicism,—is as Gothic as New College, as fully local (harring a Somerset touch in Wadhams) as Merton or Magdalen, as fully English as it well could be. It matters not the date of the Oxford buildings, they are Oxford work. The door to the qualities of all alike open to one master-key. The big-sounding architects' names attached to their initiation do not count for very much. Old architecture, as I said, is craftsmanship or nothing, and this proud city of learning is indebted for her architectural triumphs, whose fame is in all the world, to the "simple workmen whose trade dwells all upon their finger-ends." Verily, there is a place in the exercise of our craft for learning, geometry, and refinement just as there was a place for the polished weapons from Saul's armoury in the battle against the Philistines, but none the less is there a place for the native invention of the local genius with his five smooth stones out of the brook of common local art. Saul may slay his thousands, but David,—said the singing women,—his ten thousands. Even Inigo Jones, with his big

name, big individuality, and big reputation in "the profession" submits like a man to the embrace of the genius of the place, and lets the local handicraftsman have his say in the details, even to the plumber who made those magnificent stack-pipe heads you and I have sketched and tried to reproduce.

Of the art of the third phase of this section of my subject,—the art of the Gothic and other revivals,—I need only say, at this moment, that these revivals arrested workshop traditions. The revival was also a revolution in which the poor decrepit handicrafts which represented tradition went to the wall; and the Voltaire of the revolution,—the writer who with his pen shook down the whole fabric of tradition by appealing to the individual's own sense of beauty,—was Mr. Ruskin.

My next point (3), that the handicraftsman is not what he was,—in skill, practical knowledge, design, or imaginative talent,—needs, alas! but little argument to prove.

In judging of the architecture of old days,—say of Italy in the fifteenth century, of England or Germany in the sixteenth century,—you do not look merely at the plan or scheme of the buildings, but at their fittings and furniture inside. The bare walls are but the frame for the picture, the casket for the gems inside. In other words, we look at what is being turned out by the craftsmen all round. The touchstone we apply to test the merit of a nation's art is the condition of the trades. We go to the minutiae of the mason's, carpenter's, smith's, weaver's, painter's, plasterer's work to tell us the state of architecture. On visiting an old house the stamped leadwork on the waterbutt at the door that the wine-leaves will soon shrond from sight, the big stack-pipe head that two families of sparrows have appropriated during this long bout of dry weather, the moulded door, the brasswork on the mantelpiece, the clock, the panelling, the plaster ceiling, the chairs, grates, staircase,—in fact, everything your eyes light upon, bears witness of the then state of architecture. It is different now, when the British matron has to go for her home treasures to Tottenham-court-road, or when the British parson has to yield himself a prey to the handiworkings of an eminent Birmingham firm or to the eloquent self-adulatory notices of the Barnum of the West.

Of course the handicrafts and architecture went to the wall together, and were both in an equally bad state at the end of the eighteenth century. The handicrafts will not prosper without proper encouragement and proper nurture: and the humdrum existence, the bad wars, the niggardly art-patronage, the mechanical utilitarian spirit, and the Quakerish religion of the times, all contrived to their downfall. Think of the Dutch doll-houses people had the face to put up then! See, too, what Puritanism had done for England when the relations of art with religion were represented by some such entry in the churchwardens' account as this:—"To altering the Commendments, to mending the Belief, and to making a new Lord's Prayer, 4l. 10s."

Now, in making this broad and not very complimentary statement about the handicraftsman of to-day, I blame him not. I pity him from the bottom of my heart; for I know how the stars in their courses have fought against him. The domineering architect, the scornful critic, the capricious public, the steam-joinery builder, all these and many more things are against him, and all have contributed to degrade him. But when the parson explained to the rustic the three causes for a certain thing the latter forcibly remarked that "A hog h'aint got three fathers"! So here there must be one great cause for the downfall of the craftsman from the high estate he held in better times, which I have done my best to bring before you: and I take the root of the mischief to be this,—the lack of definite art-types. No trades can exist,—no, and no architecture can live,—without these. Workshop traditions were everything to the trades in old days, and nothing lasting can come out of our design till the workshops again have their stock-in-trade of types. The trades live only by the circulation of good, stable art-*motifs* and types. These are their life-blood. Check their flow and the trades languish; stop their flow and the trades die.

Now I have dwelt upon the Classic Renaissance thus long and fully so that I might be the better able to point a moral for ourselves in our conduct of the Gothic and Renaissance revivals now going on. And there is quite

enough similarly in the conditions of the times which saw their inauguration to warrant comparison. Each came on the heel of a decrepit art that after a process of soft antinatural dissolution was now seemingly at its last gasp. Each found a ready welcome from art patrons and designers. Each found the world eagerly looking for it as a sick man looks for his tonic.

There has been a tendency lately to speak disparagingly of the Gothic Revival. Too often have I been guilty of this, because one had a vague idea that the Gothic revival slew traditional art and ruined the handicrafts. But this is scarcely fair. To be honest, there was nothing that was necessarily destructive to the handicrafts in the mere revival of the Gothic. Nor was it the Gothic revival that did the mischief, but it was the idiotic, needless, abominably selfish way in which it has been conducted. The Gothic revival has been a glorious boon to paper design, because paper design was all we architects cared for. The carrying forward of the Gothic revival has been no boon to the handicrafts, because it was not our game to make it so. The craftsmen went down as the architect went up. The Classic had been an effective tonic and stimulant to the decrepit Gothic of the sixteenth century, because the tonic reached the right persons; and the Gothic was not an effective tonic to the decrepit Classic of the nineteenth century, just because it didn't reach everybody, and was only applied to the paper designer and not to the handicraftsman.

I now come to the fourth point,—The present relations of architectural design to the handicrafts. When I approach it, and ask for myself and for you, "Watchman, what of the night?" I am bound to say that I dread a too candid reply. Of course, we are accustomed to carry on design in such a grand, creative, cosmopolitan sort of way, that some may resent even the notion of inquiring as to the march of things. The view from this Olympus of ours at Conduit-street, cold and bare though its top be, brings home to us a sense of being monarchs of all that we survey. The very photographs sent to the Colonies demonstrate this, and I am sure the natives will have sense enough to see it too. But in a Jubilee retrospect of English architecture, we should have to go farther afield, and note such noble works as Barry's Houses of Parliament, Scott's Colonial Offices, Burgess's Cork Cathedral, Street's Law Courts, Shaw's "Adocate" and his "Alliance" offices, Waterhouse's Manchester Town-hall, Pearson's Truro Cathedral, Bodley's Hoar Cross Church; to say nothing of Morris's manufactures, that have done more for the workshops and the home arts of England than the efforts of all paper-designers whatsoever.

We know, then, how great is our inventive power: yet if we may dare to be honest, we must own that this gorgeous garment of Victorian art is, after all, but a patched-up thing. Its tricky devices, delightful though they be, show no community of art-motive and effort in the troop of the designers; the designs are anything but all of a piece woven through and through. Ah! what waste of brain-tissue is here! What specious success does not this art represent! In what an abnormal state must design be to admit of such concoctions! Yes, verily,—

"The time is out of joint; oh! cursed spite,  
That we were born to set it right."

At the outset I hinted that our relations with the craftsman who, at our various works throughout the land is extinguishing himself as he distinguishes us, and emphasising our individuality at the expense of his own,—our relations, I said, are only such as her Majesty's mails supply. In other words, we are dictators, and the craftsmen are our bumble slaves. Designers are completely out of touch with the trades. Design has run miles and miles away from the knowledge and sympathies of the craftsman, and that clause in our specifications which forbids the execution of any work "involving the design of the architect" signifies that we mean to keep him exiled where he is. Whether we shall ever get things back to their normal state is more than I can tell; perhaps English architecture, with its steam joinery works and architects' offices, forming one grand department of science and art, may "bust up" before remedial measures are applied at all.

My closing words shall be a summing-up of the lessons of the situation, and these I put for the sake of conciseness under the head of

fallacies that seem to me to underlie and take the heart out of all our modern efforts in design.

Fallacy No. 1.—That museums, exhibitions, schools of art, sketching excursions, manuals of design, photographs of old art, will regenerate the dead handicrafts of England. However these may stimulate the design of designers, I cannot see how workshop types can spring from such agencies.

Fallacy No. 2.—That the multiplication of able designers will regenerate art. We have too many eagles among us already, it seems to me, and too few wrens. The lessons of South Kensington upon this head should not be lost upon architects. Nothing could be less true than that the triumphs of old art were won by paper draughtsmen.

Fallacy No. 3.—That steam joinery is art. I have no faith in that "kittle of steam" that is fast enabling the builder, with the devil's help, to all but dispense with the services of the tradesmen.

Fallacy No. 4.—That art can be developed by means of our paper designs. Development means freedom to adapt and to combine during the processes of making a thing, freedom to bring a familiar type to perfection by easy stages and "happy thoughts." We never can attain good lasting results by setting men to work in the types of styles of which they have no familiar knowledge and with which they are out of sympathy. Now, whatever your views may be about current politics, there is one point in regard to this matter of workshop union of design and handicraft where you, Sirs, will certainly agree with me, and that is that Home Rule is better than Coercion.

Fallacy No. 5.—That somehow a vernacular style will spring, Phoenix-like, from the ashes of our present topsy-turviness. There is nothing in history that warrants the opinion. It requires an inconceivable miracle to make licence into law. It took a God to bring order out of chaos.

Fallacy No. 6.—That adequate working designs can be expressed on paper. Possibly so, yet to me the incidental in old art is its chief charm. To fasten an able craftsman down to strict adherence to some feeble effusion from an architect's office is to degrade the man. Fancy the Heckington Sepulchre, or the Antwerp Well, or the Hampton Court gates, being evolved out of paper designs and working drawings!

Now, at the bottom of all these fallacies is the one great cause of the lost relations of architecture and the handicrafts. We are hindered by the lessons of history, of old art, no less than by our common sense, and the convictions of our own hearts, to return with all the speed we may to the old fraternal relations of designer and craftsman. The rift in the lute has been too long active to be mended all at once, yet there are obvious ways in which remedies may be tried, and the music of English art regain its sweetness. For architects to cultivate, each one for himself, at least some one branch of the handicrafts, that is one way. To make ourselves and our pupils familiar with the insides of workshops; possibly to turn architect-holders "ourselves, or to ally ourselves with trusty builders whose staffs of workmen shall get to know our types and methods,—these and many other ways may suggest themselves to you. Granted that the desire is present in our minds, that the Brotherhood of Art is a flesh-and-blood reality to us,—granted that the claims of the Esau and Ishmaels, whom we have driven into the wilderness, are before us,—"Love will find out the way," as the old song says, to help him.

But let my last words upon the relations of architectural designer and craftsman be the golden words of the great Master Himself,—

"He that is greatest among you, let him be as the younger: and he that is chief as he that doth serve."

In the discussion which followed, Mr. Brett (the landscape painter), Professor Kerr, Mr. E. C. Robins, Mr. Walter Craze, Mr. William White, F.S.A., and the Chairman took part. A report of this discussion will be found in another portion of this week's *Builder*.

At Wednesday afternoon's meeting, Mr. Arthur Cates, who occupied the chair, prefaced the reading of the paper on "Education" by a few remarks. He said that the subject to be considered at that meeting was the most important allotted for the consideration of the Conference. The burning questions of "Federation" and "Registration," which were

to be considered at succeeding meetings, were less important to the well-being and prosperity of the profession than this vital one of education, which must largely influence any decision upon either of the others. At former Conferences and ordinary meetings in various places this subject of education had in various phases been fully discussed. The systems adopted in Continental universities and fine-art academies had been fully explained, but little progress had been made towards establishing any systematic course of education which would provide a sound and extensive foundation on which the young architect might build up that superstructure of professional knowledge necessary for the successful practice of his art. The obligatory Examination established by the Institute had done much to point out to the student the extent of the knowledge which should be acquired; and the course of study required to be gone through by the candidate to enable him to pass had been highly beneficial in its results. And when, in future years, the standard could be raised, be anticipated from such obligatory Examination, the happiest results in advancing the status of the profession. The chief difficulty with reference to the present Examination arose from deficiency of preliminary education, a want of training in mathematical and geometrical accuracy, and generally an absence of precision and exact knowledge in those technical subjects a thorough acquaintance with which lay at the root of an architect's success. But here they had no exact course of study which could be followed by the student as a certain guide for his education. There was a very large amount of educational opportunity available in London and in various centres throughout the country, but as yet there had been no uniform action, no combination of power and opportunity, nor had any definite guidance been as yet offered to the student who, either unaware of the opportunities within his reach, or bewildered by their number and want of organisation, was too often content to limit himself to office work, or, if the artistic spirit was strong within him, to devote all his energies to brilliant sketching and design before he had mastered even the rudiments of either of the scientific or artistic branches of the profession. A committee of the Institute had been for some time engaged in the consideration of this special matter, and would, he hoped, succeed in producing a students' text-book, which would bring all this scattered information into one hand-book properly arranged for the guidance of the student; but on the other side of the Atlantic a great advance had been made in this direction. In No. 9 of the "Journal of Proceedings," for February 17 last, there was an interesting notice of Mr. Richard M. Roe setting out recent particulars respecting the course of a Diploma in Architecture in France. Mr. Arthur Hill, of Cork, from whom they would have a valuable communication that afternoon, supplied detailed information respecting the curriculum of education for architects at the Massachusetts Institute of Technology at Boston and at the Columbia College, New York. Mr. W. H. White had supplied similar information respecting the course leading to the degree of Bachelor of Science in Architecture at the Cornell University, Ithaca, New York. This information deserved careful study, and had, he hoped, received attention from most of those present. With reference to the curriculum at the Cornell University, they had the advantage and honour of the presence at the Conference of Professor Babcock, by whom that curriculum was arranged. That gentleman, in order to aid and assist the consideration of the subject, had not only kindly undertaken to prepare a paper, but had hastened his departure from New York by some days in order to be present at the Conference, and personally favour them with his advice,—an act inspired by generous feeling for which their warmest thanks were due to the learned Professor (applause). The papers to be read that afternoon would necessarily be short and closely confined to the subject treated, in order that ample time might be allowed for discussion. The papers might be divided broadly into two groups, one dealing with the curriculum which should be followed in the education of an architect, and the means by which such curriculum might be established; and the other with the not less important question of the position which the Institute should take in reference to education;

and the results that influence must have in aiding that knitting together of the scattered members of the profession, and in helping Architecture to take its place in public estimation as a recognised profession, like Law or Medicine. The result of that afternoon's discussion would, he hoped, be to materially advance both objects, and he trusted that they would not separate without taking some steps towards their realisation.

Professor Babcock (Cornell University, U.S.A.) then read the following paper:—

#### A COURSE OF INSTRUCTION IN ARCHITECTURE.

MAY I not assume, in the presence of the educated gentlemen whom I have the honour to address, that the question of the *desirability* of educating young men specially for the profession of architecture, is one that needs no discussion? May I not take it for granted that a technical education is necessary in order that architects may keep up with the times? They must have a knowledge of art, of science, and of certain mechanical and trade work. How can that knowledge best be acquired? Will the young man get it most readily and thoroughly in an office, through the casual and hurried hints of his employer and the directions given by the chief draughtsman, supplemented by such reading as he can find time for? Or in a proper school, under skilled teachers, whose sole business it is to instruct?

I will not waste your time by arguing in favour of technical schools of architecture, and I can say nothing against them. Across the Channel there seems to be no doubt as to their utility; and in the United States, whence I am summoned to address you, there are at least three flourishing schools, parts of large colleges, each with a curriculum extending over four years, and attended, altogether, by about 150 students. Your invitation to read a paper here on the subject of architectural education came to me so recently that I had no time, before preparing it, to learn whether it would be most agreeable to you that I should state the *raison d'être*, or the *modus operandi*, or the practical results, of special training, in special schools, for our particular profession, or consider the possibility of teaching our art at all in such a way as to make it worth while for the student to spend the time and money required for a systematic study of it. I could readily fill up the time allotted to me with my views on any one of these points.

I think, however, that I can most profitably discuss that part of the whole matter, which I have had occasion to work out in detail, viz., the subjects of instruction that ought to be included in "A Course in Architecture," and the extent to which each one should be pursued. The courses now prescribed in the American colleges referred to have been printed in your "Journal of Proceedings," so that you have the opportunity of examining their arrangement and details, and of comparing them with one another. I will not take any one of them as a model, but rather state what seem to me the important things to be included in any such curriculum, and the best way of treating them.

The object of a course in architecture should be, if I may quote from the register of the institution in which I am employed, "not merely," it might perhaps better be "not chiefly," "to develop the artistic powers of the student, but to lay that foundation of knowledge without which there can be no true art." Architecture is a fine art, based upon a mechanical art. Before the architect can become a true artist he must be master of the art of building. He need not be, ordinarily he cannot be, a mason or a carpenter, or a stone-cutter. But he must know how to design good masonry and good carpentry, and be able to pass judgment upon completed work.

He must also, to meet the demands of the present time, which in the main are just, be a man of science; that is, he must know the scientific principles of buildings, the laws of mechanics to which structures are amenable, and the application of those laws in designing architectural structures. Then there are certain trades whose work is commonly essential to the comfort or protection of buildings, and which he must therefore condescend to recognise, such as painting and plumbing. The latter, if one may judge from the prominence given to it in architectural journals, is of immense importance. There was a period, just

ended, when, on both sides of the Atlantic, it might have been inferred, from the leading articles in some of those papers whose special function it is to disseminate a knowledge of architecture and the allied arts, that the one thing that the student should acquire, and the aged practitioner, too, if his early education was neglected, is a knowledge of traps, their nature in general, their particular forms, their uses, the materials of which they are composed, the mysteries of their operation, the derangements to which they are liable, and the dangers that lurk unseen in their hidden depths. When these and some other matters are disposed of, the architect may turn his attention to designing, which is his particular art.

Let me state the proper subjects of study under the following heads:—

Building, Mathematics, Mechanics, general Sciences, History of Styles, Drawing and Designing, and Language.

How much of each of these is it necessary for a thoroughly-equipped architect to know? How much knowledge of each can be communicated in a school? Your programme calls for short papers, and I shall give you only an abstract of the longer document that I would have been glad to offer.

1. As to Building.—It is evidently impracticable, for want of time, to put the student through a course of practice in masonry, carpentry, and the like. We cannot train him in the manual of the shovel, the hod, and the hoe, nor oblige him to dress stone and lay it by line, level, and plumb, each piece on its natural bed and all properly hounded; we cannot make him an expert in the use of planes, saws, chisels, and such like. It would do him no special good if we could. It is not necessary that a man should be able to do certain work in order to gain a knowledge of it and be a judge of it, as all critics will maintain; nor will the ability to make a door be of any particular use in enabling a student to design a door. He can learn how a door is made by seeing somebody else make it, or from instruction in a class-room. By the use of his eyes and his ears he can learn all that he need know of the processes of building. Shop practice, in my judgment, is time thrown away, unless it be taken as physical exercise. The object of a course in architecture is not to make skilled mechanics. As to plumbing, steam-heating, electric lighting, &c., things which do not materially affect the planning of the building, nor in any way the character of the design, there are certain general principles of arrangement and operation that can be systematically taught, and a multiplicity of details that can be learned only by examination of apparatus and inspection of work in progress. Here, as in the case of masonry and carpentry, lectures and text-books are to be supplemented, illustrated, enforced, by visits to buildings in which the mechanics can be seen at their work. When once the student has learned how any particular kind of work ought to be done, he is capable of specifying it, and of deciding whether it is good, bad, or indifferent. The instruction in these subjects comes under the heads of Construction and Specifications, which should go together, and be begun early in the course. Fortunately, there are several excellent text-books on these subjects.

2. Mathematics and Mechanics may be spoken of together, as the required amount of the former will depend upon the use to be made of it in the latter. The Mechanics of Architecture, properly presented, is not an intricate or difficult subject. It is simply the statics of rigid bodies. Dynamics, phonomics, kinematics, hydrostatics, may all be omitted. They are necessary to the engineer, but not to the architect. Under "Strength of Materials" the laws of tension, shearing, compression, and transverse strain must be explained; but they may be expressed in formulae which involve no other mathematics than arithmetic and algebra, and the application of these to ties, struts, beams, and piers is very easy. For analytical investigation, however, geometry, trigonometry, analytical geometry, and the calculus, will be necessary. But if the student may be allowed to content himself with the results of other men's labours, if he does not care to rank as a man of science and find out how the results were obtained, he may very properly dispense with analytics and calculus.

As a matter of fact, when he gets into the practice of his profession, he will never see them. If he wants a rolled iron I hear to

carry a given load, he will not proceed to design one with scientifically proportioned flanges and web. He will take a manufacturer's table and pick out one that will answer his purpose. The maker guarantees the strength of the beam; and the architect troubles himself no more about it. If he designed it according to the accepted formulae, he would use a factor of safety, which one of our engineers has happily named "a factor of ignorance." It is best, of course, that a student should understand the theories of things, but it is not necessary. And furthermore, owing to the lack of homogeneity in the materials we use, the factor in the formula which is derived from experiment on small pieces of comparatively perfect stuff, may be entirely unreliable in the case of large pieces. For example, we have recently learned, on our side of the water, that the average strength of wooden beams taken from the lumber-yards is very much less than the commonly-accepted formulae would allow.

In the determination of the strains in beams and trusses, and of the line of pressure in piers and arches, the graphical method has, for practical purposes, superseded the analytical, and it is so simple that any one may use it and he made to understand the principles on which it is based.

3rd. As to general sciences.—Physics must, of course, be the beginning of any studies in science. The other necessary branches are Chemistry, Botany, Geology, and Mineralogy, the uses of which, in a course of Architecture, are too obvious to require explanation.

4th. History.—An architect, like any other professional man, ought to know what has been done by those who have preceded him. This knowledge he will get by the study of architecture in the historical order. The field is a vast one, and it takes a long time to traverse it thoroughly. But there are many books on the subject. Why not, then, let the student gain his knowledge by reading, rather than by instruction given in a school? Why is a teacher necessary?

My answer to these questions is that the book which will give full, correct, well-arranged information on the subject is yet to be written. The popular histories are usually either limited or superficial. Fergusson's, which contains a very valuable collection of examples, is imperfect, badly arranged, unsatisfactory in the treatment of important details, and padded with his theories and criticisms. What the student wants is a clear, complete, well-illustrated statement of architectural facts. Theories are interesting, but at this stage of his education they will do him little good. Criticisms will tend to bias his judgment, and prevent the free exercise of his taste when he is more mature. He wants to know what the Egyptians, and the Greeks, and the Romans, and all other people have built, when, why, and in what manner. He should make himself acquainted with the constructive devices employed, and their application to various classes of building. All is plain enough in the books generally so far as the Classical period is concerned; but when the student comes to Byzantine and Romanesque, he needs a guide, and a much better informed one than has yet written a book. The earlier authors will probably tell him that those styles are mere degraded Roman, and not worth his attention. The later ones will admit that they are interesting as phases of art, but that there is little to be learned from them,—at least, for any purposes of modern use. Mr. Fergusson, so far as he understands them, does them justice. But no writer seems yet to have discovered the fact that the time included between the years 400 and 1200 is the great period of architectural invention. We are taught to regard the Gothic architects as the most inventive. But what is there, among features that may be called constructive, which appears for the first time in Gothic? Really, scarcely anything but tracery. Buttresses, both common and flying, rib vaulting, pointed arches, compound piers,—all were in use long before there was any Gothic architecture.

As to the proper historical status and logical position of Romanesque, your Oxford professor of history, Dr. Freeman, has pointed out the fact that it, and not Roman, is the true representative of the arcuated system. Roman is really a transition from Greek to Romanesque; and I do not hesitate to say that I regard the Romanesque period as the one upon which the student should receive the most careful

instruction. But when he looks into his books he finds them lacking in the very points that he wants to know about. The use of the compound vault in Roman architecture was limited to two or three forms.

The Romanesque builders employed many more. What were they? Is there to be found in any history any approximation to a complete statement of the varieties, their geometrical development, their geographical distribution? The Byzantine architects (Pergusson says the Roman, but neither he nor any one else has proved it) devised a pendentive for making the transition from the corner of a square to a quadrant of a circle so that a dome might be made to cover a square space. The Western architects modified this so that it might be carried on pointed arches. They also invented numerous other forms for getting from the corner to a straight line above, so that an octagonal vault might cover a square room, or an octagonal spire be placed on a square tower. Now, let the student turn to the histories and see what he can learn about pendentives. He will find that the information is very scanty. There are a few examples, but no one has gathered them together and classified them. Many forms are evidently unknown to the writers. Allow me to develop the forms of pendentives descriptively. It will not take long. The subject is almost entirely, as to form, a matter of geometry. Take first the preparation for an octagonal vault. A heavy stone slab may be laid across the corner of the scale of the building is not too large, and the job is done. Or a series of advancing corbel tables may be used on any scale. If the corners of the corbel courses be cut away to form a continuous plane surface, the pendentive may be regarded as an inverted triangular pyramid.

If the surface of this be curved on an arc of a circle vertically, a cylindrical surface is produced; if horizontally, a conical; if both ways, a spherical or spheroidal. There are also irregular forms, such as a transition from a cone to a half-dome. The same end may be attained by throwing arches across the corner, your familiar English squinch. To get to the quadrant of a circle a firm is first employed whose surface is that of a sphere whose diameter is the diagonal of the square to be covered, or something more. This is adapted for being carried by walls or by segmental or semicircular arches. By means of it a dome may be used to cover a polygonal space of any number of sides. When a spherical pendentive is to be supported by pointed arches there is a geometrical difficulty. The surface, if accurate, would be composed of two spherical surfaces intersecting at an obtuse angle, and the line of intersection would have a reflex curvature at the top, as Sir Gilbert Scott has stated. But neither the angle nor the reflex curve has ever, so far as I am aware, been found. Sir Gilbert suggests, if I remember rightly, that it was obliterated by rule of thumb. In France, however, the problem was geometrically solved simply by taking the pendentive surface from a convex, conoid, or pointed dome instead of from a sphere. The above is an instance of what may be done by an instructor to aid a student in getting a clear, systematic, comprehensive knowledge of an important constructive device, which the books fail to explain.

The history of architecture should unquestionably be a leading feature in the instruction provided for in the course, and should be taught, in my judgment, not from any text-book, but by means of lectures carefully prepared so as to cover all necessary points and eliminate what is superfluous and irrelevant. These will be illustrated by photographs, drawings, lantern slides, and coloured prints, and for the detail of structural forms, which I regard as all-important, by models. Unfortunately such models are not to be found. The Five Orders, ornamental work in relief, and such like, are abundant; but models of domes, of vaulting (excepting the simpler forms), of pendentives, of the methods of making or covering the transition from the corner of a tower to the side of an octagonal spire, of corbelling from the side of an octagon to the corner of a square above, of the varieties of cusps, and of many other things, are not to be purchased. I have a collection of two hundred and more, most of which have been made by myself or under my direction. They are invaluable, as a model is usually worth any number of drawings for purposes of illustration.

5th.—Drawing and Designing.—Drawing, both instrumental and freehand, being the architect's means of expressing himself, should be taught with great care. Accuracy and clearness are the points to be insisted on. Every line in a drawing should mean something, and its meaning should be plain. Descriptive geometry, the science of drawing, is of the utmost importance, and the student must be thoroughly drilled in it, as he will have to apply it in stereotomy, in perspective, and in finding the limiting lines of shades and shadows. It is not necessary to make every student a line draughtsman; but it is necessary that he should be able to draw with unflinching precision. Rapidity is desirable, but may be regarded as merely an accomplishment, though it has a commercial value. As to the higher art of painting in water colours, while the class ought to have some instruction in it, few will take to it readily, or become experts. I would include it in a course, but not always require it. There are many, who will become good architects, that will never learn to make a passably good coloured perspective. In fact, according to my observation, the best draughtsmen do not make the best designers. One who is intent upon expressing an idea will not stop to refine his means of expression.

As to designing, there are those who question whether it is possible to teach it. It is often considered as one of the things the power to excel in which is a special gift, the prerogative of genius. Doubtless there are men who will become good designers without training in a school; and there are some whom no amount of training will make skilful; but the average student can be taught the elements of the art in such a way as to develop his latent power. I have been astonished at the progress made by some of the bright young fellows under my charge.

As to languages, it is not practicable to require more than a year of French and a year of German, or two years of one. It would be better, I think, that the student should have Greek and Latin, which furnish most of the terminology of architecture, than any modern languages, but they are ruled out of the "new education" for scientific and practical ends. If taught in a Course in Architecture a considerable advance in them should be required as a condition of entrance. As to a choice between French and German, I incline decidedly to the former, if for no other reason than that it will enable the student to consult the best work on architecture ever written, Viollet-le-Duc's "Dictionnaire Raisonné." Until that is translated into our tongue, no English or American architect who aspires to any approximation to a full outfit for his profession can afford to dispense with the knowledge of French.

A few words in regard to the practical results of the efforts which our schools are making to teach architecture. Students who graduate from the four years' course are enabled at once to get employment. Their acquirements in drawing, designing, and mathematics make them particularly useful to their employers, and they commonly get rapid promotion. Whatever can be learned in an office they are peculiarly well qualified to profit by. Their habits of study lead them to investigate anything that on first presentation may not be quite clear. Their education has given them a power of absorption and assimilation by which they take in and digest knowledge from every available source. They soon learn the business methods of an office, and after two or three years of service may safely venture upon the practice of the profession.

Mr. E. C. Robins, F.S.A., next read the following paper

#### ON THE TECHNICAL EDUCATION OF STUDENTS OF ARCHITECTURE.

THE Examination of Architects has long been an established fact. Its first start was in the form of voluntary examination. The present Examination is compulsory for all who aspire to be associated with the Royal Institute of British Architects.

The Education of Architects is by no means an established fact, it is but an inference. It is taken for granted that architects are educated men, and that the Examination was all that was needed to show their title to the diploma, which it was contended was necessary to give to the

public the confidence they required, and to the architect the distinction he deserved.

But if the Examination has served any good purpose, it has certainly been the means of opening our eyes to the necessity for more education, both general and technical.

The admirable circular letter of the President has appropriately followed the remarks contained in his opening address to the Institute, wherein he urged the importance of making articles of apprenticeship something more than a formal introduction to the profession.

And I congratulate the Institute upon the fact that the Amended Charter has removed the *non possumus* which stood in the way of beneficent action in the direction of architectural education.

The Royal Institute of British Architects is now empowered to appropriate any available funds for the furtherance of professional education, and can not only bestow the laurel wreath, but may nurture the growth of the candidates' ambitions of its honours, without infringing its chartered rights. In these circumstances it has seemed to some of us a proper time to consider seriously in what way architectural education may best be promoted.

The fiftieth year of the reign of her Majesty will be celebrated in many ways, and by architects it will be remembered as the year upon which their chartered liberties were confirmed and enlarged,—may it also record the recognition of the necessity for extending architectural knowledge, and the establishment of an organisation by which young men intended for the architectural profession may be thoroughly fitted for the position in life they contemplate, in so far as a preliminary training may contribute to that end.

Entrance to the Church, the Army, the Law, and Medicine is guarded by special courses of instruction, through which candidates for admission must pass before presenting themselves for examination; and if any value is to be attached to the Institute examinations they must also be preceded by preparatory studies of a technical character. The nature of these studies is indicated by the pamphlet circulated by the Institute, but no special curriculum has yet been formulated.

The general spread of technical education among the masses is beginning to make itself felt, and if the pre-eminence of the architect in all building operations is to be maintained, he also must be technically educated; therefore evidence of preparatory technical acquirements must be superadded.

Specialists of all kinds are rising up around us, and are perpetually narrowing the range of an architect's sphere of action. To maintain his position as chief constructor he must become the capable master and not the slave of specialists.

Some few years ago, at the request of the Council, I drew the attention of the Institute to the supplanting work of the specialists in sanitary construction, who were rapidly undermining the influence of the architect, by proving his incompetence to build a healthy residence. The result of that paper on "The Relation of Sanitary Science to Civil Architecture" has been to awaken architects out of their sleep in this particular, so that now it is as rare to find an architect neglecting the drainage and water supply of his buildings as it was common before.

Subsequently also, at the request of the Council, I have given to the Institute the results of my enquiries into the construction and fitting of applied science buildings, a subject to which my attention had been drawn through my early association with the Executive Committee of the City and Guilds of London Institute for the Advancement of Technical Education.

My travels at home and abroad in following out this subject have made me acquainted with the extraordinary advances now being made to raise the technical aptitude of modern students all over the world. Even at home, at the two extremes of the social scale, the elementary workmen's trade schools and the University of Cambridge and Oxford are making ready for the applied science teaching demanded, and middle-class colleges are growing in number and completeness every day, whose curriculum of education are exclusively technical. Professional men associated with the arts,—like engineers and architects,—can no longer be satisfied with purely academic knowledge.

an age of laboratory instruction in the applied sciences.

The Polytechnicum has never been an English institution, but its correlative, the Technical College, is every day growing in importance and influence, as it is seen and felt that the continued scientific and commercial supremacy of the nation depends upon its appreciation and extension.

The chance knowledge picked up by a pupil in an architect's office brought there straight from an ordinary middle-class school, innocent of either art or science, with everything to learn and nobody to teach him, is not the sort of person calculated to do honour to the Institute, though he may have just squeezed through and obtained a pass entitling him to become an Associate of the Institute.

The standard of the Institute Examination will certainly have to be raised in the near future, but it must be gradually done, and that in connexion with some well-organised scheme for imparting to architects the special knowledge they are admitted to require as professional men and practising architects seeking the Institute diploma.

We are all well aware that an architect must be an artist as well as a scientific man. It is his artistic abilities which distinguish him from the civil engineer. Nevertheless, if he too exclusively devotes himself to art in his early life, he will soon get a distaste for the scientific side of his profession. It is better that a youth intended for an architect should take courses in the sciences underlying his proposed occupation for a year or two before he goes as a pupil into an architect's office for three or five years, as the case may be, his cultivation of the fine arts being rather a relaxation from his severer and more exact studies. There is no fear of losing the artistic fervour, if it ever existed; nothing to hinder the use of the sketch-book at odd times and holidays, and, if he fails to do so, no better evidence could be given that his time would be better spent in finding out in what else his genius lies. There is a wide field of usefulness for an architect of good understanding and strong common sense, even if he be not artistic. And it does not fall to the lot of every architect to pick and choose the business he likes best.

As Mr. Conder wrote to me, just before he returned to Japan, "I am strongly for the more technical education of architects; in the present age, the antiquarian and 'exclusively artistic' side of the profession can only be of much value to a very select few, or to moneyed men who take up architecture as a pastime."

The object of this paper is tentative, not empirical; dogmatically to insist on any particular course of action is quite out of place in the present position of the subject. I simply propose to make a few practical suggestions, with the view of provoking discussion, and thus to lead to the careful consideration of the question and ultimate solution of the problem. To this end let us consider

1. The preparation of a syllabus of studies.
2. The organisation of a system for imparting a knowledge of the same.
3. The revision of the rules by which the Obligatory Examination shall be conducted on the completion of the foregoing arrangements.

Preparatory to addressing myself to each of these topics, it is necessary to have a pretty clear idea of what we want to do and how it is to be done.

1. Negatively speaking, we are not ambitious to increase the number of architects, but rather to improve the quality of future members of the Royal Institute of British Architects.

2. While we should welcome natural talent and self-taught powers wherever their merits entitle them to distinction, we are not thinking of lowering the tone and standing of an honourable profession, but are distinctly desirous of raising it, so that the titles "an architect and a gentleman" shall be convertible terms.

3. While we are not satisfied with the old system of apprenticeship, and think it is not now sufficient for the needs of the profession, we are not proposing to do away with apprenticeship, but, on the contrary, to render it more effective.

4. Without revolutionising the present system, we propose to build up gradually, but firmly, a more complete system, on the old lines, but in the new manner required by the circumstances and exigencies of the present environment.

Speaking affirmatively, I have already asserted that technical education is as neces-

sary to the architectural student as to the artisan over whom he is destined to rule as a future practitioner. This point has been very clearly and tersely put by Professor Ayrton in the following paragraph:—

"Not only by means of technical education is the practical man trained to use his brain when he uses his hands, but what is quite as important for the country's welfare, the scholar, by receiving technical education, learns to use his hands when using his brains. Technical education, then, is not only the means by which scientific knowledge may be acquired by the manufacturing classes, but it also puts the scholar on a par with the country's needs, and shows him what are the battles waiting to be won, with his all-powerful mathematical and scientific weapons."

The obvious result of technically educating the masses is this, that more exact knowledge of the applied sciences will be expected and required of architects throughout the land. Fortunately for us, the means of education are widening every day, and honest workers will not fail to take advantage of their privileges. For example, the City and Guilds of London Institute for the Advancement of Technical Education have founded three important metropolitan institutions:—1. The Kennington Applied Art Schools, in the South, where life classes for drawing and painting, modelling and sculpture, are carried on under many advantages. 2. The Finsbury Technical College and School of Applied Science and Art, in the East. The life classes and decoration courses are conducted by Mr. Brophy. Both these institutions are crowded with evening students, in addition to the day classes. 3. The Central Institution in Exhibition-road, South Kensington, which has no evening classes, but it is situated in the near neighbourhood of the Natural History Museum and the National Collection of Art Treasures.

The sciences of Mechanics, Physics, Chemistry, and Mathematics are already in full swing, and a chair of Architecture is in contemplation.

The professors of these institutions are ready and willing to second the efforts of the Royal Institute of British Architects by arranging special courses of study for architectural students should they ever be required. But it will first be necessary that the Royal Institute should know its own mind, and tabulate the educational provision it thinks desirable for would-be candidates for its honours; in short, we are thus brought face to face with my first proposition.

I.—The Preparation of a Syllabus of Studies. The first question which arises here is the length and duration of the classes. Shall we go in for day as well as evening classes? If the former, shall they embrace both science and art, and extend to a three or four years' course as in American and Continental technical colleges? Or shall we be content with one year's devotion to science, almost exclusively, before entering an architect's office as a pupil, and one day a week during the pupillage for the continuation of day studies in science and in art? (Of course, no earnest worker would fail to join evening classes and lectures, of which there is every variety.) I am inclined to think that the latter course would be all that could be attempted with success at the present stage of the movement, especially since we wish to retain the pupillage system.

Even so small a variation as this from prevailing custom would need an authoritative recommendation to be published by the Royal Institute of British Architects (similar to its papers regulating fees and competitions) addressed to parents and guardians, and the profession generally, informing them that in the opinion of the Royal Institute of British Architects the following is the legitimate mode by which entrance shall be made into the profession, after due notice and from a certain fixed date, viz.:—

"On the completion of the usual general education, youths intending to enter the profession of architecture shall have sufficiently prepared themselves to pass a preliminary examination, entitling them to the privilege of joining the first year's classes for science and art provided at the Central Institution or other accredited technical college in London or the provinces.

On the completion of this one year's course of three terms, the youths to be articled to an architect for three or five years as the circumstances of the case may dictate, during which time the architect is to allow his pupil to be absent for one day in each week, or fifty-two days in the year, for the purpose of attending day classes for continued instruction in literature, science, and art as a fine art. He is also to interest himself in the evening studies of his

pupils, taking care that they are fully informed of the various classes available; the duty of the architect, as a rule, being confined to teaching the practice of the profession, unless he has a special aptitude for teaching generally.

One or more years after the completion of his articles the pupil may become a candidate for examination by the Board of Examiners of the Royal Institute of British Architects, upon the presentation of sufficient preparatory work and other credentials to satisfy the examiners that he is a fit and proper person to be examined. And if he passes creditably, he may become an Associate of the Royal Institute of British Architects, if elected in the usual manner. But no person shall present himself for examination who has not been a *bonâ fide* student of architecture, literary, scientific, and artistic, for at least five years."

Proceeding on some such lines as these, the syllabus of studies applicable for the first year prior to the introduction to an architect's office will have to be considered in the first instance. And it must not be supposed necessary or desirable to know only a little of everything in that first year, but rather to know thoroughly some few subjects, which, well grasped, will be of life-long value to the student.

The Journal of the Proceedings of the Institute (Nos. 8 and 9) contains full descriptions of three modern American technical colleges,—the Cornell University, at Ithaca, New York, described by Mr. W. H. White; the Columbia College, New York, and the Massachusetts Institute of Technology, both described by Mr. Arthur Hill.

They together represent an Americanised version of the Continental curriculum for the education of civil architects before passing a sufficient examination to entitle them to practise as architects.

And, like its foreign prototypes, this curriculum, when completed, in four years' time, takes the place of the usual term of apprenticeship; the student then entering an architect's office as an improver till he has picked up the business part of the profession with more or less readiness.

In these American institutions the course for architects in the first year is the same as that of other students, with the exception that architects and engineers are specially required to practise geometrical and freehand drawing. I propose to adopt a similar course, and by tabulating their first year's requirements the following is the resulting syllabus:—

**Mathematics.**—Geometry, plane and solid, descriptive and analytical, conic sections, trigonometry, mensuration, and algebra.

**Art.**—The history of the architecture of all ages and countries, freehand and linear drawing, projection and tinting, mechanical drawing, and the elements of perspective.

**Physics.**—Experimental mechanics, heat, optics, electricity, acoustics, laboratory practice in all.

**Chemistry.**—The chemistry of physics, materials, elementary chemistry, and laboratory practice; hygiene.

**Language.**—Either French or German, or both.

The above are together comprised in the first year's course of the American colleges, but they separately differ.

The value of this first year's course, which is necessarily an elementary one to be afterwards developed, is chiefly its preparative character,—its introduction to scientific accuracy and method, its alternate theoretical training and laboratory practice, its general sharpening of the wits and storing of the mind with scientific facts and formulae.

The ordinary education of middle-class schools is presumably sufficient to enable a youth of seventeen to pass the preliminary examination entitling him to pursue the above studies at an applied science college.

During the period of his articles, the student will make use of his evenings and of the fifty-two days in the year which his master will allow him to be absent from the office to acquire the further information which is given at the American colleges during the last three of the four years' course.

Both the Cornell University and the Massachusetts Institute provide a special course of Architecture, extending over two years only, and it may be sufficient to tabulate the subjects included therein as a guide to what is expected to be done during pupillage in addition to the continuation of the first year's applied science course already given in the syllabus for the year prior to entering an office, thus:—

**Primarily.**—Architectural history generally; Egyptian, Greek, and Roman architecture;

Romanesque architecture; Gothic architecture; building materials and construction; mechanics and graphical statics; mechanical and free-hand drawing; projections, shades, shadows, and perspective; sketching and water-colouring; and principles of design.

*Secondarily.*—Renaissance architecture; modern architecture; ornament and decoration; construction and planning; working drawings and framing; specifications and contracts; original designing and drawing; schools, churches, and theatres, &c.; ventilation and heating; surveying and geology and mechanics; and acoustics, chemistry, and mathematics.

More or less acquaintanceship with the subjects enumerated in addition to the professional practice acquired in the routine of a general practitioner should enable a young man to pass a highly creditable examination entitling him to the *Aspirant* prize.

II.—I have now arrived at the second division, viz., the organisation of a system for imparting a knowledge of the subjects contained in the foregoing curriculum.

I am of opinion that the first year's course can only be efficiently taught at one or other of the technical schools or colleges, metropolitan or provincial, and I have satisfied myself that as soon as the demand is created so soon will the supply arise. I have found that the disposition of professors generally is to strive to meet the expectations of the public and to organise courses of education suitable to forthcoming students. At all events, I can answer for the professors attached to the metropolitan technical colleges.

As to the day courses for pupils in offices, here again the want will create its means of satisfaction. And it is not altogether visionary to suppose that the Institute itself might organise a system of teachers and lecturers for architects' pupils.

As regards the evening classes, no difficulty at all can arise. Besides the courses at the Academy, the University and King's Colleges, and technical schools and colleges, there are the Architectural Association and other federated societies; in short, it will not be want of means but want of will and energy to use them that will be lacking wherever failure occurs. Therefore I may at once proceed to the third and last division of my subject, viz.,—

III.—The Revision of the Rules by which the Obligatory Examination shall be conducted.

Probably this last head is one which may be more appropriately discussed at the Board of Examiners than at the present gathering, and all I care to say upon it is this,—that the proportion of marks which shall be sufficient to entitle a student to pass must always be regulated by the means of education provided to enable him to reach the required standard. That standard also must be adjustable to the general growth of intelligence, until the organisation is complete; not only for examinations, but for teaching the knowledge required to creditably pass them, very little variation upon our present system would be possible.

But too much stress cannot be laid upon the great importance of starting fair with a year's scientific training before entering the office of an architect, to be followed up thereafter by day and evening classes, as artistic as may be.

Enthusiasm for work and for art will take away the drudgery. Armstead, the great sculptor, supported himself by designing silversmiths' work for fourteen years before he took to sculpture as a profession. He worked from nine to five for his livelihood, attended life classes from seven to nine, and then went to play at home work, and study till twelve or one, and this he kept up for several years. Verily, genius is but another name for enthusiastic work and study.

Mr. Arthur Hill, B.E., of Cork, next read the following paper:—

#### COLLEGE TRAINING FOR ARCHITECTS.

In all professions special training of some kind is an acknowledged necessity. The old-fashioned system of apprenticeship, whatever advantages it possessed, is now as much out of date for professions as it is for trades.

If any one desired to make his son a doctor, would he bind him apprentice to the old family physician; to trace prescriptions; to read such medical books as might come in his way indis-

criminate; and occasionally, perhaps, to have the benefit of a little carriage exercise in his master's brougham? Would this process be likely to produce the highly-trained body of scientific men who, as physicians and surgeons, are now to be found in every corner of the kingdom? Would he not rather send his son to some recognised school of medicine, where he would learn the theory of his profession before coming in contact with its practice from men who had already made a study of the art of teaching; and where every aid to learning that could be devised was at the student's command? It is the same with many other professions. The public know very well that preliminary college training for them is simply essential, and institutions are to be found everywhere ready to take a student and teach him exactly what he needs. With architecture it is quite different. People fancy that the routine of an office and the payment of a fee will supply all the education that is needed from the time a boy leaves school until he is expected to be able to swim for himself. And even if any one thinks otherwise, where will he find the professional training he requires? Outside London it is not to be had anywhere in a complete form, and even in London itself teaching must be sought for in three or four different places, wholly unconnected and without system. In any case, the student is left pretty much to direct the course of his own studies according to his own fancy.

There is no reason why architecture should not stand on the same platform as Medicine and other professions, and be included in the curriculum of the several universities of the kingdom, one direct effect of which would be that it would give architecture as a learned profession,—a status the public would not be slow to acknowledge. Arrangements could easily be made, at least in those colleges where schools of engineering already exist, which would enable young architects and young engineers to pursue their studies side by side,—an association which would be of manifest benefit to both.

The problem has been already solved in America. In several colleges in that country Departments of Architecture are to be found. In Columbia College, New York, which I may take as an example, there are seven parallel courses, all leading to a degree, viz., 1, Mining; 2, Civil Engineering; 3, Metallurgy; 4, Geology; 5, Chemistry; 6, Architecture; 7, Sanitary Engineering. The first year's course, which is the same for the students of all the different departments, embraces mathematics, some of the physical sciences, and drawing. The second year's begins to take a special professional direction, introducing the history of architecture into a course which is mainly an extension of the former. In the third year, the higher mechanics, strength of materials, and other scientific studies are linked with architectural design, decoration, and drawing; while in the fourth year the student's time is more devoted to art and professional work, and science is only treated in its application to technical subjects.

In England we are quite as well able to provide a system of professional college training as they are in America; and the facility we enjoy of being able to study ancient monuments without crossing the Atlantic Ocean is at least one important point in our favour.

In Liverpool, a most admirable School of Civil and Mechanical Engineering has recently been established. There is a similar school in Bristol. Owens College, Manchester, is well known; and in other towns besides London technical schools are springing up, mostly due to private munificence, such as the Mason Institute, where scientific training is to be had, but where,—unfortunately for scientific men, as well as for others,—science is taught without the smallest shade of art in the prevailing atmosphere.

Now every one of these Institutions, as well as the Irish and Scotch Universities, could be utilised for the purpose, and Cambridge, with its magnificent School of Archaeology and its Slade Professorship, and the recently-established School of Applied Mechanics, might also aid in the movement.

At Bristol an effort has already been made to associate architecture with engineering in one department. How far it has been successful I am unable to say, but an isolated and tentative effort of this kind, without general professional connexion, cannot hope to effect the title of

what a united effort would, with the assistance of the profession at large.

At the Conference of 1874 a paper of mine was read advocating the addition of a Professorship of Architecture to those colleges where a school of engineering already existed. In repeating the suggestion as I do now, after an interval of thirteen years, I believe the necessity of some system of education for architects is no longer in question; that nothing remains but to devise the way and the means. Since then the Royal Institute of British Architects' Examination has come into existence, and any system of education that may now be devised should be so built up that this examination may become the key-stone of the whole.

Now examinations conducted without a properly connected underlying system of tuition cannot be productive of any uniformity of result, a defect fatal to any broad influence of general benefit to the profession. But with a system of collegiate training, not confined to the metropolis, but scattered in many parts of the kingdom, all working in harmony, preparing candidates for this Examination, a very different result would be attained, for there can be no doubt young men who had spent two or three years in some college where their time was wholly devoted to study, and not frittered away in the commonplace duties of a drawing clerk, would ineffably surpass those whose reading was of the present promiscuous type, thereby tending (1) to raise the standard of the examinations and consequently of the profession at large; (2) to impress the public with the advantage of proper preliminary training.

Theoretical college work is not intended as a substitute for pupillage in an architect's office, but as a preliminary step thereto, for business habits cannot be acquired by theory, and the various details of practical work must be learned by contact with them. But an architect, once accustomed to pupils or assistants who had a knowledge of drawing, of the nature and properties of materials, and some idea of mouldings and other architectural details before entering his office, would never again take a raw youngster, no matter what fee was offered, but would recommend the youth to study in some college for a couple of years or so, and then, and not until then, to think of office-work.

Of course, any scheme of education would be doomed to failure unless it were taken up by the profession at large with the intention of making it an ultimate success; and it is upon this particular aspect of the education question that the Conference may be so influential.

It is not necessary to refer in detail to the subjects to be taught; the extent or balance of the various studies; how they should be taught; and who should teach them; as these matters do not affect the main question, and are comparatively easy to arrange; but examinations, the award of diplomas, and the general control and direction of the system are questions of primary importance and demand more particular reference.

Each of the several colleges already referred to might set up independent schools of architecture, and grant any degrees or diplomas they chose, having no connexion with the Institute or profession in any way,—a state of things undesirable, but not at all unlikely to arise unless the profession take an initial step and appoint a General Board of Professional Education, whose duty it should be to organise, control, and direct everything connected with education throughout the whole country. This Board should consist, in the first instance, of those gentlemen who form the present Examination Committee of the Institute, who have devoted so much time and labour to this matter, and who have brought it into the position it now occupies, together with representatives of the Architectural Association, and possibly of the leading provincial societies also. Some of the professors of the different colleges which, from time to time, join the scheme, should, *ex officio*, have seats on the Board, or, at least, a consultative voice in the settlement of technical questions. But the Board should act as the representative of the Institute, and be responsible to that body.

Their first duty should be to enter into negotiations with some college or colleges to be selected for the purpose of experiment,—say, for example, King's or University College, London, and in the provinces, Liverpool, or Owens College, Manchester,—and secure the



appointment of a professor, or professors, of architecture, who would lecture on professional subjects, and superintend the drawing school and class of design. Then a proper course of study should be arranged. In these colleges many of the courses on scientific subjects and languages would be found exactly suitable for the purpose without requiring any alteration, and the special lectures now intended for engineers might be utilised to a large extent, so that in this way a very comprehensive education might be afforded to the future members of our profession, without any expense save that of the special architectural course, and the cost of this, together with any illustrations or books that it may be necessary to provide could not under any circumstances be very serious, and might be divided in some ratio between the Institute and the colleges themselves.

From year to year further efforts should be made to induce other colleges to join and become affiliated to the Board of Education, so that ultimately all parts of the kingdom may be included in the system.

Having so far provided for "education," the next duty of the Board would be that of "examination." To insure uniformity of teaching amongst the different colleges, all examinations should be conducted by examiners appointed by the Board. The examiners might visit and hold examinations in the different centres, or all the candidates might assemble in London for the purpose. The final examination for the degree or diploma which, under the new Charter, the Institute have taken powers to confer, might be found preferable to conduct in this latter way.

A student should give his whole time to study for the first two years, but the third year's course might be so arranged, by giving the lectures in the afternoon or evening, that the student could commence practical work in an architect's office at the same time if he were disposed to do so.

The examinations should be divided in the same way. One to be held at the end of the second year's course, equivalent to what is called the "half degree" in some universities, and carrying with it admission to the Institute as an Associate. And after the third year's course, a still higher examination for the Diploma in Architecture and Fellowship of the Institute.

Of course, the scheme is here indicated in general outline only, and yet requires a great deal of consideration before all the details can be filled in, but I believe it is quite capable of being brought to a successful issue. Its main features are:—

1. Decentralisation.
2. Education conducted by trained teachers.
3. Professional control.
4. Maximum of result combined with the minimum of expense.
5. The association from the beginning, of art and science in the same course of technical education.

The adoption of some such scheme as this, which can be effected without an Act of Parliament, will tend more than anything else to produce the federation so many seem now to desire, but in what I believe to be its true form, namely, the federation of learning.

Professor Aitchison, A.R.A., then followed with a paper

#### ON ARCHITECTURAL EDUCATION.

GENTLEMEN,—It seemed to me that a conference where there was no conferring was a waste of time; that when we were visited by able men, practising in the large manufacturing, mercantile, and agricultural centres, or coming from the North,—one of the main sources of the sap and vigour of our nation,—it would be culpable negligence on our part if all these means of mutual knowledge and improvement were to come and go in vain. Diamonds can only be cut by other diamonds.

The burning questions of the day, architecturally speaking, are, in my opinion, these:—

1. How can the public be made to desire architecture and to appreciate its excellence?
2. How can architects be adequately rewarded for their skill and knowledge; for, under the present system, they are obliged to present all their artistic work for nothing?
3. What can be done to aid the progress of architecture?

This third question has for one of its factors, at least, the education of students, and it is to

this particular factor that I propose devoting the few minutes that are allowed me.

In his "Essay on Studies" Bacon says:—"Read not to contradict and confute, nor to believe and take for granted, nor to find talk and discourse, but to weigh and consider." I have, therefore, tried to weigh and consider this subject, and to put the results before you as well as I can, even in spite of being dull, hearing also in mind another of his precepts, that "some in their discourse desire rather commendation of wit, in being able to bold all arguments, than of judgment in discerning what is true, as if it were a praise to know what might be said and not what should be thought," and I hope that those present may throw more light on the subject, fill up omissions, and correct errors.

The subject seems to me of paramount importance, for it deals with the future excellence of our art, and I feel certain that there is not one architect or architectural student amongst us who would not sacrifice himself if he felt sure that by so doing he would insure a more brilliant future for the art he has embraced.

I think we may be proud of what has already been done in our time by architects, but that is no reason for not striving to do better. We have lately been overhauling the weapons in our own conquering army, not without advantage, and doubtless there are points in its drill, discipline, equipment, and skill that are capable of improvement.

The first thing that strikes us is that when an art is native, and when it is the expression of a popular want, we find no schools of it. I may instance, in the arts of the day, novel writing and engineering. Schools are mostly founded for one of two reasons,—either to start an art that does not exist, or to prop up one on the verge of decay.

We could form, too, a better notion of the value of schools, if we found that where there has been the best school there has been the best architecture; but it is not easy to know which country had the best school, unless we take it for granted from its having the best architecture.

I think if the civilised world were polled at the present day each nation would place French architecture in the second place, i.e., after their own, and France has in the Ecole des Beaux-Arts an excellent central school, though some of its former pupils think that French architecture is good rather from the natural gifts of the nation than from the teaching of its school.

We have only one good architectural school in England, the Architectural Association, and that is rather a mutual improvement society than a school.

It is very curious we should know so little about the schools of past times. What were the Greek and Roman schools like? We do know, however, that the Roman Emperors founded schools in Gaul, but these, I imagine, were what we should call grammar schools. I believe the technical schools were the Roman trade guilds. We know, too, that Charlemagne established schools in his empire, and that some of the professors were got through Haroun Alraschid from the Saracens. We know that the Saracens established schools in connexion with their great mosques, and devoted themselves to studying the geometry of the Greeks, and that at the beginning of the ninth century, viz., 813-834, in the time of Mamoun, Haroun Alraschid's son, algebra was introduced to the West from Mohamed Ben Musa's Arabic translation of the Hindoo algebra.

The first start of Saracenic architecture was in A.D. 855, and by a Christian architect; and Gothic began towards the end of the twelfth century. Although this may seem a little beside the point, particularly as we know so little about it, it is dropped as a suggestion of the effect produced, by the study of mathematics, on the new styles of architecture of those times.

The Benedictines we know had workshops for glaziers, jewellers, and goldsmiths attached to their monasteries, and must also have had architectural schools as well, for as early as 1009 A.D. they furnished the main dimensions of the monasteries to be erected in distant parts.

Nearly all our great poets have been to one of the Universities, though we must except Shakespeare and Burns.

Of the great seventeenth-century architects, neither Wren nor Perrault was educated for

an architect, and it is doubtful if Vanbrugh was.

It seems to me that as we cannot produce men with great intellects and with a taste for architecture, our only plan is to look at what is wanted, and to render the acquisition of the necessary knowledge as easy as possible, and, above all things, to bear in mind that though we cannot produce a genius we may well spoil one by smothering his talent under a mass of knowledge. As Mark Pattison says, "Accumulated learning stifles the mental powers."

It is comparatively easy to state what a man should know to be an architect,—at any rate, if you exclude the fine art,—but we have to consider what chance there is of his being able to learn it; for, to be a great architect requires a combination of qualities very rarely found to exist in the same person. Great architects are not "like two single gentlemen rolled into one," but, as was lately said, like eight or ten.

I think we ought to be careful that our student is not equipped like the knight with a mousetrap and a beehive, lest he should sleep at a place overrun with mice or meet a swarm of bees in his travels.

It seems to me that every architect must be able to construct soundly, for without that he is no architect at all. It is a great advantage to him if he knows mathematics, and when I say know, I mean that he can use the higher branches, or else he must take theory on trust, and be indebted to some one else for the solution of difficult problems. But he must know arithmetic. He ought to know descriptive geometry for developments, the interpenetration of curved surfaces, for the setting out of staircases, and of groins, vaults, and domes, with their ribs or panellings. With the Greeks, the Saracens, and the Mediaevals, geometry was the foundation for architecture.

We know from the "Arabian Nights" that the Saracen architects are always called mathematicians or geometers, even if we had never seen their elaborate geometrical patterns; we also know what a deep knowledge of practical geometry the Mediaevals must have had, from their works. To revert to our student, he must know the statical problems that are met with in building, or he must have great observation, and great memory, and then, too, he will probably only feel safe, when he is within the limits of works already executed. He must, too, have a thoroughly practical acquaintance with the materials he uses, if he is to escape serious failure, and as few architects have any real practical knowledge, he must have it theoretically.

He must, too, be a master of geometrical drawing.

He must have a fair notion of how his rooms are to be lit, warmed, and ventilated, and of those requirements for health, in the shape of drainage, &c., and precautions against heat, cold, and damp.

He wants some small knowledge of the law of contracts, and of the laws of easements, &c.

The fine art part stands in a very different position.

It is a thousand to one against any student having any architectural invention, and, as far as I know, invention cannot be taught, though there is now a proverbial belief that a good school is like that American machine where, if live pigs go in at one end, pickled pork, snaffles, and hair brushes must be turned out at the other.

We have therefore not only to provide the proper instruction for the one born architect, but we have to furnish the others with something, that will more or less take the place of natural powers and invention.

I will put a case which, I think, will make my proposition clearer. Suppose we want to make musical composers out of a thousand-and-one young fellows, and, as our first test, we take only those who can whistle a tune or play "Jim Crow" on the Jew's-harp, what provision should we make for their teaching?

I have used this illustration because it strikes architects that musical composition is a rare gift, while it is commonly supposed that architectural composition is a common gift, although it is not more common than the other.

The utmost we can do is to cut, polish, and set the stones we have picked up on the beach, the bulk will be flints and Brighton emeralds. We are lucky if we get a few agates, some rock crystals, and a few common amethysts amongst them, and we can hardly expect to find a ruby, an emerald, a sapphire, or a diamond.

Let us see what we can do in the way of cutting, polishing, and setting.

You cannot have architecture without proportion, and scarcely without mouldings.

The ordinary method of teaching harmonic proportion is to let the student draw out the Greek orders, and a few Greek buildings, and learn the ratios, and perhaps to draw one, and calculate the ratio of a few other buildings celebrated for their proportions, and try by these means to cultivate his taste.

We do the same with the Greek mouldings, but too frequently forget to teach him that these were executed in marble for a clear atmosphere and a sunny climate, while our material is brick or stone, our climate is misty, not to speak of the fog in large towns, and the climate is the reverse of sunny.

Gothic mouldings will at least show him how to get shade in a sunless clime, and also the devices used to produce lines of light, and he should be made to design mouldings for various positions, as elegant as Greek ones, and as logical for our climate as the Gothic ones.

Study will give him more or less insight into the harmonies of lines and shapes.

Style we cannot teach, for no style peculiar to our time exists in any civilised nation of the world.

Our only hope is that, by showing him the real styles that have existed, Greek, Byzantine, Saracenic, and Gothic, and by letting him take an artless structure built in accordance with purely logical deduction, he will try to make it beautiful.

Eccentric ugliness is better than second-hand beauty, if it be the right step forward.

Viollet-le-Duc's humorous comparison of architects to an opera chorus where they all sing "Let us go," and never move, is as true now as it was when he wrote it.

Queen Elizabeth's stinging repartee to Raleigh seems to be acted on by all architects in a contrary sense:—

Raleigh.—I fear to climb as high lest I do fall.  
Queen Elizabeth.—If thy heart fail thee, do not climb at all.

If an architect has time and talent enough to be a sculptor as well, by all means let him be one, but our buildings are covered with archaic ornament because the architect thinks he ought to design it and have it carved by a mason. The public encourage this; they care nothing for sculpture, and know if it is an architect's work they get it for nothing or next to nothing.

If Ferguson was right in his statement that the only cause for our not being superior to all past times in the fine arts is because we go the wrong way to work, it would be of the very first importance to find out how the Greeks, the Byzantine-Romans, Saracens, and Mediaevals were taught and worked; but I fear the causes lie deeper than that. Nevertheless, much improvement is lost by isolated work, and more by not making a second building in correction of the first. All that we know is how the Italian Renaissance architects were taught. The Italians first apprenticed a youth with a taste for the arts to a goldsmith to make him handy with his fingers, and to assure him of a livelihood should he fail in the arts, they taught him to draw the figure, and if he wanted to be an architect, he picked up architecture by measuring ruins, and seeing how new buildings were built.

Though "self-taught is well taught," real systematic instruction is, in my opinion, invaluable; it not only saves time, but it is more thorough and complete; only the teaching must not be by pedants, however learned or able, but by men who know that their teaching is towards another end, and who will render it as useful as possible to that end.

Professor Ayrton, in a lecture given at the house of one of our professional brothers, put this very well:—

"Let us make a student understand that a certain knowledge is of real service to him, and he will then, unless he is exceptionally lazy,—exert himself to gain what he feels the need of. This most important element in human nature, the desire to get what we want, seems to me to have been sadly overlooked in the educational system of the past."

From a lack of preliminary knowledge pupils seem to me to leave an office at the very time the knowledge they can only get there, is beginning to be of use to them.

The three main things nineteenth-century architecture seems to me to lack is more original and daring construction more inven-

tion, more perfect subordination of parts, and greater finish.

If you agree with me, it is for you to say how we are to compass this.

Professor T. Roger Smith next read the paper immediately following:—

#### A STUDIO FOR ARCHITECTURE: A SUGGESTION.

No proposal for architectural education is, in the judgment of most of us,—certainly in mine,—likely to supersede pupillage as the most valuable way of fitting a youth for the practice of architecture. But something is needed that shall supplement pupillage.

I have a recollection of a most influential public meeting held under this roof, now many years ago, which appointed a committee and set on foot an organisation for architectural education on a somewhat grand scale, with such men as Rnskin, Scott, and Burges upon it; and the effort led to no result. My suggestion to-day is, that the attempt should be made in quite a different manner, with a comparatively modest and unpretending equipment, and under the sole guidance of one or two suitable men who can give time and attention to it, and, I believe, that a modest commencement of that sort might have a better chance.

What appears to me desirable is an organisation for giving regular systematic instruction day by day, at the drawing-board chiefly, and therefore different from and in addition to the classes at King's College or University College or the Architectural Association.

Instruction in architecture obtainable in the day-time at moderate, yet fairly remunerative fees, in the metropolis, and the great centres, such as Edinburgh, Glasgow, Manchester, and Liverpool, ought to attract students of at least three distinct classes. (1.) Youths destined for the architectural profession who have left school or college, but whose friends are very wisely advised that they will be better prepared to reap benefit from being architects' pupils if they have some instruction in the rudiments of architecture before being articulated. It is, let me observe in passing, of great importance to provide for youths at this stage something which shall form a kind of bridge between the regular routine of school, when all the work is cut out before hand, and every hour accounted for, and the freedom from restraint, and usually also from guidance, of an office. (2.) Pupils whose masters recognise that their offices are not places where much definite instruction is possible, and embrace an opportunity of securing such teaching outside. (3.) Young men of older standing preparing to pass the Institute Examinations. Classes 1 and 2 would furnish the junior students; class 3, the seniors, some of whom would be fitted to act as monitors, with advantage to themselves and to the juniors, as some of the elder men did in Mr. Harvey's excellent masonry class.

The object of this paper is to suggest that it would be perfectly feasible, and not difficult to establish for the benefit of such students, by private enterprise, what I propose to call an architect's studio; not on the lines of the ateliers in which architects, painters, and sculptors in Paris learn their art, but with some resemblance thereto, though more like some private drawing studios, such as Lee's, which have done good work in London at one time. I believe that such an establishment set up by the right man, would be successful, and would be of great service.

Why should not a properly-qualified architect,—or better, two friends, of whom one inclines to the art and the other to the science of our profession,—open a large well-lighted room, fitted like a drawing-office, but with the addition of a good supply of the needful books, prints, and plaster casts, where students could attend five days and a half in the week, and receive instruction, and draw, under constant, or at least daily, guidance and supervision?

The subjects to be taught ought to be those which the master is thoroughly competent to teach, and such as the students most require to learn. Some or all of the following suggest themselves:—

1. First, draughtsmanship.—Every drawing made should be scrutinised from the point of view of how it is done, as well as what it represents, and each day's work, as far as it is done with the pencil, should be a drawing lesson as well as an architectural lesson.

2. Architectural forms and details.—In the case of junior students I would limit this to a somewhat complete study of Greek from prints and drawings, and, where possible, casts; and of some one period of English Gothic from actual buildings and plaster casts. Perhaps I may be permitted, as it is necessary to make this paper short, to refer to my syllabus on the study of architecture issued by the Department of Science and Art, for a statement of the reasons for this programme, for which there is not space here. In the case of advanced students I would add work in that style of architecture with which the teacher has made himself most familiar, or in which he has won distinction, and if this were to lead to the formation round an able teacher of something like a school I do not think the result would be a bad one.

3. Designing architecture, general principles of composition, consistency in the use of examples, and practice in making designs to conform to a fixed programme, and to embody the forms and details of a definite style.

4. Perspective and sciography.

5. Water-colour drawing.

6. Measuring, sketching, and drawing out portions of some existing building, and drawing up a written description of the same.

7. Descriptive geometry, and the modern graphic methods of investigating the strains in trusses, beams, arches, and other structures.

8. Building construction.

If it were possible to combine with the studio a workshop where the students could do some carpenter's, joiner's, or mason's work, under a competent foreman, this would add to the value of the course.

Students who attend a studio could consult the master about their private reading and how best to employ their evenings, and which of the various institutions or classes open affords them the instruction suited to their individual needs. I do not think the studio should itself have evening classes, unless it were drawing-classes. Some of the students might, perhaps, spend part of the day-time as well as their evenings in attending classes for the study of some cognate subject, such as mathematics, geology, mineralogy, or hygiene.

The experiment would have the best chance of success if tried first in London, or better still Westminster, close to the Abbey and the Architectural Museum, and within easy reach of the South Kensington Museum, and accessible from most parts.

The most difficult and most essential part remains, viz., to find the right man for the undertaking, and to deter the wrong one from attempting it. He who might with advantage start and carry on such a studio must be an educated and cultivated person, both as to general knowledge and as to architecture. If he is to teach and train he must first know and be trained. He must also be apt to teach. This aptitude is to some extent a natural gift.

Further, he must be thoroughly in touch with the students. This is perhaps oftenest met with in a young or youngish man, but mature age need not be a disqualification. There are many men past middle life still capable of feeling all a young man's difficulties, winning his confidence, and rousing his enthusiasm. Who, for example, that knows our friend the present Director of the British School of Archaeology at Athens could imagine that his years and his honours would ever prevent any student from feeling at home under his guidance?

A last qualification, but I think an essential one if the experiment is to succeed, is that the master must be to some little extent a man of mark. I do not mean that he must be a Royal Academician or some one of that standing, but he must be sufficiently a marked man to command the confidence of students, of the body of architects, and to a certain extent of the outside public; otherwise students will be slow to find him and their friends backward in sending them. He must also be able to devote a considerable amount of time to the work; not, indeed, all day, but some part of every day, and with energy and devotedness it appears practically certain that the starter of such a studio would render a great service to his profession, and that his undertaking would serve to introduce a much-needed improvement.

Mr. R. Bené Spiers, F.S.A., read the next paper, on

#### THE ARCHITECTURAL SCHOOL OF THE ROYAL ACADEMY.

As it is now close upon eighteen years since I was appointed Master of the Architectural School of the Royal Academy, it has seemed to me, on the present occasion, that a few words might not be out of place on the experience which I have there gained in the training of students in architectural design and draughtsmanship.

It may further be of advantage if in the discussion which may follow, some hints are given as to any development in the programme there carried out.

I feel strongly, in these days of progress in education, that it is impossible to stand still, and although the advance in architectural design which has taken place in England during the last fifteen years is greater than the most sanguine of us could have hoped, that very progress should give us hope, and incite us to further endeavours in the promotion of greater development.

As it is always necessary to commence on some foundation, when appointed by the Council of the Royal Academy, I began by an attempt to carry out those principles in which I had myself been brought up, viz., the curriculum of the Ecole des Beaux Arts in Paris. I soon found out two difficulties.

1. The time at the disposal of the students was too short to allow me to hope that I could give them more than a smattering of French traditional teaching; and

2. In many cases I had to deal with students whose taste and predilection were in favour of almost every known period of art, and the utmost I could do was to accept their version of what was the correct style to design in, and to confine my advice within the limits of the styles they selected.

In 1876 or 1877, the late Mr. George Edmond Street proposed to the Council of the Royal Academy that the Architect Members of the Academy should be allowed to contribute their quota of instruction in the school, as had always been done by the painters and sculptors. At first, I did not think the scheme was likely to succeed, for it seemed difficult to understand how architects in large practice, and who were obliged to be frequently absent from town, could attend regularly. I was mistaken; the Visitors (as they are called) made it an engagement, and from then till now have carried out completely the programme which Mr. Street laid down.

It is needless to say that it has been productive of the greatest good; after many years of teaching there is a natural tendency to settle in a groove: it was not observable at the time, but now, as I look back on the old days when I was Sole Director, I see I was running in a groove out of which I have been taken by the Visitors, and I have probably learned more from their teaching than perhaps even the students.

The Visitors are, of course, men of different views, but they have all of them recognised that they had to deal with students designing in various phases of style, and have given their advice accordingly. I remember when Mr. Street first came down he began by presenting each student with a design of his own. He found, however, that when they came to a second subject they expected another design, gratis, to be made for them, and he saw that it was better to take the students' idea, and suggest how it could be improved. It was interesting to note how, with his profound knowledge of the value of mouldings, a poor, commonplace cardboard design developed itself gradually into a fair example of serious work, reasonable in its plan and in its construction, and in some cases of great artistic merit. It is on this principle that the instruction in the Academy is given, and I consider that if the student is required to frame his plan on the actual requirements and their best distribution, to base his elevation and section on the plan, and to keep the whole design within the limits of sound construction, it is better to leave alone the question of style for the moment to the taste of the student, and to trust that in course of time artistic design will naturally develop itself. If, for instance, a student brings down a design bristling with Dutch impurities (and I am afraid Mr. Norman Shaw has passed many a

*mauvais quart d'heure* over some), it is of no use trying to make it pure Italian. Keep within the style (if it can be called one), but insist upon the construction being properly shown, and the scale being preserved throughout, trusting that in course of time the impurities will pass away; everything must have a beginning. I do not mean to say that this is always done. Owing to office and other engagements, there is not that regularity of attendance which enables the Visitors or myself to see our advice carried out to the full, but it is the principle on which the instruction is based, and I am sure of this, that, so far as construction is concerned, there is rarely a drawing sent in by an Academy student which would not make a much better *working drawing* than the finest example sent up in competition in the Ecole des Beaux Arts. The English architectural student has fortunately never even heard of that pale pink tint which is generally passed over all the sectional parts of French drawings, even in those which are sent to the contractor as working drawings. Now in making these observations, it must not be supposed that I wish in any way to diminish the immense value of an academical course of training, such as is given in the Ecole des Beaux Arts at Paris; having passed through it myself, I should be most ungrateful if I did. But we have to take things as they are. There is no National School of Architecture here; there is no traditional teaching of 200 years, as in France; so far as architectural design is concerned, I am inclined to think this is a positive advantage, and that in consequence English architecture is at present in a much more healthy state than that of either France or Germany. In Ecclesiastical architecture it has always been so, and of late the progress made in domestic and town architecture has been such as to outstrip entirely our foreign contemporaries. In speaking of town architecture I am referring to single buildings only, and not the arrangements of streets and squares, in which, unfortunately, the advice of architects is entirely ignored. There are various causes to which I attribute this, and if I venture now to express my opinion on them it is (1) to challenge criticism, and (2), if I am right, to emphasise their existence, so as to guide students in their future studies.

Firstly, to the influence of the Gothic revival we owe the foundation of our modern school. The practice of constant measurement and delineation of our ancient cathedrals and churches for the purpose of their restoration led of necessity to the study of the principles on which their designs were based, and English architects, instead of trusting to pattern-books for their ideas, went to nature; that is to say, having no traditional school of teaching, they sought for the principles of design in ancient work. It was a much longer process, and the full measure of its value was becoming apparent about fifteen years ago when, singular to say, one of those peculiar changes of taste took place to which, in the absence of traditional workmanship, we are liable, and the later phase of the Renaissance styles gradually forced themselves to the front; but the seeds were already sown, and the interpretation of a phase of style (say, for example, of the architecture of Francis I.) by an English architect approaches much nearer to the spirit of its design than that which can be conceived by a student who has followed the traditional teaching of a foreign Classic school.

Secondly, we have to take into account the more practical mind of an English student, who bases his design on the nature of the materials he has to employ, and who, in default of abundance of stone and to waste, as in France, has to turn to the best account the simpler materials of brick, terra-cotta, and what is known in England as half-timber construction. Now, the economical and artistic treatment of these materials forms no part of the curriculum of study in foreign schools; if brick is used it is employed decoratively, and not as the elementary means of construction. It is in the employment of these materials, and their artistic development, that the English architect has made that extraordinary progress to which I have already alluded.

It will suffice if I draw attention to one example in London,—the Regent's Park Lodge, by Mr. W. Eden Nesfield,—and ask you to compare that building with any of the hundred and more villas of the better sort which have sprung up round Paris, at Auteuil, Passy, and other

places. The plan is about the same in both cases, and of square form: in the French villas the walls are all carried up to an equal height, decorated in various fantastic ways, and crowned with an ordinary pitched roof and an iron cresting. Mr. Nesfield, on the other hand, has by an ingenious arrangement of roof and the employment of bow windows, oriels, dormers, half-timber and tile-hung construction, created a world of artistic design, and at something like half the cost per cubic foot of the French stone villa.

Mr. Nesfield's design is a brilliant example of what I may call *material architecture*, in which the economic and artistic treatment of simple materials is turned to the best account. The French villas are examples of what I may call *paper architecture*, that is to say, designs which on paper with graduated tints look very well, but in execution are not only commonplace, but sometimes at variance with the proper and consistent use of the material. Now, I think that this is a very important consideration. You will remember that Victor Hugo in his novel, "Notre Dame de Paris," points out with remarkable sagacity the real cause of the decadence of modern art. Gazing from the printed book to the magnificent Cathedral of Paris, he puts these words into the mouth of one of his characters, "Ceci tuera cela, le livre tuera l'édifice." I may now go further, and turning from the elaborately-finished drawings of the present day to one of our ancient monuments erected when drawing materials were of the scantiest description, exclaim, "Ceci tuera cela, le dessin tuera l'architecture."

In these days of expert draughtsmanship this is what we have to fear most, and the best advice I can give to students is to accustom themselves to measure and draw continually from old work, and not to take their ideas from pattern books. In this respect I consider that the late William Burges, in his admirable work on architectural drawing, has left us a book which may always be held up as a model of the kind of measuring and drawing which every student should pursue. His aim was not to make pretty and effective drawings, but to analyse and dissect ancient work, and thereby deduce the principles which governed its design. The good influence which Burges exerted in his lifetime was greater than that, I think, of any other artist; let us hope that the legacy he left in this work above alluded to will continue to exert that beneficial influence.

The following paper by Mr. Lawrence Booth, F.R.I.B.A., President of the Manchester Architectural Association, and President of the Manchester and District Society of Surveyors and Valuers, was read for him, in his unavoidable absence, by Mr. Herbert D. Appleton, one of the Honorary Secretaries of the Conference:—

#### THE INSTITUTE AND ARCHITECTURAL EDUCATION.

THE Institute having obtained, under royal sanction, enlarged powers, intended to increase its usefulness, there appears to be an implied obligation that no time should be lost in applying them to some practical purpose.

The primary object of this paper is to suggest how the authority and usefulness of the Institute could be increased by the adoption of an educational scheme, which, if successful in its working, would, within a few years, lay the solid foundation for an application to Parliament for those stringent powers of repression against all unqualified practitioners to which so many of us are inclined.

Hitherto the promotion of this latter project has induced some little friction between men who were practically agreed as to its desirability, because divided in opinion as to the opportunity of the time and circumstances under which it should be thrust forward.

Henceforth the several sections of the army can march in the same direction, and combine their forces for the attainment, ultimately, of common objects worthy of their best efforts,—the statutory recognition of the importance of the duties we are called upon to perform as architects, and plenary powers to prescribe and enforce a high standard of professional competency and moral rectitude on the part of those who assume to enter the ranks of the profession.

If this great work is to be achieved by and through the Royal Institute,—and it appears

hopeless to expect it from any other source,—the Institute will require to be strengthened both within and from without. How is this to be done?

In no way more surely and in no way more worthily than by a beneficent assistance, supervision, and direction of the educational efforts now being put forth by numerous local architectural societies on behalf of those who are honestly and industriously endeavouring to qualify themselves as proficient architects; and the stimulus which would, incidentally, be given to the formation of numerous combinations for similar purposes in districts which are at present apathetic, if not absolutely antagonistic to the Institute's pretensions.

The writer's sympathy and observations are the result of a somewhat lengthened experience of the isolated efforts of provincial societies, and they may not, therefore, secure the complete acquiescence of metropolitan brethren, who are in more immediate "touch" with the Institute and other educational resources.

But if the Institute would only assume its proper position as the Alma Mater of the whole profession, receiving and distributing valuable assistance without distinction or favour, it would at once become apparent that the provinces are capable of giving, as well as receiving, something substantial for the general good.

One example in illustration. It is probable that in the matter of taking out quantities, measuring up and pricing builders' work, and writing a specification, an average architectural student in the provinces would far outstrip his metropolitan brother; and although the varying custom in metropolitan and provincial practice may differentiate the value of such knowledge, it will hardly be denied that it is in itself desirable, if not absolutely essential, for the proper equipment of an architect who assumes to watch over and guard the financial interests of his clients, even if its exercise should be confined to supervision only.

The writer is within his experience in mentioning several "pupils" fairly possessed of such knowledge and capable also, and at the same time of surveying and levelling, or making a perspective drawing, and all with equal facility.

His purpose is, however, not to stir up strife, but rather to bring about a spirit of friendly emulation, and an impartial recognition of meritorious work in whatever branch or branches of the profession it may be exhibited.

Some of the artistic excellence displayed by those who are nearest to the "light" might well be exchanged for some of the practical knowledge possessed by the outsiders, to their mutual advantage.

A proverbially dangerous word of prophecy in passing:—If the practice of the architectural profession is destined to become a close one under statutory enactment, and whether the Institute is to hold the key of entrance or not, the "Open Sesame" will not be either artistic or linguistic attainments, but rather a thorough knowledge of sanitary science and construction; because the public, our masters, are daily becoming more convinced of the fact, which is a fact, that such matters are to them a question of life and death.

No more useful hint could be given to the "rising hope" of our profession than the importance which will in the future attach to this branch of the architect's responsibility, and those who apply themselves to its consideration will in any event have their reward in the approval and patronage of a discriminating and recently-enlightened community.

Either by federation or affiliation,—the name is not of much importance if only the object be secured,—every available ray of professional light should focus to the Institute as a centre to be thence distributed for the guidance of those especially, our destined heirs and successors, who are in their present isolation mere pilgrims of the night.

In the writer's earlier experience the Institute was little more than a superior kind of office for the registration of the fact, sometimes doubtful, that N or M had, without any cause for a feeling of gratitude to the registry office for help received therefrom, established himself as a well-known practising architect, able and willing to pay his admission fee, and likely to continue the payment of his annual subscription for the privilege of appending a few mysterious letters to his signature, the significance of which the general public have

not, even yet, been sufficiently educated by observation and experience to comprehend.

A considerable advance in the right direction has been made since then; and the road is now clear for one of supreme importance.

Let the Institute, like a true, fostering mother, henceforth seek to secure the affection of its children by *early adoption*, and such acts of kindly and timely help in their juvenile efforts as will make them, when arrived at manhood's estate, the firm adherents and the staunch supporters of its best traditions and interests.

Every architectural student ought to have the chance of a recognised status in its ranks, to be obtained, in the first instance, by a preliminary examination as to his general knowledge and special aptitude for the work before him.

A second or intermediate examination should follow in due course, wherein he would be expected to give evidence of proficiency in technical knowledge and manipulative skill.

A successful pass at the third or final examination should entitle him to admission as an Associate; and in this and the other stages provision should be made for the recognition of exceptional ability by the grant of "honours."

The Institute would, of course, suggest the curriculum of study; and in its collective wisdom formulate the examination papers, which would be distributed simultaneously to the several provincial centres.

No enforced attendance of candidates in London for purposes of examination should be necessary; because effectual guarantees as to fairness could easily be provided under deputed authority and supervision in the provinces.

With a common standard of proficiency thus set up for our younger brethren, in their several degrees, there would soon be developed such a spirit of emulation on their part as could not fail to arouse the most lethargic student to exertion.

The facilities afforded by gentle guidance for graduating step by step, and without the necessity of having to make a journey or journeys to London for the purpose of being "plucked" or otherwise, would encourage and induce many a modest youth to try his luck near home, who would hesitate to ask, if may be, a widowed mother to equip him for what he might think a hazardous and costly experiment.

But above all, there would be opened out for the Institute itself such a sphere of beneficent educational administration as would enable it to justify even its regal title; and by exhibiting to the world a body of high-minded men unselfishly seeking to qualify those of their own "calling" as efficient and useful members of the community, it would assuage the doubts of those who, with an instinct pronouncedly national, might otherwise suspect in any application for the power of absolute control over the entry into the practice of our profession only an attempt at a selfish monopoly, or, in other words, a mere development of trade unionism.

The Institute would be raised immeasurably both in the public and in its own estimation, and would soon attract all that is worthy and desirable to its support.

More work would have to be done, but there would be more willing hands to do it.

Once placed the education and training of students in the fore-front as one at least of the Institute's most important aims, recognised by it both as a privilege and as a responsibility, with equal earnestness, and there would be such an accession of numbers and strength as has not been either developed or even suspected to have an existence.

The transformation would direct the latent energies of those,—some inside and many outside the ranks of the Institute,—who are now simply looking on at a comparatively few well-known members engaged in writing papers at each other, to a field of much more useful work, in which they could do yeomen's service in giving the benefit of their practical experience, not to those who have too much, but in aid of the young, the hungry, and the deserving, thus realising the beautiful picture of the double blessing for the giver and the receiver.

Mr. J. A. Gotch, President of the Architectural Association, read the last paper of this series, as follows,—

#### LEARNING TO BE AN ARCHITECT.

LEARNING to be an architect is about as arduous a task as a young man can undertake;

and yet in this country, at any rate, there is no task as to which less definite information exists for the young man's guidance. The only thing certainly known to be necessary is to article him somewhere,—to a friend, a relation, a cheap man, or a man in the nearest town, so that he is not far from home; but not by any means necessarily to a man who will make a good architect of him, though it by no means follows that none of the aforesaid could do so. And when he is article'd, what does his apprenticeship do for him? In nine cases out of ten it makes him at the best an architectural practitioner; but as for being an architect,—with a desire to tread the higher and nobler paths of the profession,—very few offices make him that,—at least, provincial offices. If he can spend a year or two in another office, and can then settle down somewhere as an assistant, or perhaps scrape together a practice in his own town, learning as he goes along, his ambition is satisfied; for he has had no higher ideal placed before him, and if he reads in the professional papers of Designs and Essays, he regards them as wholly outside his province, and meant only for those lucky people whose parents live in London. It does not occur to him that he too might try his hand at design, for he has never been taught to do anything but grub along from day to day at his tracings, and his dull brick villas with Bath stone beads and sills and 6-in. hands by way of ornament. And as for travelling studentships, he hardly knows what purpose they serve, for no one has opened his eyes to the instruction, the interest, the poetry, and the never-ending delight which every village in his country-side holds out to those who seek it with intelligence and a desire to gain knowledge. From the force of circumstances, from the absence of any defined track to follow or of fixed goal to reach, he moves in a narrow circle, with no ideals, and no ambition beyond avoiding some disaster, which his scanty knowledge renders imminent several times in a twelvemonth.

No doubt the pupil whose lot is cast in a large town, and particularly in the largest of all towns, is more fortunate and less handicapped by want of guidance. If he gets little from his master, he has, at least, more friends of occupations similar to his own with whose help he is better able to struggle towards the light. But he, too, suffers from the absence of a defined track and fixed goals.

I take it to be one of the objects of this Conference to do something towards defining the track and fixing the goals. One such goal exists now in the shape of the Examination for admittance to the Association of the Institute, but this is, comparatively, far along the path of life, when the student has passed his youth and is entering into manhood. What we ought to do is to get at him at the outset, to give him a good start upon the track, and to let him feel that there is some one who has an intelligent interest in his welfare,—some one to whom he can apply for help in his needs and for guidance in his studies, and some one who will reward him for his exertions. This position must be filled by the Institute, which must first make known what advantages it will offer to those who seek its help, and then must define the conditions on which that help shall be given.

At the outset I think we must make up our minds that the Institute can at present be not a teaching body, but only an examining body. It can give a direction to studies and reward success in them, but cannot superintend them from day to day. If it can give the right direction to studies it will do a great service, for by its means energies now liable to be frittered away will be concentrated upon a definite end. But it must begin early enough. It must have an influence even upon school education, and this it can do by instituting a Preliminary Examination, the object of which shall be not to test the student's knowledge of architecture, but his general knowledge, which will be all the more useful if it has a leaning towards architecture. This present is not the occasion to define what subjects such an examination shall embrace, but it might include, in addition to ordinary school subjects, such as algebra, geometry, trigonometry, and conic sections,—one modern foreign language, elementary mechanics, drawing, and, perhaps, a certain amount of the history of architecture. Its object being, in fact, to make sure that the intending architect shall have a decent general

education before he applies himself to the particular pursuit of architecture.

This examination passed, the student is in touch with the Institute. To it he will look as the governing body of his profession; from it, and especially from its library, he will receive assistance; and for its prizes he will be able to compete. The advantage of thus reaching the student at the outset and of keeping a hold on him is obvious.

One goal, therefore, we have now fixed.

The next would be an Intermediate Examination, which might dispose of elementary matters in materials, construction, and history, and pave the way for the third goal in the shape of the Associate Examination.

By these means the interest of the student would be maintained throughout his course of study, and his studies would be concentrated towards a definite end; he would have a palpable series of objects to strive after, and he would have a certain amount of assistance afforded him in the process.

But, gentlemen, it is one thing to set up goals, it is another thing to provide the means of attaining them. As to the first or Preliminary Examination, if it were once established there is little doubt that plenty of schools would shape their course of study to meet it, for it would embrace little besides ordinary school knowledge. But once fairly committed to the profession and working for the Intermediate Examination, there exists at present no satisfactory guidance and no adequate agency to impart instruction. It is generally admitted that, however much the system of pupillage may suit our English character, it does not and cannot impart certain branches of knowledge which are becoming essential to the architect. It is true that in London there are many isolated sources for obtaining this extra-official learning, but they are not known to all; they are scattered here and there, they keep all sorts of hours, and no one has yet offered a clue to the labyrinth of their conflicting positions and times of work. Such a clue the Institute might certainly give, and I believe it is about to do so. That is to say, it will recommend to the student a course of study to be followed at one or more of the existing institutions, and no doubt that will be of the highest utility; in fact, it will be the most that can be done in the present state of things. But it will be a curious patchwork of an education, with a lecture here and a lecture there, extracted from courses which only touch architecture incidentally, and to which architectural students are admitted, as it were, by grace. However, if we grumble, let it be understood that we grumble not that other people do so much for us, but that we have done so little for ourselves. However, we are beginning to stir now. Our Supplemental Charter will give us greater scope, and it will be one great step towards improving our system of education if we establish such a series of examinations as has been sketched. It will bring the question into focus. There will yet remain the more difficult task of providing the agency by which the instruction necessary to meet these examinations is to be obtained. As a stopgap, the course of study to be followed at existing institutions will be of great use; but I for one shall hardly be content till the function now fulfilled on a voluntary system by the Architectural Association has developed upon an authority recognised by the profession, and in a manner to reach not only students living in London, but those whose lot is cast in the obscurity of the provinces.

In the discussion which followed, Professor Roger Smith, Professor Aitchison, Mr. Stannus, Mr. John Slater, and other gentlemen, took part. We necessarily defer a report until next week.

On Wednesday evening, at 8 p.m., Professor Aitchison, A.R.A., presided, and Mr. John Slater, B.A., read the following paper on

#### NEW MATERIALS AND INVENTIONS.

In treating such a subject as new inventions connected with building operations and architecture before an assembly of practical men, it may be as well to state at the outset that there are three things which it will be impossible for me to do. First, I cannot attempt to notice all the varied new inventions which the last few

years have brought to light; secondly, I cannot avoid describing some inventions which are not new to many here; and thirdly, I cannot help omitting some which, in the opinion of many persons, are superior in interest to those which I shall describe. All that I can hope to do is,—taking my own personal experience as a guide,—to bring before your notice certain comparatively modern inventions which have interested me either on account of their ingenuity or of their practical usefulness. It must be borne in mind that it takes a very considerable time before a new invention becomes so well known and its utility so thoroughly recognised for its use to become almost universal; and, moreover, no one has a right to recommend the employment of new methods simply because they are new; a certain amount of experience of them is necessary first, and this experience can only be obtained in time. I believe it is just twelve years since a paper on this subject was read in this room by Professor Roger Smith, and it is curious to notice that some of the novelties which he called attention to then remain almost novelties still,—so conservative are we in matters connected with building. Our course across the water are far more inventive than we are, and I have had to go to them for several of the novelties which I shall bring before you. The American intellect seems to take nothing for granted, to look upon nothing as final, and to lend its whole endeavours to find out some way of improving any mechanical operation which has for some time been in use. I think new inventions and discoveries are rarer in the domain of architecture than in other branches of industry, and for this reason: all new invention must be in a mechanical direction towards saving of labour, and as the best building has as much art about it as science, and as art cares far more for the variety obtained by individual effort than for the precision and exactness of mechanical repetition, architects (who, after all, exercise far more influence indirectly upon building than is sometimes imagined) are disposed to look somewhat shyly upon the facilities for doing away with individual labour, and to decry the reproduction of ornamental features by mechanical means. We are inclined to agree with Mr. Ruskin, and to prefer a tiny bit of carving into which the workman has put his head and his heart as well as his fingers, to any number of yards of machine-made moulding. And, within certain limits we are right in this preference. But when we turn from the purely artistic to the practical and scientific side of architecture, we cannot be blind to the immense advantages which modern scientific discoveries give us over our forefathers, and we should be foolish if we did not make use of them. Take, for example, the use of iron in building. It has completely revolutionised our methods and enables us to economise space and to erect buildings in positions where it would have been impossible to do so without its employment. And it is for the architect to take any new materials which assert their structural superiority, and to adapt them to artistic forms and treatment; and granting the requisite ability, I do not believe there is anything that cannot be "invested with artistic merit," so use a phrase which we heard a good deal of a year or two ago, even though it be so utilitarian and, to most of us, utterly detestable, as a cast-iron front to a warehouse.

My remarks this evening must necessarily be somewhat unconnected, for the reason that the inventions which I have to describe have little or no connexion with each other, but I will endeavour to work as much as possible upon the lines of our own specifications, that is from the more purely constructive to the decorative portion of a builder's work. We are all of us now so thoroughly imbued with the necessity of properly trapping and ventilating house-drains, and cutting them off from the sewers, that it is scarcely necessary to allude to these matters at all; but in connexion with sanitation there is one discovery that has been made comparatively recently that demands a word or two of notice: I allude to the unsealing of traps. It used to be considered sufficient, if closets were trapped, to ventilate the soil-pipe alone, but the experiments made in the United States, at the instance of the Washington National Board of Health, and in this country by Mr. Stevens Hellyer, have proved to absolute demonstration that unless the traps themselves are ventilated they will be liable to be unsealed. There are two ways by which traps can be unsealed,—first, by the

momentum of any discharge passing through the trap itself; secondly, by the passage of a considerable quantity of water through a pipe with which the trap is connected. The passage of this water causes a momentary vacuum, by means of which the water is sucked out of the trap, and it is absolutely necessary, if the trap is to be a safe one, that all the trap branches into the main pipe should have an ample ventilating-pipe carried up from them and branched into the main pipe above the point where the highest trap branch enters it. This important fact cannot be too widely known, as it is certainly still the exception rather than the rule to have these branches ventilated. Before passing from the subject of drains and pipes, I should mention that increased experience all seems to point to the desirability of decreasing rather than enlarging the size of pipes; 4-in. glazed earthenware pipes for house-drains, and 3½-in. lead pipes for soil-pipes, if properly connected and laid, will suffice for all purposes, and will keep much cleaner than those of larger bore, always supposing they are properly flushed out. In fact, Mr. Hellyer has used soil-pipes of no more than 2½ in. diameter.

I do not think I need occupy your time in describing concrete as a building material, as there have been more than one evening in the last few years devoted to the subject, nor shall I attempt to enumerate the various kinds of ornamental bricks for walls which are now produced by various manufacturers of excellent quality and design. I will merely ask you to examine two comparatively recent forms of concrete paving,—Stewart's granolithic and what is called the "impenetrable" paving, both of which appear to me to be excellent. Terra-cotta also is so well known to all of you, and its usefulness as a building material is so thoroughly established that I need not detain you on this subject further than to mention a new form of nosing for stone or concrete steps invented by Messrs. Doulton. This is called the silicon tread, and is a kind of terra-cotta, i.e., clay burnt as hard as it is possible to make it. These treads were used for three years at the recent exhibition at South Kensington, and must have had several millions of persons passing over them. There is one comparatively recent invention somewhat in the nature of brick, which is not, I think, so well known as it deserves to be. The impossibility of getting good fixing to ordinary brick walls has necessitated the use of wood bricks or plugs, which have two drawbacks,—(1) that they are liable to shrink, and therefore lose their hold on a wall; and (2) that they are certain sooner or later to decay. Mr. Wright has endeavoured, with much success, to get over this difficulty by making what he calls "coke-breeze fixing blocks." These are made of the same size as an ordinary brick, and can be built in the walls wherever required, and their constitution is such that they will hold nails as well as wood. For the purpose of fixing skirtings, dados, and linings of all kinds on the interiors of brick walls, I consider them admirable, and even more useful are they for external use if portion of a wall is to be hung with tiles. Every one knows how unsatisfactory wooden fillets are in such situations, as they are certain to get rotten before long, but these coke-breeze blocks are practically indestructible. Another method of using them is when wooden floor-boards are required over a concrete floor, as they obviate the necessity of bedding wood blocks in the concrete, a plan which never commended itself to my mind.

The next subject to which I shall ask your attention is that of fireproof construction. The enormous losses which such huge conflagrations as have been seen too often of late years in the city of London cause to the insurance companies have had the effect of making these companies exceedingly shy of insuring large warehouses except at very high rates of premium, notwithstanding their being what is called fireproof. The reason is that, practically, such buildings do not turn out to be fireproof at all. If the insurance companies could be convinced that a building were really and not theoretically fireproof from top to bottom, they would not decline the insurance; and it is well worth the while of those who are erecting these gigantic piles of buildings which we see around us to consider whether the sum that would have to be expended to bring about this result would not be, in the long run, a most wise economy. Iron and stone used to be considered fireproof

materials, but sad experience has shown the fallacy of this opinion time after time. In America the system of fireproofing has been carried much further than with us, and it is there laid down as an axiom that no building can be considered fireproof unless the whole of the structural ironwork used in it be covered with a real fireproof substance. I wrote to one of the largest firms in the States who make a special business of fireproofing, and asked for particulars of their practice,—the Wight Fireproofing Company,—and they were kind enough to send me an illustrated pamphlet from which some diagrams have been prepared. Some of the methods adopted do not differ widely from those in use in this country, such as Hornblower's system, but as the whole subject is one of great practical interest and importance I will endeavour to explain the American systems somewhat in detail. The first kind shows a combination of iron joists, concrete, and hollow fireclay tiles of different depths. The hollow tiles are temporarily supported by centering, and are set in cement, the middle tile acting as a key-stone. The bottom edges of the tiles are grooved, in order to give a good key for the plaster of the ceiling, and on the top of the flat arch thus formed concrete may be laid of any thickness that seems desirable, thus entirely encasing the iron girder. The weight of the deeper arch is about 35 lb. per foot super. In erecting a new building there is, of course, no difficulty in providing a floor of this kind, but if one has to deal with ordinary wooden joisted floors in actual existence, it would be a very expensive matter to replace them with iron and concrete floors. The next diagram shows a method of making wooden floors practically fireproof on the under-side. This is done by flat interlocking fireclay tiles carried by iron clips screwed to the joists, the underside of these tiles being grooved to form a key to the plaster. A space of 2 in. is thus left between the plaster and the wooden joists, and as the tiles themselves will stand almost any heat that can be brought to bear on them, the joists are absolutely protected; on the upper side fine concrete or pugging might be used. This system of fire-clay ceilings can be affixed to existing floors by simply hacking off the lath and plaster. I believe this system to be absolutely new to this country, and it appears to me both simple and effective. If iron columns are to be fireproofed, it is done by encasing them with fire-clay blocks, which are grooved and are secured by iron plates with claws, which fit on the rivet-heads. In circular cast-iron columns a metal band is brought round the column, bolted together, and dropped into the groove of the blocks. In either case a heavy bed of mortar is next applied, and then another course of blocks is added, or, as the Americans say, "crowded down" over the band or plate. This process is continued till the column is entirely encased, then it is plastered with Keene's or Parisian cement, making a good surface for decoration. No words of mine are needed to show how much more perfect such a system as this is if thoroughly carried out than what we are in the habit of doing here. Soon after I had obtained these particulars from the Wight Company, Mr. Doulton, of Lambeth, kindly sent me a notice of his new patent, the Doulton-Peto fireproof blocks. These are extraordinarily like the first kind of American arch blocks which I described; in fact, I believe the idea was obtained from the American system, and I have no doubt that Mr. Doulton will carry this system further in the way of casting columns, &c. I do not think, however, he has as yet manufactured anything like the flat tiles for wooden joists. I am not going to occupy your time further on this subject of fireproof floors, except to call your attention to an English system, whose merits I estimate very highly; I allude to Lindsay's steel decking, of which I have a model here. This consists of a series of steel troughs riveted together and supported either on walls or on girders, and filled in with concrete. The strength and rigidity of the small troughs are most surprising, and the small space which they occupy is even more astonishing, as for a space of 30 ft. the depth of the decking need only be 5 in. to support a load of 11 cwt. per foot super. Another great advantage is that brick partitions can be placed on this decking and concrete in any position independent of walls or girders underneath. This flooring is largely used in the National Liberal Club.

With regard to this steel decking, it is a curious fact that many years ago a manufacturer, whose name I have forgotten, patented every form of corrugated iron which he thought could be manufactured, and left out the very one which has proved most useful. This form is based on the strictest scientific methods, as the top table is made thicker than the sides, and the sectional strength thereby greatly increased, and the various sections are riveted together at a point which is very close indeed to the neutral axis. The concrete used by Messrs. Lindsay is called by them pumice concrete, as it is very light and tough, and it is a good material for constructing roofs, domes, &c.

You will perhaps have noticed that I alluded to the wrought-iron columns of the Phoenix Company. Until the completion of the Inner Circle of the Metropolitan Railway, I do not think wrought-iron columns were much used in this country, but I believe their use will rapidly extend. We have been told for a length of time that when columns are beyond a certain length in proportion to their diameter, they fail by bending and not by crushing, and we also know that wrought-iron is much stronger to resist tension than cast-iron, and as it is an undoubted fact that connexions can be made to wrought-iron much better than to cast, we have here a combination of advantages where long columns have to be used which cannot but be appreciated, and which our American cousins are not slow to avail themselves of. Messrs. Lindsay have been on this tack for some time, and they have sent me here a section of their wrought-iron column, the strength of which is patent to all. The use of steel for constructional purposes is increasing rapidly, as it is so much more reliable than iron, and Messrs. Lindsay roll many sections of steel which can very easily be formed into columns by riveting. The safe loads which such columns will sustain are very great; for instance, a column made of a series of steel troughs, such as I have described, the total external dimensions being 16 in., would bear a safe load of 115 tons if 30 ft. long, and the weight would be 74 lb. per foot only. I have roughly calculated the weight, and the safe load on a cast-iron column 16 in. in diameter, 30 ft. long,  $1\frac{1}{2}$  in. thickness of metal; I find the weight would be 220 lb. per foot run, and the safe load 100 tons. I do not think the day is far distant when steel will have almost superseded iron for structural purposes.

Anything of the nature of fireproof material seems to me worth attention, and I will therefore briefly notice a substitute for wood lathing, either for partitions or ceilings, of which I have a model in the room. This consists of galvanised iron netting, which is fixed by staples to hoop-iron slips, which are themselves secured edgewise to the studs or joists. The wire netting is then covered with plaster in the ordinary way. The wooden framework of the partition may be replaced by a construction of angle iron, which takes up only half the space of an ordinary quarter or brick-nog partition, and this saving of space may sometimes be of considerable importance. The only thing that I am doubtful about is its permeability to sound; but, after all, ordinary partitions, or even brick party-walls, are, as many of us know to our sorrow, far from impervious to sound. I should say that a small structure formed by this iron lathing was severely tested about a year ago in Manchester, and the chief of the Fire Brigade reported very strongly in its favour.

Next to preserving the interiors of buildings from fire, one of the most difficult tasks is to preserve the exterior from the ravages of time and the weather, and it is, in fact, almost impossible to find a natural stone that will withstand the damaging effects of such an atmosphere as we have in London. In many parts of the country, too, beautiful old stone edifices are going rapidly to decay. The work of restoration of stone buildings is always difficult and expensive, but a means of doing this with comparative cheapness has been invented by M. Talary, whose metallic cement has been extensively used on the Continent. This consists of a trachytic stone reduced to powder and then rammed by an acid without being decomposed. The material thus formed is permanent, and harder than the stone itself; it is not moulded, but carved to match any pattern exactly like stone, and the surface and colour can be made so precisely to resemble the original stone that the joint cannot be perceived. Mr. Blomfield and Prof. Lewis made a careful examination of several buildings in France

where restorations had been made in this metallic cement, and they reported most enthusiastically of it, and since then Mr. Blomfield has used it in many of his restorations in England. I cannot help thinking that this invention ought to prove of enormous value, because it will enable us at a small cost to stop decay of the stone at the outset. With stone itself one always has to wait till a sufficient mass of the stone can be removed, because of the difficulty of adding small pieces to what is left, but this difficulty is now entirely overcome.

Many gentlemen who were present a few weeks ago at the reading of Mr. Crossland's paper on the Holloway College must have been much interested by the short notice which he gave of a system by which the pressure on the water mains of a building could be very largely increased at will in the event of a fire breaking out. The instances have been numerous in which, although the fire hydrants have been in perfect working order, considerable damage has been done through there being insufficient pressure to put out a fire before it has got beyond control. In London the pressure in the fire mains at the ground level averages from 25 lb. to 30 lb. per square inch, which is reduced one-half at a height of 35 ft. from the ground, i.e. the pressure diminishes as it becomes more urgently needed, because it is on the upper floors and at the roof of a building that water supply would be most effective. In order to remedy this it has often been thought necessary in the case of important buildings to erect a large tank at the top of a building or even to build a water tower at considerable expense and even where a head of water of 144 ft. can be obtained the pressure per square inch in the mains is only 63 lb. Now the system which I have alluded to is the invention of Mr. Vinning, and is called the High-pressure Fire Hydrant system. It consists in connecting with the ordinary mains one or more closed steel tanks charged with water which can be at any moment submitted to any desired pressure up to 100 lb. or 120 lb. per square inch. This pressure is maintained by a series of wrought-iron cylinders filled with compressed air by means of a small air-pump or by other means, and kept permanently at the required pressure. These cylinders can be placed in any convenient position at a distance from the water-tank, and are connected together by small pipes so as to form practically one vessel, the bottom of which is connected by a small air-pipe about  $\frac{3}{4}$  in. internal diameter with the water-tank. The means for throwing the apparatus into use is a stop-valve, which, when shut, confines the compressed air to the cylinders, but by turning the handle the valve is opened. At the base of the water-container there is a large float half-valve which closes the access to the mains as soon as the water is discharged, and thus prevents the air entering these mains. The water-container can be made of any required size, but for a large building it would probably be preferable to increase the number rather than the size of the containers. It is calculated that a vessel containing 2,000 gallons would give, with ordinary-sized pipes, a delivery of 50 gallons per minute for 40 minutes, and the extinguishing power of water is much increased by very high pressure, this amount would generally suffice for the suppression of a large fire. Of course, after once going off, all air-cylinders require re-charging, but an air-pump is not absolutely indispensable, as steel bottles containing air at a pressure of 200 lb. per square inch can be carried about to any extent. Mr. Vinning is now engaged in putting up this apparatus at the South Kensington Museum, by order of the Science and Art Department.

While on the subject of water-pipes, I should like to call your attention to a very beautiful invention which again comes from the other side of the Atlantic. Everybody is familiar with the corrosive action of water on metal pipes, and, in some cases, very serious effects upon health have resulted from the combination of certain chemical constituents in the water with the material of which the pipes were composed. But I have here some glass-lined pipes to which nothing could be more cleanly, as they can be made to any bend that may be desired. These pipes have been patented for some few years, but there was found considerable difficulty in making the joints sound; this has, however, now been overcome, as the joints are all ground by an emery wheel

and special washers are used, and I think there ought to be a great future before this invention. In addition to these pipes being non-corrosive, it has been found practically that it requires a much more severe frost to congeal the water in these pipes than in ordinary metal ones. This is due partly to the packing and partly to the bad conducting power of the glass. These pipes can be jointed with much greater ease and speed than lead pipes, and when this is taken into account, their cost will be hardly any more than lead pipe. For breweries, acid works, and other places where ordinary pipes are soon destroyed, these glass-lined pipes will be most useful.

As land increases in value in London and other large cities, the tendency is to increase the height of all business premises, and thus gain more room. We see this in the new warehouses which are constantly being erected, but we do not go anything like so far in this direction as they do in the States, where buildings of ten stories are not uncommon. These high buildings would be comparatively useless without a very complete system of lifts, and the one to which I shall call your attention seems to me to combine, in a high degree, mechanical skill, ease in working, and safety. You are, of course, aware that elevators may be divided into two main classes—those in which the cage is suspended, and those in which it is fixed at the top of a ram, which is generally worked by hydraulic machinery. Ordinary suspending tackle answers very well for good lifts, but there is considerable risk in relying upon it for passenger-lifts, even when provided with safety catches, and, in fact, in many Continental cities suspended passenger-lifts were absolutely forbidden. With hydraulic-ram lifts, of the usual construction, it was necessary to excavate a chamber for the ram of the full height of the working of the lift, and in the case of hard soils, such as rock, this would entail very great expense. One method of overcoming the difficulty was devised by Messrs. Stevens, who formed their ram in a series of cylinders, working one inside the other; but I am not able to state whether this principle has been found to answer well. The Otis elevator is a suspended lift, worked by hydraulic power, but the arrangements are such that I believe it to be absolutely safe. The cage is carried by four iron wire ropes, which pass to a wrought-iron yoke, and then, dividing into two pairs, are carried down to two timber beams, upon which the frame of the cage stands. The wire ropes pass over a guide pulley, and also over a loose pulley, and are fastened to a strong beam at the top of the building. The ropes are not connected directly with the cross-beam, but with a balanced lever-beam, the action of which I shall refer to again.

The framework of the cage carries gun-metal guides, which slide on each side of the timber uprights. The motive power is water, but no excavation for a ram is required, as the cylinder and piston which constitute the driving power can be fixed on the ground bed. By the intervention of the loose pulley just mentioned, the ascent or descent of the piston in the cylinder for any distance lowers or raises the cage just twice as much, and there would of course be no difficulty in increasing the mechanical advantage by the use of more pulleys. [The action of the lift was explained by means of diagrams.] Now, everything depends upon the safety appliance of such an elevator as this. The causes of danger are three: first, breaking of the supporting ropes; second, too rapid a descent in consequence of heavy weights; third, the counterweight carrying up a lightly-loaded cage higher than intended, and thus breaking the connexion with the flanges. The latter was the cause of the accident at the Grand Hotel, Paris. As the cage is in itself slightly heavier than the counterweight, the latter accident cannot happen; and even if it could, and the piston-rod were broken, the only tendency would be for the cage to fall rapidly, and this cannot occur. In case of the breaking of any one rope, the balance-beam is acted on, and a wedge-grip is brought into action on both sides of the lift. If all the ropes were to break, and the cage were to commence to hurry to the bottom, a second safety device is provided which comes into play as soon as a certain speed is attained, and this brings the wedge into play at once and stops the descent of the cage. As soon as these wedges have acted, they cannot be released except by raising the

cage. I believe, however, that no case is known of all the ropes breaking. It is important to notice that the mere stretching of one of the ropes affects the balance-beam, and thus advertises itself to the attendant, who must at once see what the matter with the ropes, and properly adjust them. I believe that experience has proved that the wire ropes made by the American Elevator Company last, on the average, five years.

Another important point to be noticed is that this lift can be worked at a very low pressure, say 40 lb. to the square inch, whereas other hydraulic elevators require a very high pressure, that would have been almost impossible to obtain a few years ago before the introduction of the hydraulic power system of high-pressure mains, where pressure up to 700 lb. per square inch can be obtained. This is not the place to enter upon a discussion as to the relative merits of low and high pressure, but no notice of modern inventions would be complete that did not include this most valuable system,—in the starting of which our late President, Mr. Winchmore, took very great interest,—by which hydraulic power can be laid on to any building in London from a central station.

To turn to a very different subject, viz., heating, I should like to say a few words about a new stove which has come under my notice and which I have lately introduced into one of my buildings. This is the invention of Mr. Lofis, of Cambridge, and acts upon the principle of giving as large an amount as possible of radiant heat, by compelling the smoke and heated air to take a circuitous course, warming a large surface of metal before it goes up the chimney. It thus differs from the majority of improved stoves which have been manufactured of late years, and which for the most part rely upon warming a large amount of air and causing it to enter the room. Several tests of this stove have been made, and its economical consumption of coal has been clearly established.

It has probably been the lot of some of us to have to design buildings for clients in whose eyes economy is a virtue far exceeding artistic effect, and I believe it is not an unknown proceeding to be obliged to go through the drawings and specification with a hilder in order to reduce the estimate. I have known cases in which an architect has been at considerable trouble to design a staircase, and to put a little of what is known as "feeling" into his halusters, &c. These are precisely the features which a hilder will pitch upon with the remark, "There's a lot of work in that staircase, air; I can get some very nice turned halusters that will look quite as well as this, and not cost half so much," and your staircase looks just like any other speculating hilder's. Some very great improvement has been in turning machinery lately, and halusters and newels can be got now "square turned." I confess I do not know how it is done, as I believe the machines are kept in jealous seclusion, but I have some specimens of square-turned halusters which will give you an idea of what is, at any rate, a little variety from the ordinary run. These have been kindly lent me by Messrs. Carter & Aynsley, of Bishopsgate-street. I must not be understood as in any way approving the design of these, but the fact that it is possible to turn things square was quite unknown to me a few months ago, and I thought it might be of interest to this meeting to know that such a thing is possible.

In connexion with house fittings I would call attention to Kay's locks, several specimens of which are on the table. The simplicity of construction of these locks seems to me very commendable, and they have given great satisfaction in cases where I have used them. I would particularly call attention to an automatic cupboard lock.

Among decorative appliances I may mention Radeke's compressed wood pulp, which has been used to some considerable extent abroad, although it has not found its way at all largely in England. Some kind of composition is used as a basis, and is laid on a thin veneer of any kind of wood, such as oak, walnut, &c., and the whole is then compressed by hydraulic power into moulds, which can be made of any required design, except that it is impossible to have deeply under-cut mouldings. The grain of the wood is excellently preserved, and the effect of the finished product as a means of wall decoration is certainly good. I believe it can be

treated in all respects as wood, viz., cut, sawn, or planed.

Artificial illumination is a subject that has attracted great attention during the last few years, and the threatened rivalry of electricity has given a strong impetus to the improvement of gas-burners, in order to obtain more perfect combustion. Among these I may mention the Albo-Carbon light, the Wenham lamp, Sugg's Cromarty burner, the Siemens regenerative gas-burner, and the Welshach incandescent lamp, which latter consists in the combination with the gas flame of a thin cylinder of some refractory substance which glows at a white heat. Although electricity has not ousted gas from the field, as it was at one time thought it would do, it has yet made more progress than many people imagine, and no architect would now think of designing a theatre, music-hall, hotel, or restaurant without fitting it with incandescent electric lamps, which do not give off as much heat as gas, and,—more important still,—do not contaminate the atmosphere. The invention of storage batteries as a sort of buffer between the machine and the lights, and as a means of avoiding the risk of breakdown of the engine, did much to render electric lighting more generally available, and considerable improvements have been made in these storage batteries during the last few years. In the earlier forms of storage battery,—for instance, the Farnes-Sellon-Volckmar type, which is most largely in use,—there is always a certain amount of local action going on between the lead plates; but in the battery of the Union Electrical Power Light Co., which they have been kind enough to lend me to-night, there is no local action at all. The elements consist of solid slabs of peroxide of lead and plates of sponge lead, and are immersed in dilute sulphuric acid. The peculiarity of the peroxide plates is that the material used in its construction causes it to set into a perfectly hard and durable form, so that it is not injured by transport. The size of the plates is 7 in. by 4 in. and the total weight of the cell complete in a case is 20 lb. 11 oz. only. This lightness is achieved partly by the plates being loosely held by strips of celluloid, which material is also used to cover the strips of platinum by which contact is made. The elements are connected together by platinum wires dipping into small wells of mercury. Professor Forbes made some very careful tests of one cell of this battery, and obtained a discharge of about 8½ ampères for nearly fourteen hours. He also reported that the efficiency of the cell was between 80 and 90 per cent. The cells are contained in small wooden boxes, which are readily transported from place to place. When the elements are exhausted fresh ones can be supplied, and the old ones recharged, but spare plates can always be kept ready for use at any time. A battery of fifteen cells will run twelve ten-candle incandescent lamps, and occupies a few feet only. The recharging of the plates must of course be done by a dynamo machine.

While on this subject, I must mention a small primary battery and lamp combined, which will enable any one to have an electric lamp on his table at any time, and which can be recharged by simply pouring into the cell containing the plates the necessary liquid. These lamps are made in very ornamental cases, and one of the size here will run about three hours, i.e., during the continuance of dinner; but if a larger size were adopted, they would, of course, last longer.

I now come to a subject which cannot be called in any sense an invention, but it is a discovery of very great importance as affecting the strength of materials, and although it affects engineers more than architects, I think we ought to be acquainted with its main features. For a considerable period it was considered sufficient to ascertain, with more or less exactness, the ultimate tensile or compressive strength of a timber beam or an iron bar, or any such material subjected to stresses or strains, and then to take a certain factor of this ultimate strength as a fairly safe working strength. But so long ago as 1870 a German engineer, named Wöhler, made a very large number of experiments which showed conclusively that the breaking strength of any material depends not so much on the statical load, but on the *extreme variations* of load which the piece has to undergo. For instance, taking 45,000 per square inch as the average breaking tensile strength of wrought iron, a rod which would be subjected to a steady load of 90,000 lb. ought to have a sectional area of 8 square inches,

using a factor of safety of 4; but if, instead of the steady load, the rod would be subject to alternate changes of load varying from 10,000 to 90,000 lb., its sectional area would have to be 11½ square inches. If the same rod were subjected to alternate compression and tension it would require to be even stronger. Wöhler expresses this law as follows: the fracture of a material can be effected by variations of stress repeated a great number of times, none of which reaches the breaking limit, the difference between the extreme stresses determining the breaking strength. Wöhler's experiments were purely empirical, and their results have considerably exercised the minds of scientific men, but another German, Professor Bauschinger, of the Munich Polytechnic School, has been carrying on for several years a most exhaustive series of experiments, the result of which are published in a series of memoirs to which Professor Unwin was kind enough to call my attention, and of which he has published a short *résumé*. The puzzling anomaly of Wöhler's experiments lay in the fact that when subjected to alternate tension and compression a bar broke down at a stress lower than its elastic limit, and Bauschinger thinks he has discovered the explanation to be that in many materials the elastic limit has been raised artificially in the process of manufacture. I have not time to pursue this question further, but one illustration will show how it may affect our work. In an iron roof of ordinary construction, in which the pressure on one of the struts under ordinary circumstances is 1,500 lb., a heavy gale of wind would just double this, and this variation of pressure would reduce the ultimate strength of the strut nearly 20 per cent.

Professor Bauschinger has also carried out a large number of most careful and elaborate experiments on the behaviour of full-size cast-iron columns and wrought-iron stanchions, under the influence of heat and sudden cooling, and he found that cast-iron did not warp so much as wrought, but that if cast-iron was heated to a certain point and then had a stream of water directed on it it bent so much that it broke in two. He has also experimented on piers of stone and concrete, and comes to the following general conclusions:—(1) That no natural stone will withstand fire, but that granite did so the best; (2) that brickwork behaved much better than any stone; and (3) Portland cement concrete was best of all. It is impossible to give any idea of the exhaustive and minute character of Professor Bauschinger's experiments, and he is, I believe, still continuing them, and their results must have a very important bearing upon our knowledge of the strength of materials.

The experiments from which the formulae for the strength of timber beams, joists, &c., were deduced, were in almost all cases made on very small pieces, and it has been a pure assumption that large pieces would behave in the same way. During the last few years a number of experiments have been made in the States, chiefly by Mr. Lanza at the Massachusetts Institute, on full-size pieces of timber; the results show that our ordinary formulae require considerable revision. For instance, a spruce beam 12 in. by 2 in. by 15 ft. long, broke with a central load of 5,894 lb. According to Tredgold's formula, it ought to have supported a load of 8,928 lb. before breaking. This result was corroborated by other tests, and the general conclusion arrived at is, that whereas we have been accustomed to use as a constant in the familiar formula 
$$W = \frac{c b d^2}{l} \text{ 4 cwt. for fir or pine beams, — in fact,}$$
 in one of Tredgold's examples 530 lb. is used,—we ought really to use a constant of not more than 2½ cwt. The more thoroughly large size specimens, whether of wood or iron, are tested the more will our knowledge of their strength be increased, and we shall be less dependent upon theory.

In conclusion, I will only say that one most important discovery has been made in the last few years to which I have not yet alluded, and that is that one necessity for an architect is a thorough education, and the result of this discovery must have very far-reaching effects on our profession.

In the discussion which followed Mr. Slater's paper the following gentlemen took part, viz., Professor Bahcock, Professor Kerr, and Messrs. Woodward, Neville, W. White, Hall,

Smallpeice, Doulton, Seddon, and Gibson; but our report is necessarily deferred till next week, when we shall detail the further progress of the Conference. We may, however, here briefly mention the order of proceedings:—

Thursday, May 5th.—11 a.m. Visit to the City and Guilds of London Institute, Central Institution, Exhibition-road.—3 p.m. Conference Meeting (Mr. John Holden, Fellow (Manchester), in the chair). Discussion of the Report of the Special Federation Committee, R.I.B.A., prior to its consideration by the Council.—9 p.m. Conversation of the President and Members, R.I.B.A., held by permission of the Lords of the Committee of Council on Education at the South Kensington Museum.

Friday, May 6th.—11 a.m. Visit to the Drainage Works of the Houses of Parliament.—3 p.m. Conference Meeting (Professor T. Roger Smith, Member of Council, in the Chair). Short Papers on the "Registration of Architects," by Mr. Charles Aldridge (Liverpool); Mr. G. W. Cannon (Leeds); Mr. David Thomson (Glasgow); Mr. E. T. Hall, and others.—8 p.m. Ordinary Meeting of R.I.B.A., for the Presentation of the Royal Gold Medal to Mr. Ewan Christian, and for presenting the Institute Prizes. The President, who will take the chair, will deliver an address.

Saturday, May 7th.—11 a.m. Visit to the new rooms of the National Gallery.—12 noon. Visit to the Diploma Gallery, &c., of the Royal Academy, Burlington House, Piccadilly.—7 for 7.30. Members' Dinner, at the Freemasons' Tavern.

#### STAINED GLASS.

*Great Barr (near Birmingham).*—Another Munich window, by Mayer & Co., has just been placed on the north side of the Parish Church of Great Barr, near Birmingham. It consists of two lights, through which is represented the "Presentation in the Temple," and it has been erected "In memoriam Mahel Augusta Jaffray, died 1886."

*Kingston (near Taunton).*—A stained-glass window has just been placed in the west end of the north aisle of the parish church of Kingston, near Taunton, in memory of the late Mrs. Gale. The subject is a copy of Holman Hunt's picture "The Light of the World," and it has been executed by Messrs. Payne & Green, of London.

*Leigh (Essex).*—A window in painted glass, designed and drawn by Mr. Wm. White, F.S.A., has been placed in the north wall of the church of Leigh, Essex, as a memorial to Bishop Eden. In the centre light is a figure of St. Andrew, and in a medallion beneath is a small ship. The inscription at the bottom is as follows:—"To the glory of God and in grateful memory of Robert Eden, Bishop of Moray and Ross, Primate of Scotland, formerly rector of this parish sixteen years. He presented to Bishop Edward Field, of Newfoundland, a church mission ship, the *Hawk*. He deceased August 26, 1886, aged 82 years. Also in memory of Emma, his wife, who deceased March 24, 1880, aged 77 years."

*Manchester.*—The *Manchester Guardian* says that it is proposed to celebrate the Jubilee year of the Queen, and at the same time perpetuate the memory of the late Bishop Fraser, by erecting in the Albert Memorial Church, at the western end, a stained-glass window. Messrs. Hemming & Co., of Margaret-street, London, are to be entrusted with the execution of the work, which has been designed by the curate, the Rev. W. J. Mooney. The window will contain the royal arms and those of the Prince Consort, also the arms of the See of Manchester and of the late Dr. Fraser. The illustrations are of scenes in the life of St. Paul. The cost of this *in memoriam* work will be about £500.

*Oldham.*—A new chancel window in St. Mary's Church, High Crompton, has just been unveiled. The work has been designed and executed by M. J. B. Capronnier, of Brussels.

*Wiveliscombe.*—A stained-glass window, executed by Messrs. Clayton & Bell, has just been erected in the north aisle of the parish church of Wiveliscombe, by Miss Pocock, in memory of her late parents.

\* This report was printed *in extenso* in the *Builder* for April 23, p. 602.

#### RECENT PATENTS.

##### ABSTRACTS OF SPECIFICATIONS.

6,640, Water-closets, &c. J. Shanks.

The improvements embodied in this invention are mainly to limit the use of water while securing the full effective cleansing power of the same; an "after service" is arranged which with a wash-down basin completes the flushing. The distinguishing feature of the valve is a piston in the cover of the valve-box arranged to open the valve by diminishing the pressure on the outer side of the diaphragm.

6,943, Ventilating Rooms. E. G. Wright.

A tube with conical baffles is placed between the ceiling and floor, or behind the cornice. The ends of the apparatus are provided with inlet and exhaust cowls respectively; the cones by increasing the pressure attract the vitiated air quicker to the top of the room.

17,116, Damp Walls. E. C. S. Moore.

Portland cement is used as the basis of the patentee's system, and is applied on the inside of the building in two coats, afterwards covered over with a third coating of Parian or Keene's cement. The first coating is pure cement ½ in. thick, and the second is mixed with sand one part in three, so as to exclude the damp. The condensation on the surface of the wall is prevented by the application of Parian or Keene's cement or plaster.

15,983, Kitchen Ranges. G. W. Courtier.

This invention relates principally to an oven attached to the range, and consists in making an inner casing of iron; so that when the oven is to be enlarged the casing can be drawn out telescopically, and the baking area thus increased.

1,758, Sash Fasteners. J. Harrington.

The object of this invention is to prevent the pushing back of the lever by a knife or blade between the sashes. An additional hinged piece of metal is fastened in such a way that it falls over the two sashes, and covers the junction of them for some distance to protect the lever of the fastener when the latter is bolted.

1,881, Fire Alarm. W. E. Heys.

This invention relates to a system of electric alarm with an automatic device for opening or closing the electric circuit.

##### NEW APPLICATIONS FOR PATENTS.

April 22.—5,847, H. Hagen, Chimney Pot for Smoky Chimneys.—5,848, J. Ditchfield, Water Taps for joining to Lead Pipes.—5,876, A. Barton & C. Arnold, Window or Sash Fasteners.—5,901, J. L. Doulton, Earthenware Blocks and Tiles.

April 23.—5,928, H. Richardson, Piercing or Boring Holes in Walls constructed of Bricks, Stone, &c.

April 25.—6,021, A. Le Marquand, Sewerage or Drainage of Houses, &c.—6,027, A. Rhodes, Window Fastener.—6,033, G. Sharpe and Others, Cement for Plastering or Moulding.

April 26.—6,048, A. Smith, Fixing Door-handles to Spindles.—6,075, F. Tuerk, jun., and Others, Water Meters.—6,080, J. Eves, Water-closets.—6,108, J. Sheehy, Window Sashes.—6,111, A. J. Davies, Supplying Water to Water-closets, &c.

April 27.—H. Wake, Lowering and Depositing Concrete under Water.—6,137, S. Pickersgill, Open Fire-grates or Stoves.—6,152, W. Thompson, Portable Buildings.

April 28.—6,187, H. Longdon, Step Ladders and Trestles.—6,242, C. Clarke and F. Williams, Soldering Irons.—6,244, C. Clarke and F. Williams, Flushing Water-closets.

##### PROVISIONAL SPECIFICATIONS ACCEPTED.

3,380, J. McKee, Register Grates or Stoves for House Fireplaces.—3,404, S. Coombs, Frictional Door Check.—4,255, M. Snyr, Siphon Water Waste Preventer.—4,321, F. Jarsul, Door Locks.—5,310, E. Deacon, Locks, Catches, or Latches.—5,392, W. Brailey, Locks and Latches.—15,607, G. and M. Stowe, Bolt for Doors and Windows.—3,757, W. Pilditch, Adjusting and Hanging Doors and Casements.—4,544, J. Williams, Metallic Window Sashes and Frames.—4,598, S. Eshott, Metal Water Bars for Windows and Doors opening inwards.—4,618, R. Haddan, Brick or Block for Building Purposes.—4,689, W. Froussier, Artificial Stone.

##### COMPLETE SPECIFICATIONS ACCEPTED.

###### Open to Opposition for Two Months.

7,163, T. March, Horticultural and Other Buildings and Structures.—12,331, C. Swindell, Store Grates, Fire Grates, or Fireplaces.—2,937, D. Deyn, Closing and Seaming Doors.—7,039, W. Smeaton, senior, Flushing Water Closets, Lavatories, &c.—8,081, F. Morgan, Casement Fasteners.—8,593, J. Luke, Paper Floor and Wall Coverings.—12,174, T. Barnett, Register Stoves.—15,904, R. Davison and W. Creed, Wood Block Flooring.—3,850, J. Gooch, Shop Fronts.—4,244, A. O'Leary, Frames for Portable Structures.—4,427, D. O'Leary, Hinge for Gates, Shutters, &c.



# The Builder.

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SATURDAY, MAY 14, 1887.

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### Architecture at the Paris Salon.



FOR two years past, while there has been a superfluity of pictures and statues at the Palais d'Industrie, the architectural exhibits have progressively diminished. This is no doubt because, with the exception of premediated designs afterwards carried out and designs submitted for diplomas, the management has begun to discountenance the admission of the numerous waifs and strays of competitions from all quarters which have formerly invaded the architectural galleries to the prejudice of designs seriously intended, and which have no interest to any one except to the authors who gain a free admission in virtue of them. As quantity is never the real charm of an exhibition, we are in no way shocked at this evisceration on the part of the judges. It facilitates our task, and we might even wish it further exercised, especially in regard to those sketches of tourists which become every year more and more numerous. Sketches of this kind certainly have the interest of representing the first impressions of youth; they form an excellent gymnastic exercise for the taste and the touch, and usefully complete the education of young pupils by giving them an independence and originality in the use of the pencil which they could not have acquired in the École des Beaux Arts; but still, a discretion ought to be exercised in regard to this crowd of sketches, at least so far as to confine them to those whose subject is architectural. Some of the exhibits are far too omnivorous in this respect, a reproach particularly to be addressed to M. Ghesquier, who has accumulated in immense frames all his tourist *souvenirs* with an almost puerile exuberance, with the sole end of proving that he has not wasted his time or squandered his money for naught.

In this category of work M. Courtois-Suffit, whose remarkable sketches we noticed last year, exhibits this year an interior view of Siena Cathedral, very finely executed. Charming also is the little atrium at Pompeii, painted by M. Paul Blondel, the young "Prix de Rome" holder, who has been commissioned by the municipality to design the pedestal for the statue of Étienne Dolet.

Italy and the East are the object of most of the sketching architects. M. Saladin brings the best sketches from the neighbourhood of Tunis. M. Renaut exhibits watercolours from Greece and Constantinople. The drawings of

M. Micoud and M. Dezermaux are from subjects in France, which itself presents such a great field of architectural study. The former has confined himself to the central provinces, the Loire and the Upper Loire, &c.; his views of the Château de Polignac and of La Chaise Dieu are exceedingly interesting: the latter has occupied himself with Chartres. M. Chas. Normand also has made various studies of picturesque houses in France. M. Normand is a zealous defender of the antiquities of Paris, and his special taste for archaeology is fortunately supplemented by genuine talent as an artist.

As usual, ecclesiastical buildings, either restored or in their actual state, occupy an important place in the architectural room at the Salon. We may mention especially the fine water-colour drawings of M. Baudot, very accurate though rather hard, representing the splendid Cathedral of Clermont-Ferrand. M. Camut, for his part, has faithfully reproduced the church of Notre Dame de Port (also at Clermont), the most ancient and, perhaps, the most perfect example of the eleventh-century architecture of the Auvergne type. There are also two exceedingly careful and well-executed sketches by M. H. Chaîne of the ancient collegiate church of Eymontiers (in the district of Haute Vienne), celebrated for its fifteenth-century windows. Why is the drawing by M. Georges Farcy of the portal of St. Trophime at Arles hung so high? It is certainly a great deal superior to that by M. Louzier, which is hung lower. The same artist gives us, further on, a design for a church intended for a village in Normandy, which is well conceived and without pretension,—a rare merit in the present day. There are also to be mentioned two frames containing sketches by M. Rouillard from the Church of St. Sauveur at Petit Andelys; the Church of Puiseaux by M. Paulin, and the curious drawing by M. Pettigrand, reproducing a wooden door from the Cathedral of Puy, with great finish of detail and remarkable ability. We must also mention specially the interesting water-colours by M. Gaïda, executed after the paintings of the thirteenth century in the Cathedral of Bayeux, and the exhibits of M. Ernest Monnier, representing the Church of Vauvres, with the new flèche which he erected on it some years ago, and which shows some degree of novelty in the treatment of Gothic detail.

The designs for civil architecture may be classed under the two heads of public buildings and private houses. One of the most important of the former class is the Library and Museum which has been in course of construction at Toulon, from 1882 to 1887, from the designs of M. Allar, brother of the eminent sculptor of that name. This is a

remarkable work, showing obviously the influence of his master, Esperandieu. It is a fine design, with superposed orders, the principal story being relieved with polychromatic decoration. The grand staircase, with its double windings, recalls that of the Palais des Arts at Marseilles, so admirably decorated by M. Puvis de Chavannes.

M. Anhurтин (a native of Metz, who has remained a Frenchman) exhibits a design for the enlargement of the Museum at Metz, a good design and plan of great simplicity of lines. The same cannot be said of the design for the Fine Arts Museum at Lauzanne, by M. Fivaz. His new façade for the Church of St. Nicholas at Fribourg is much better.

Scholastic architecture is represented by M. Dornay and M. Bonnenfaut. The former exhibits the drawings of the Lycée de Saint Étienne, which recalls, as regards polychromy, the Chaptal College. M. Bonnenfaut exhibits the designs for the schools of Choisy-le-roi and Viroflay, the cold and depressing architecture of which is a mere repetition of other buildings of the same class. M. Ulysse Gravigny, who is just completing a new Mairie for Arcueil-cachan, in the Department of the Seine, has not confined himself, like many other architects of the same class of building, to the production of a purely decorative work, a piece of show architecture. He would have been hampered in such an attempt, in any case, by the difficulties presented by the shape of the site, and the acute angle formed by the intersection of the two steep streets where the new building is placed. In spite of these difficulties, the author has developed an admirably-arranged plan. The façade is well studied for the situation, though a little over-weighted by the campanile which surmounts it; but it has not the refinement of detail of some of the Paris Mairies which we have illustrated.

M. Hermant, who last year exhibited a design for a Mairie, is represented this year by a design for a republican barrack,—a sober and practical piece of architecture, well thought out in all its utilitarian provisions, and with a gaïde but sufficiently architectural exterior design. M. Lheureux's design for the enlargement of the "École de Droit" is another good example of practical architecture with the same kind of merit.

The new Casino for Dieppe, the work of M. Durville, is certainly not high art; but this rather hybrid-looking polychromatic design, presenting such a gay appearance, is the kind of thing very well suited to a Channel watering-place, which, in summer at least, hasks under a warm sun and almost as blue a sky as on the Mediterranean shore.

The designs for private dwelling-houses are of special interest, because it is really in this

field that there is the most scope for the exercise of the taste and invention of the architect in the present day. In this respect, the *Salon* of 1886 showed a collection of interesting works which promised well for this class of architecture; but our hopes in regard to it are hardly fulfilled in the show of the present year. Mediocre is the design of M. Barhaux for a "Maison de Campagne," mediocre also the house design by M. Bonnier. There are some pretty details in that by M. Chabat, and the little villa for Varenne, designed by M. Farge, is cleverly treated; but most of the designs for domestic architecture want style and character, and are desperately commonplace.

There is a whole series of restored châteaux, many of them very interesting: the manor-house of Chemazé by M. Ridet, that of Tournai by M. Jarrier, &c. The Château of Chalncet, by M. Benouville, is particularly curious; and M. Daujoy has rendered in a masterly manner in all its details the majestic chateau of Villersexel belonging to the Count de Grammont, and which was burned in 1871 during the engagement of General Bourbaki with the Germans.

By the side of these actual buildings carried out, and restorations of ancient buildings, there are, as usual, many designs of the kind which we prefer to regard as works of pure imagination, in the sense, at least, that they are not susceptible of any immediate or practical application. It is evident, for instance, that the immense caravanseraï which MM. Carle and Grémally propose for a winter station hotel would be in practice a very inconvenient and wearisome place to live in, and had much better remain on the drawings of its two architects, without making any endeavour to go further into realisation. It is also evident that the "Ile de Cité," at Paris, is not really likely to have anything to do with the monument with which M. Deverin proposes to adorn it,—an enormous model of the prow of an ancient galley, carrying a colossal figure representing Lulétia. That is what may be termed architectural utility of the first order. M. Hamelin, again, haunted by a utopian scheme for an ideal observatory, exhibits a drawing of an incomprehensible aspect which one would be disposed to take at first sight for a design for an immense cremation structure. There are every year a series of things of this kind, designs which make one feel sincere pity for the misguided architects who have given themselves seriously to the production of this kind of work. The design for an "École de Droit," however, by M. Joannis, may be named as an exception, being a conscientiously studied and practical design, the only fault of which is that it is rather too obviously inspired by the façade of the Palais de Justice of the late M. Duc. It is true that no better model could have been chosen.

M. Wable proposes, in view of the Exhibition of 1889, a palace or pavilion for Algerian or Tunisian exhibition. That of 1875 was copied from an Algerian mosque. M. Wable proposes to substitute for Arabian religious architecture a specimen of the style of its civil architecture; and his design, well studied and graceful in form, deserves serious consideration.

Although the site of the Tuileries appears to be absolutely reserved for a monument to the Revolution,—unless, indeed, a Museum should be erected there,—M. Cassien Bernard thinks nevertheless to erect there a monument in honour of Victor Hugo, which has the serious fault of reminding one of a great many other monuments already in existence, especially the Palais des Arts at Marseilles and the monument to Victor Emanuel, which M. Nenot exhibited two years ago. It is a vast semicircle lined out by colonnades, and terminating in a pavilion at each extremity. In the centre is a large triumphal arch, on the axis of which is placed the statue of the poet, in front of which is a long stone balustrade mounted on a flight of many steps. The aspect of the whole is fine and decorative in effect; it has only the mistake, as already observed, of being too much of a reminiscence. By the side of this apothecosis in marble and granite is the monu-

ment which the fraternal piety of M. Ambroise Baudry has led him to design for Pere la Chaise, to receive the remains of his illustrious brother. The monument is quiet and dignified in effect and in idea. A bronze female figure leans, in an attitude expressive of deep grief, over a sarcophagus covered with palm branches, among which may be seen the palette and brushes of the painter. A large figure of Fame, also in bronze, shading beneath its wings the bust of Baudry, places a crown of laurel on his brow. Behind rises a tall granite stele.

Among the designs for funeral monuments, not very numerous, may be mentioned also that to the memory of Armand Carrel, executed for the city of Rouen. The statue is by M. Albert Lefevre, and the pedestal, designed by M. Touzet, is very simple, but has the rare merit of being proportioned to the dimensions of the statue.

A little while before his death Victor Hugo was still entertaining the wish to build a house for himself. It was one of the last pre-occupations of his thoughts. "Je veux un hôtel entre cour et jardin," he said in 1884. "Quand donc me haitrez-vous ma maison?" he inquired some few months before his death of M. Leidenfrost, who, to satisfy the old poet, prepared the design which is now exhibited here. It is a pavilion in Louis XIII style, of brick with stone dressings. Victor Hugo loved the architecture of that manner and date, which recalled to him the Place Royale where the generation of 1830 used to visit him. The design is abnormal enough in character, composed of an *avant-corps* with terraces, colonnades, painted gables, Renaissance dormers, roofs à la Mansard, a verandah ornamented with rare plants, &c.; a kind of poet's and artist's dream of a house, very charming in effect, and which does great credit to the taste and imagination of the designer.

Among the works of the pupils of the Academy de France at Rome, not very numerous this year, those by M. Deglane and M. Esquie are, perhaps, the most interesting. The first exhibits his very careful studies of the Temple of Mars Ultor, the Temple of Concord, and the Tomb of the Matæstas at Rimini. M. Esquie gives us the restoration of a ruinous vault without ribs (*voute d'arête*) at the Villa Madama, and also some details of Classic architecture very carefully made out.

M. Gayet, member of the French *Mission Archéologique* at Cairo, exhibits six frames of very interesting drawings, comprising a complete restoration of the Great Temple of Luxor, based on the researches of M. Maspero. These studies are forced and violent in colour, bright yellows and strong reds predominating; but this is, we imagine, really the kind of effect which the original work in its freshness would have had, and its over-pronounced effect must not be charged against the author of the drawings, which are very conscientious and well executed. This restoration is the only one of importance of its class, and we regret not to have seen this year any work analogous to those by M. Lalou and M. Blavette, exhibited last year.

Generally, it may be said that the architectural exhibits of the *Salon* of 1887 include no work of great note or genius. Certainly there are, as there always are, some good elevations, some ingenious restorations, some interesting schemes, and some pretty drawings, but no breath of genius animates these works, which for the most part do not pass beyond the level of an honourable mediocrity.

#### THE MANCHESTER EXHIBITION.

**O**NLY the demand on our space made by such a number of matters of interest in London during the last week or two,—the Architectural Conference, the Academy and Grosvenor exhibitions, &c., all coming to the front at once,—has induced us to postpone even for a week any notice of the remarkable exhibition at Manchester, which in interest ranks second to nothing at the moment, and which is in some respects one of the most remarkable exhibi-

tions of its kind that has been seen in England. It is a thing that has been thoroughly well done in every way. The building for the exhibition, of which we gave a view some time back, when the competition for it was first decided, has, in the first place, been well planned and constructed; it is not quite so striking an edifice architecturally as the Manchester papers make out,—and probably no one knows that better than the architects themselves; but it is a well-constructed temporary structure, laid out in a manner, at once effective and suitable for its purpose. A great deal of trouble and care has been bestowed upon the decorative treatment of the interior, which is much more carefully thought out and more homogeneous in plan and principle than is generally the case in a structure of this kind. Then the Manchester Exhibition has earned the great distinction (certainly a great one among exhibitions of this class) of having been practically complete on its opening day, instead of leaving many weeks of confusion and getting things into their places to follow the opening. Manchester has the repute of being emphatically a place of business, and in regard to the exhibition her business-like character has been thoroughly borne out. Then the promoters of the exhibition have got together the most remarkable and typical collection of English paintings, extending over a considerable period, that has ever been seen in one place. They have an "Old Manchester" which beats the famous "Old London" of the Kensington Exhibitions in scale and finish. They have arranged their industrial art exhibits in a systematic manner, so that it is really possible, in most cases, to find what one wants. They have got out a very complete catalogue. They have a large exhibition of machinery in motion, much of it connected with the staple industry of the city,—the spinning of cotton. They have a special exhibition of Irish work, which, at the present moment, is likely to be a matter of interest to many persons. It is not a mere pleasure exhibition; it is one where much that is of practical interest is to be seen; but added to these more serious objects of study are the more joyous attractions of fountains, hands, a fine organ, and an elaborate system of electric lighting and "effects"; so that it may be said there is something for all tastes.

We propose to give a general idea here of the contents and arrangement of the exhibition, taking the opportunity of going more into detail in regard to some of its departments hereafter.

Entering from the "Chester Road" we find ourselves at the end of a pretty long gallery or avenue stretching down in an oblique direction towards the central space or "crossing" of the exhibition building. But before going down it, we can turn aside to the left into the gardens and wander about the "Old Manchester and Salford." This, as observed, is more elaborate than Old London, but we must remember that Old London and its designer, Mr. Birch, led the way in this kind of show. There is a good deal of stage effect,—men in armour and in costumes of various ages, according to the buildings to which they are specially attached; and the street is entered through a rather nondescript structure supposed to represent the Roman gateway of the town of Mancunium. The streets are mostly of houses of a sixteenth and seventeenth century date, many of them reproductions from old engravings (some of which are to be seen in a room in one of the "old" buildings); there is old Salford bridge and Manchester Cathedral tower, and one or two of the small prim old Classic buildings which have been swept away to make way for the larger buildings required by the growth of the city and its population. The thing is exceedingly well done, and there are many pretty hits in it, but we would just hint a question whether, now that the novelty of the idea is gone, this scenery is quite worth all the trouble and expense of making it. There will probably be an impulse towards making an old town wherever there is an exhibition now, and it is a kind of thing that may be overdone

It was overdoing it to put up an imitation of the cathedral tower there. It is a poor, weak tower in itself, and the imitation, of course, looks weaker still, and besides, why have the sham when the reality is at hand? The use of such an old town is to reproduce what has passed away.

Returning, and going down the entrance avenue (on one side of which may be seen some of the work done in the Technical and the Art Schools of Manchester), we enter the north transept of the exhibition building proper, devoted to a portion of Section I. (Industrial design), on the right samples of cotton stuffs and materials, on the left of silk and some of the operations of treating it. In front is the large open platform, covered by the dome, and surrounded by a terra-cotta screen or arcade, in a semi-Byzantine style, by Messrs. Doulton; very good work, but it would have looked better with a plinth of the same material, instead of the slender shafts springing off the wood floor. The main avenues run east and west (approximately). The centre alley is devoted to industrial art, the centre space being occupied by separate stands of various manufactures, such as porcelain, glass, &c., and the sides are lined with small rooms or booths, open towards the main avenues, and arranged for the display of various classes of goods. Those in the eastern avenue are entirely devoted to artistic furniture and upholstery. This part of the exhibition is very well arranged; the front of the whole forms a continuous design, broken at regular intervals by gables of black and white work (rather a sham this); the openings of the booths are treated decoratively with a certain degree of variety, but a broad band of bold foliated ornament, in two shades of red, running above the whole, binds it all together, and gives it an appearance of studied unity of effect; indeed, the amount of trouble which has been bestowed on the mere setting or framing of the exhibits in this part of the building is noteworthy, and highly creditable to both the spirit and the taste of all concerned in it. We understand Mr. Burne Jones had a considerable hand in the designing and arrangement of these decorative accessories.

Behind these booths, on the northern side of the nave, are the galleries for the exhibition of paintings executed during the present reign. This is a most entrancing exhibition, and in itself fully sufficient to occupy a whole long day, without looking to any other portion of the collection. The oil paintings fill ten large rooms with not far from a thousand paintings, all, be it remembered, picked specimens of various authors. One conclusion we at once came to on looking through them, viz., that the progress in modern English painting during the last half century, is, in most branches of the art, a real and quite unmistakable one. It is curious to look now at some of the works which in our younger days were among the most important things in our annual exhibitions, and to see how they stand now in comparison with the best recent painting; curious to notice who have and who have not stood the test of time. The progress is most marked and most emphatic in regard to figure painting. In landscape painting, there was a person called Turner painting during the present reign, who is represented by several of his oil paintings from the National Gallery; a proceeding which we hope is not to be a precedent. The National Gallery pictures are not supposed to be lent about the country. But apart from such an indisputable giant as Turner, there are some of the landscapists of the past generation whose works are no doubt very different from what passes for fine landscape painting now, but who are not to be lightly dismissed. There is Calcott, for instance, whose colour is, of course, exceedingly conventional (as is that of Claude, for that matter); but there is a grand style about his larger works which cannot be denied. There is Stanfield, who was a great sea painter of a generation ago, and who is well represented here. His seas were very deficient in depth and transparency: his composition and his effects are starchy, more or less. "The entrance

to Zyuder Zee," for instance, is a regular *made picture*; the craft put just in the proper place on the top of a heap of waves, &c.; but there is a life and movement about his sea-pieces, and "The Abandoned," which is here, is a grand idea, though rather melodramatic in its working out.

To give a rapid note of what is to be seen; in the first room the main interest is in the works of Mr. Holman Hunt, which include "The Shadow of Death," "The Scapegoat," and that little gem, "The Strayed Sheep." The latter will hold its own anywhere and everywhere; but we doubt if "The Shadow of Death," now the property of the Corporation of Manchester, will continue to be regarded with the reverence once lavished on it. Mr. Madox Brown's "Work" is here; it will not do; but the "Romeo and Juliet" is a truly powerful painting of intensity of passion. Two or three of Mr. Alfred Hunt's landscapes, notably "Leafy June," look glorious here; and it may be remarked that the rooms are so well lighted that many pictures we know well look finer here than we have seen them anywhere else. Mr. Pettie occupies a considerable space in the second gallery, not satisfactorily; but Mr. Mark's paintings, of which there are a good many in a row, impress one very much with the thoroughness and delicacy of their execution. Mr. Brett's "Britannia's Realm" looks resplendent. Then in the third gallery is an apotheosis of Mr. Burne Jones, whose "Story of Pygmalion" and "The Golden Stair" come out with especial beauty. Mr. Watts is enthroned in state at the other end of the room; "Love and Death," "Love and Life," "Hope," and a whole row of portraits, and "Psyche," and other lesser works represent him nobly; the "Hope" looks finer and more impressive than it did in the Grosvenor; it is placed centrally. Mr. Calderon is here with "Home after Victory," but no one can regard that seriously after Tenniel's rendering of it with "Dizzy" as the hero; and Mr. Leslie, whose "School Revisited" is as charming as ever. Mr. Alma Tadema has a place of honour in Gallery IV.; "The Oleander" and the "Sculptor's Studio" are the most important of the set; but we are glad to see here a little gem called "a Pomona Festival," which was at an Academy a few years ago, and is not much known. Mr. W. P. Frith is great in this room; his "Before Dinner at Boswell's Lodgings" retains its interest; but "Rams-gate Sands" and the "Derby Day"? Alas, alas! Is it true that these were once thought among the important achievements of English art? Mr. Britton Riviere is in the same room, with a number of capital animals and very weak figures, and Mr. Orchardson, whose works include "Mariage de Convenience" and "After," or "Alone," as it is called in the Manchester catalogue. These, compared with the one now in the Academy, lead one to look for yet greater things from Mr. Orchardson; there is steady and unmistakable progress; the first one struck every one two years ago, but it is comparatively coarse in execution compared with this year's picture.

Mr. F. Holl's portraits are collected in the Fifth room, and works by Sir F. Leighton, including the "Hercules and Death" and "Summer Moon"; the latter we have always thought the most poetic of his works, but it is not quite equal in colour to what we fancied it from the recollection of a good many years ago, when it appeared in the long room of the R.A. exhibition. Sir John Millais is in the same room with a good many of his landscapes and portraits, and the "Vale of Rest," which holds its own well against the more recent ones. In the next gallery we come on Mr. Poynter's beautiful "Visit to Æsculapius," and his two dragon combats, and "Atalanta" and "Nausicaa." Sir F. Leighton's "Daphnephoria" is here, and we like it as well as ever (except those trees); and Sir J. Millais's "Aaron and Hur," which is a finer thing than some people supposed; and there is Mr. Long's "Babylonish Marriage Market," which makes one wonder what all the fuss was about when it appeared at the Academy.

Certain specimens of Etty in the seventh

gallery make one hold up one's hands. Look at the "Bivouac of Cupids," and better still, the "Andromeda"! Etty, we fear, has gone into limbo; he could paint flesh, but he was irredeemably vulgar. Nor does John Philip retain his place, nor a once greater light, Landseer. He is pretty largely represented here, but the result is not happy. There are certain landscape painters not much talked of now, who assert themselves notably in this and the succeeding gallery. Müller is one of these; a true follower of Constable, for whom one or two of his works might be mistaken. Another is Henry Dawson: who hears of him now? But there are some large works of his here of great power and in a grand style; one in Gallery X., of "Greenwich," looks like a large Turner of the early period. The discreet visitor, especially if he be one who takes an interest in architecture, should also look at everything with the name of James Holland over it; large architectural scenes painted with a remarkable combination of accuracy and effectiveness; one of them is worth a dozen Canaletti's, and they are every bit as good now as when they were painted.

In Gallery VIII. is a selection of George Mason's works. Some of the smaller ones, a "Pastoral Symphony," for instance, are not so fine or so delicate in colour as our memory fancied. On the other hand, Frederick Walker, who is well represented, is a complete success in the race: his "Harbour of Refuge" and "The Plough" are as impressive now as when they first gave the world assurance of a new genius, to be, unhappily, so soon taken from us. At the top of the same room is a collection of Rossetti's, including the best of his larger works, "Sybilla Palmifera," and "The Beloved," for instance,—gorgeous in colour, but it is a false school of art, and the day will come when its value will be, at least, much depreciated. Another disappointing painter among the old set is Egg. He will not attract many admirers now; nor Dyce, nor Elmore. A single Copley Fielding in the Ninth Gallery, by the way, gives one pause, "Vessels in a Breeze off Bridlington." Copley Fielding was a better man than he has sometimes been thought; there is nothing as good, as free as this, in Stanfield. And Maclise? Just look at "Merry Christmas in the Baron's Hall," and think that this was one of the eminent English painters. However, Maclise did better things than that. David Cox, of course, holds his own; and Mulready is another man who, at his best, will stand the test of time (see "The Whistonian Controversy"; and Eastlake's "Gaston de Foix" too, seems as beautiful and tender as ever. Mr. Wallis's "Elaine" is a remarkable work of his pre-Raffaellite days; and Mr. Calderon's "Aphrodite" looks twice as well here as at the Grosvenor; it quite sparkles in the midst of the other paintings.

We merely give a kind of hint of what is to be seen among the paintings, and of the interest attaching to this remarkable collection. Among the furniture and upholstery exhibits in the booths before referred to, there is a great deal of good work to be seen. Messrs. Morris & Co. occupy considerable space, and have some splendid designs in arras tapestry; large conventional foliage patterns of grand and bold character among them. Into these portions of the exhibition we must go on another occasion. Some of the Manchester decorators and furniture makers have exhibits of special interest.

Among the separate exhibits in the centre of the avenue (west side) is a model in relief, one foot to the mile, of the Manchester Ship Canal and the country it passes through, which naturally attracts a good deal of interest. Viewed in this manner, and in its full proportions, it seems, we must confess, a considerable distance of country to take large ships for unloading, and by a rather tortuous route.

The Irish section occupies the portion of the plan on the west side of the crossing corresponding to that occupied by the picture galleries on the east side. It includes an immense variety of things, from locomotive engines down to bog-oak carvings, an industry which still seems to keep a place. Among the

exhibits is a stand representing the Wigham lighthouse lights and reflectors, on the merits of which, as against the electric light for lighthouses, so much has been said of late.

The section of machinery in motion, forming a separate set of buildings, reached across the Talbot-road by a bridge, covers a large space of ground, and includes a great variety of machines. Looms, and spinning and weaving machinery generally, are largely represented, and many of them can be studied in action. About these we will say more in detail on another occasion. The dynamo department is at the east end of this portion of the building. On the south side of this portion of the exhibition is the machinery not in motion, including several fine specimens of locomotive engines. Among these is a new goods engine, on Mr. Webb's compound system with the additional low-pressure cylinder beneath the boiler, using the waste steam from the high-pressure cylinders. This is the first goods engine made on this type, so that we presume the report that it was intended to abandon this model, as being expensive in regard to coal, is incorrect. We should be sorry to hear of the failure of this type of engines. They appear to run splendidly when once fairly under weigh, and to be then steadier in running than the ordinary model of locomotive; but the difficulty at starting, when the two sets of cylinders do not seem always to hit it off together, has not yet been got over; during the first minute after starting there is frequently a perceptible unevenness in the pull, making itself felt in a succession of little jerks, until a fair speed is attained: it is to be hoped this drawback will in time be remedied. Another speciality in the locomotives is Messrs. Sharp, Stewart, & Co.'s, eight-wheels-coupled "Consolidation" engine, four small wheels on each side coupled. This is a metre-gauge engine, intended, we believe, for a South American railway, and evidently designed for heavy gradients.

Section III., devoted to "Chemical and Allied Industries," is close to the Machinery department, with which, indeed, it has in many respects very intimate relations. This section also includes building materials. One of the items in this section is a model of the Dietzsch cement-kiln, of which we gave an illustration recently. The section of building materials is not large, however, nor does it appear to contain, in the main, very much of novelty or of special interest. The pictures and the machinery are the two strong sections of the exhibition.

The architectural drawings are hung on the walls facing the main avenue at the east end. They form a very fine collection of drawings, and most of the leading architects of the day are represented among them; but the collection is not as representative of the present reign as that of the pictures, the number of drawings by deceased architects being very small in proportion to the rest. The reason for this is obvious; architectural drawings have not the same general interest as pictures, and, therefore, are not bought and carefully preserved by collectors as paintings. They are, we fear, chiefly interesting to the architects themselves. Accordingly, while the majority of the paintings are lent by owners who have purchased them from the painters, the majority of the architectural drawings are lent by the architects themselves. A few drawings by Mr. Decimus Burton, Sir C. Barry, Sir G. Scott, and other deceased architects, have been lent by their representatives, but otherwise the architects not now living are very meagrely represented. As illustrations of the architectural work of the present generation they form, however, a fine collection, and we hope that more facility will be given to the public to get at them than was the case on the day of our visit, when chairs were ranged up on either side so as to leave no space to get to the drawings, which, of course, are not such as can be well seen at 15 ft. or 20 ft. distance. The public are slow enough to take interest in architectural designs under the most favourable circumstances, and they might, at least, be given every facility for doing so, in case their interest or curiosity is awakened in that direction.

## NOTES.

**T**HE recently-decided case of Drew & Co. v. Josolyne (Law Reports 18 Q.B.D., p. 590), is one of so much practical importance to those who have to do with building contracts that it is desirable to point out its main features. It is of greater importance as being a decision of the Court of Appeal, and must necessarily serve as a guide in the future. The contract was one in which there was the customary clause that in case the contractors should at any time during the execution of the works become bankrupt or commit an act of bankruptcy then the building owner might dismiss and discharge the contractors from the further execution of the works and employ some other person to complete them, and in such case the several materials brought on to the ground for the purpose of the works were to become the property of the building owners, and the sum or sums to be paid to such other persons to complete the works should be deducted from the amount of the contract, and the balance, if any, after making any deductions which the building owners might be entitled to make, was to be paid to the contractor. There was also the equally common clause that twenty per cent. of the sums due from the building owner were to be paid on the completion of the work, eighty per cent. of the sum certified being paid from time to time. In due course the contractors became bankrupt, and the committee of inspection passed a resolution that the trustee should carry out the pending contracts of the debtors. How he was to find money and materials it is unnecessary to state; the main point is that he was thus empowered and acted accordingly. Previously, however, to the contractors' bankruptcy they had assigned by way of mortgage to Messrs. Drew & Co. the sum of 1,000*l.* due and owing to them, or which might thereafter become due and owing to them under the building contract, and being part of the retention money mentioned in the specification. The contest in the law courts was whether the mortgage of these retention moneys or the trustee in bankruptcy who completed the contract was entitled to these moneys. Mr. Justice Field decided that the trustee had a right to them on the authority of a case called *Tooth v. Hallett*: the Court of Appeal reversed his decision, and awarded the sums to the mortgagee. What, then, is the test by which it is to be decided in future cases of a similar kind in whom the right to the retention moneys lies? The criterion is whether the building owner has put an end, as he is entitled to do, on the contractor's bankruptcy, to the old contract, and has entered into a new arrangement with the trustee to complete the work. That was what happened in *Tooth v. Hallett*. "Under those circumstances it was held that, as the building owners could deduct from the money coming to the original contractors the sums paid to the person employed to complete the work, and there was, when that deduction was made, no balance due under the old contract, the claim of the mortgagee failed. Here the retention moneys are due under the original contract, and the assignment must operate upon them." This quotation from the judgment of Lord Justice Bowen puts the point with perfect clearness. The case shows both the danger to a person who takes mortgages of such retention moneys, and to a trustee of a bankrupt contractor who completes works. The former may lose his lien if the contract is not completed under the original contract; the latter may, if he carries out the works without a fresh contract, find himself out of pocket by so doing. In either case there is a dilemma. The practical moral seems to be that a prudent man should not lend money on such security without some collateral security, or without guarantee from a third party; and that a trustee should not undertake to complete a contract unless he can do so with the certainty of being paid the retention money.

**T**HE four papers read at the Conference meeting, on Friday last week, on the sub-

ject of the Registration of Architects as members of a closed profession, are worthy of careful attention, and show a thoughtful consideration, on the part of each of the authors, of the advantages and difficulties connected with the proposition as seen from his own point of view. The subject has far too many hearings, however, to be decided on in any way in a hurry, and it is well that the meeting was committed to nothing more than a recommendation to the Council to give the subject special consideration. The effrontery displayed by the knot of persons who have been endeavouring to advertise themselves, in opposition to the Institute, as the leaders in the reform of the profession, in coming down to the Institute rooms and making use of the occasion for further advertisement, needs no comment, except that a more stringent chairman than the amiable Professor who presided that afternoon would have disallowed this misuse of the meeting. The chairman, indeed, ruled, when the question was raised by a member, that this subject of the drafting of a Registration Act by persons belonging to a society not recognised by the Institute, was not a subject before the meeting—in other words, was out of order; as it unquestionably was. But if so, why was not this performance stopped at the outset?

**M**R. PILDITCH'S paper on dilapidations, which was read at the Surveyors' Institute, and is published in vol. xix., part ix., of the Transactions of that body, is one which may be usefully perused by all who have any interest in the subject. It is a careful summary of the practice, with some notes on recent decisions. Mr. Pilditch cites an instance which exemplifies the absurdity of hard-and-fast rules, as to painting at stated times. He recently surveyed a terrace at the West End; one house, which had been quite recently painted, either from neglect or had workmanship ought, in his opinion, to be repainted and papered; in the next house, though nothing had been done for forty years, "both paper and paint, though drier and rusty, were in such an excellent state of preservation that there could be no justification for demanding it again." There can be no doubt that a careful tenant will often leave a house which has been thoroughly well painted and papered in the first instance, in a better condition,—nothing having been done to it,—than a tenant who is careless and has the house repainted and papered by second-class workmen. But having regard to the state of the London atmosphere, paper which does not require restoring at the end of forty years would be worth exhibiting, as well as the occupier and his servants who had had charge of the house.

**M**R. TOMKINSON, in obtaining an injunction to prevent the South-Eastern Railway from giving a donation to the Imperial Institute, took a proper, though perhaps an unpopular, step. If public companies once begin to subscribe to this or that object a very wide door is open to all kinds of johbery. Moreover, a gift by a railway company is not a voluntary donation so far as many shareholders are concerned. It is a compulsory tax, though small in amount, levied at the will and pleasure of the directors. If these corporate commercial donations were to become common they would tend to close individual purses and to raise prejudice against the objects of such misplaced generosity.

**T**HE *Nineteenth Century* for the current month, in an article entitled "How to ensure Breathing Spaces," suggests, or rather adopts a suggestion made by the Rev. James Johnson in 1885, that where land is laid out for building a certain proportion of such land shall be set aside to be kept open in perpetuity for the health and recreation of the people. The author acknowledges that the idea is opposed to commonly-received opinions as regards the rights of property, but points out that there are precedents for the proposal in the case of the by-law under the Metropolitan Local Management Act regulating the width of streets, and the provisions of the

Metropolitan Building Act and of the Metropolitan Building Act and Metropolis Management Amendment Act requiring a certain open space to be left at the side or the rear of dwelling-houses. The requirements with regard to open spaces are even now inadequate to insure healthy and well-ventilated dwellings, and, as has been well pointed out by Miss Octavia Hill, whose experience of the homes of the poor entitles her to respect, the open space should vary in proportion to the height rather than the frontage of a house instead of being a fixed quantity or one varying with the frontage. The author of the article in the *Nineteenth Century* in the precedents he has cited overlooks the fact that the restrictions he refers to do not affect the landowner, but only the lessee or builder, and that any proposal which would affect the value of land for building purposes would be certain to meet with the most strenuous opposition in both Houses of Parliament, the majority of whose members are landowners.

A VERY striking addition has just been made to the Etruscan Room of the British Museum, to which, in the *Classical Review* (May), Mr. A. H. Smith draws attention. This addition consists of a large terracotta sarcophagus, on the lid of which a life-sized woman reclines. Flesh, drapery, and ornaments are painted in colours still vivid, and the whole effect is startlingly life-like. The figure, it was at once seen, has the closest resemblance to the famous sarcophagus at Florence, the date of which, from coins found with it, can safely be made out as the early half of the second century B.C. If we may trust our own memory, refreshed by a glance at the coloured plate ("Monumenti," xi., tav. 1), the Florence specimen is the finer of the two. But the Etruscan antiquities of the Via Colonna Museum are arranged in a peculiarly happy way in a room with a subdued light, so that their coarse realism appears less blatant. For full particulars we refer to Mr. Smith's note (p. 118), which should be read in front of the sarcophagus. He gives the inscription, *Seianti Thunmia Thesmasia*, and for comparison we add that of the Florence sarcophagus, which, oddly enough, also contained the body of a *Seianti*,—"Seianti Villania Tareti." By notes of this description, the *Classical Review* is doing excellent service to archaeology, and will, if we are not much mistaken, sensibly increase the number of intelligent visitors to the Museum.

IN the *Gazette des Beaux Arts* (No. 356, xxxv., pp. 87—108), M. Collignon has an article on "La Sculpture antique au British Museum," which gives an interesting popular view of the chief treasures of our national collection. Some account is given of the gradual accumulation of the various antiquities during the last 150 years, of the Hamilton and Townley collections, the Parthenon marbles, Cockerell's discoveries, and the more recent finds by Mr. Newton at Halicarnassos, and Mr. Wood at Ephesus. Then follows an excellent historical conspectus in the easy, lucid manner for which M. Collignon is well known. The paper is illustrated by six woodcuts. Any one who wishes to get a general view, good as far as it goes, of the British Museum collections could not do better than read the essay, and they will do well to take, in connexion with it, Mr. Newton's two papers "On the Study of Archaeology," and on the "Arrangement of the Collections of Art and Antiquities in the British Museum."

THE statue of King Victor Emanuel at Venice was unveiled on May 1st, in the presence of the King and Queen and a vast assemblage of people. Touching this statue, the *Venice News* remarks, "As to this monument itself, perhaps the less said the better. Its history is not the most happy one possible. Begun with a loyal desire to perpetuate the memory of King Victor Emanuel, an unfortunate site was chosen in the first instance, namely, the little piazzetta of the Leoncini, on the north side of St. Mark's. Then a design

or model was selected which had no companionship in artistic feeling, no suitability in outline, composition, or style with the position it was to occupy (and in this the artist must be considered to have been in error as the Executive Committee), and when the work was well advanced a rough full-size model was put up in the chosen position, and shifted here and there until everybody was convinced that the case was hopeless, and that another site would have to be found." The model was dragged about the Piazzetta and the Molo, each new position finding advocates and admirers, until, as a last resource, the present site was chosen,—not well or advisedly by any means, as it crowds up a part already not too wide, and, worse than this, renders the monument practically invisible from one side, as the space between it and the neighbouring houses is very small indeed. The best view is, of course, from the water, though the architecturally indifferent *Hôtel d'Angleterre*."

ON St. George's Day last, April 23, the Duke of Westminster formally opened a new Vestry-hall for the parish of St. George, Hanover-square. The site, in Mount-street, Berkeley-square, was obtained for 11,624*l*. The hall has cost 15,362*l*. The vestry dates from 1662, in which year they were appointed for the out-wards of St. Martin-in-the-Fields by the then Bishop of London. These outlying wards, representing the ancient manor of Eia, were constituted into a separate parish in 1719, since sub-divided (1844), and a ratepayers' vestry established. The lease expired in 1884 of the old vestry buildings, which was granted in 1789 by Richard, first Earl Grosvenor, grand-nephew of the Sir Thomas Grosvenor who married Mary Davies, the wealthy heiress to the Ebury property in Westminster.

IT is gratifying to notice the continued interest of the Institute Transactions in regard to illustrations. In place of a dry volume of papers with, perhaps, a few small explanatory diagrams here and there, we have now in the "Transactions" volumes a series of fine illustrations of various details connected with architecture. The last issue contains a number of illustrations of the decorative use of marble, in connexion with Mr. Brindley's paper, and drawings of Japanese house planning and construction, in connexion with the paper on Japanese architecture by Mr. Conder. Professor Hayter Lewis's Notes in Greece are of considerable interest.

MR. E. J. TARVER'S paper on Street Architecture, at the Society of Arts on Tuesday evening, was original and suggestive, and deserved a larger audience than that which it succeeded in attracting, although those who attended were sympathetic and attentive. The proposal that in the case of laying out a street improvement the elevations of proposed new buildings should be set up to a uniform scale by an official appointed for that purpose, and that if the designs should be found to be inharmonious the architects should be invited to reconsider their designs, is about as Quixotic a scheme as ever was promulgated. Architects are notoriously as irritable with regard to their own productions as literary men are said to be, and to expect a man to modify his design spontaneously in the interests of harmony and the public good, is to indicate a simplicity of character and a belief in the possibilities of human nature which is very refreshing. Mr. Tarver's proposal to connect the arch at the top of Constitution-hill with the screen at the entrance to Hyde-park by means of a vista of statues of famous generals, terminating with a statue of Wellington in the park, is not likely to excite any general enthusiasm, any more than Professor Kerr's proposition to celebrate the Jubilee by placing a statue of the late Duke of Kent on the vacant pedestal in Trafalgar-square as a pendant to Chantrey's statue of George IV. An irreverent wit once suggested filling the pedestal with a statue of Brunnel, asking (pointing to the other side of the square), "Who's your fat friend?"

THE Ramsey School Board seem to have resolved to distance other Boards and Committees in the matter of obliging offers to competing architects. They invite any architects who are fools enough to do so (that is not, we admit, the literal wording of the advertisement) to send plans and specifications for school and school-house for Parkeston, Essex, the school to accommodate 350 children. The Board will retain the set of plans and specifications which pleases them best, "on a payment to the sender thereof of 5*l*. 5s., but it shall not be necessary or incumbent upon them to employ such sender in superintending the building of the school for which the plans and specifications are used." This must be sheer ignorance. No set of people who had any idea of what is properly due to an architect for planning (without superintending) a building of that class could have had the face to make such an offer.

ANOTHER example of the liberality of competition advertisers, and of the cool way in which they propose to victimise architects, has been sent to us in the shape of the conditions of competition for a cottage-hospital at Romford, Essex. It was advertised in our columns that the architect whose design was selected would be employed "on the usual terms"; but in the conditions sent to competitors it is stated that, "Being a Jubilee charity, it is expected that half the usual fee will be remitted." This is what we call not only an unreasonable bid, under the circumstances, an impudent proceeding. It amounts to this, that the promoters advertised in our columns a wilful misrepresentation; stating that they were going to employ architects on the usual terms, and then rescinding that statement in the privately-circulated particulars. We hope they will not get a single response.

WE have received from Messrs. Chubb illustrations of the two ceremonial keys manufactured by them for the opening of the Manchester Exhibition, with the usual paragraphs which are circulated "for the Press" on such occasions, describing the artistic interest of the keys, &c. We use our own judgment on such matters, and we can assure Messrs. Chubb that, however good may be the workmanship of these keys (as we have no doubt it is), they are entirely destitute of artistic value or interest, and therefore not worth illustrating from our point of view. Why do not manufacturers go to an artist to design a key for an important function of that kind? When they do that, and produce something that is really artistic, we will illustrate their keys,—and not before.

SANTA MARIA DEI MIRACOLI,

IN VENICE.

BY SIGR. GIACOMO BONI.

Few people have seen the interior of this church, "the most interesting and finished example in Venice of the Byzantine Renaissance" during the last twenty-five years. Repairs have been proceeding slowly or have been suspended altogether during long intervals. It is as yet closed, but in a few weeks its new pavement will be swept for the last time and its doors will be opened to the public. People who come to Venice will go and see this church, and I hope they may find useful some of the notes which I translate here concerning the foundation of the building and the ceremonies of its consecration.

Some time ago I examined a MS. book of the Gradenigo collection, in our Museum (No. 119), bearing the title "Memorie lasciate da Francesco Amadi della sua famiglia." It begins by original memoranda, written towards the end of the fifteenth century, when the church *doi Miracoli* was built. I then studied a small anonymous book in the Marcian Library, bearing the following title: "Cromichetta dell'origine

\* "Stones of Venice." Mr. Ruskin has criticised the ornaments of the pedestal of a pilaster. The photographs, taken from a valuable collection done by G. B. Brusa, represent the details of the same, which have aroused so much admiration and blame from art-critics and historians. All, however, agree in judging it an unrivalled example of delicate execution in our Early Renaissance.

principio e fondazione della Chiesa e Monasterio della Beata Vergine de' Miracoli, — mdcxliii." The author says he has taken it from a MS. book, about two hundred years old, and from some old papers, much torn and confused. It was easy to recognise the passages of the fifteenth-century MS. chronicle, which appear in a slightly altered form in the compilation of the seventeenth century, but as this compilation has several passages taken from other memoranda which have not come down to us, I extracted what I found most interesting in it bearing upon the history of the building, and incorporating cursive letters, sentences, and paragraphs of the original MS., which either deserve to be given in full or which do not appear in the printed Chronicle. I hope that the literal translations retain some of the charming characteristics of the originals.

## CHAPTER I.

## On the Universal Adoration of the Virgin.

## I.

Amongst the principal churches dedicated to the Virgin is that of the Miracles, a building well kept and adorned, to which is added the Monastery of the Claustral Nuns of S. Chiara. It was named *Doi Miracoli*, as it continued to work wonders.

## II.

The year 1408 there was living in this town of Venice Ser. Francesco degli Amadi, a pious man who caused an image of the Virgin, with the Son on her arm, to be painted by Master Nicolo, much celebrated in that time, and, "according to our Venetian fashion," he hung it on the corner of a house of Alvise Barozzi, close to his own, which was nearer to the public street, where it remained some time without effecting miracles.

In the year 1430 Messer Marco de Rasti lights lamps and candles before that image, especially on Saturdays, and adorns it with flowers and green leaves (verdure), from which it received greater veneration of the people.

## III.

An omen foretells the place where the church would be built.

## IV.

The reverence towards the image increases; the owner of the house wants to take it to his own parish church, "hut I (Angelo Amadi, born in 1425, during the Calends of December, the vigil of S. Thomas, towards day-break) about the fifth hour of the night I took to my house the said ancona, which is a painted image of the Madonna holding the Son on her arm, and two more figures, one of S. James the Apostle and the other of S. Anthony, and at the same time I had an apparatus made of a wooden altar, covered with a silk cloth and adorned with laurels, bossi, cypresses, junipers, and other worthy leaves; this was (done) in our court, in the parish of S. Marina, the Greek holy virgin." The enemy of human species suggests to the owner of the house to resent this alienation.

## V.

Barozzi persuades the Patriarch to moderate the adoration of that image.

## VI.

The parson of S. Marina dissuades the Patriarch.

## VII.

The alms increase. Procurators of the Madonna are elected.

## VIII.

The 6th of September, 1480, four houses are bought for 700 ducats.

## IX.

The 28th of September, 1480, the demolition begins; a hut of planks is prepared in the centre of the area to be occupied by the building, in order to protect the image.

## X.

Barozzi has recourse to Doge Giovanni Mocenigo, claiming the property of the image, hut being proved that one Amadi had it painted, it was decreed to belong to that family.

## XI.

Barozzi refuses to sell his houses.

## XII.

The 21st of October, 1480, the Procurators obtain from the Patriarch a licence to build the church; he signed it with his ordinary seal, and wrote with his own hand that he would give 25 ducats, and beforehand, the Serenity of our Prince John Mocenigo promised to give 25 ducats for the building of the church.

## XIII.

The Procurators, following the advice of the Savi (Counsellors) ask and obtain (the 15th of January, 1481) a diplom from Pope Sixtus IV. for the erection of the church.

## XIV.

In the first of January, 1481, the parson of S. Marina was elected a chaplain of the image.

## XVI.

The 25th of February, 1481, takes place the translation of the image from Ca' d'Amadi to the wooden hut, with the concurrence of the schools (companies) of the Misericordia, of the Carita, of S. Marco, of S. Giovanni Evangelista, and of S. Rono, the brethren of which, dressed with sack (canvas) strike themselves with disciplines (whips) and iron chains. The image is borne upon a platform, covered with a cloth of gold and crimson, silver candlesticks, "with certain Oriental figurations on it," under a canopy, whose field is gold and crimson. And we, Ser. Alvise and T. Angelo Amadi, under this canopy, bore upon our shoulders the said platform, as a thing of our own, just as the people of Constantinople did with their prodigious Pamera. We were all dressed with purple, scarlets, and silk gowns. "Trumpets and fifes." The Patriarch with the cross, the mitre, and the pastoral. . . . and the clergy and magistratos. A numberless multitude of men and women, singing

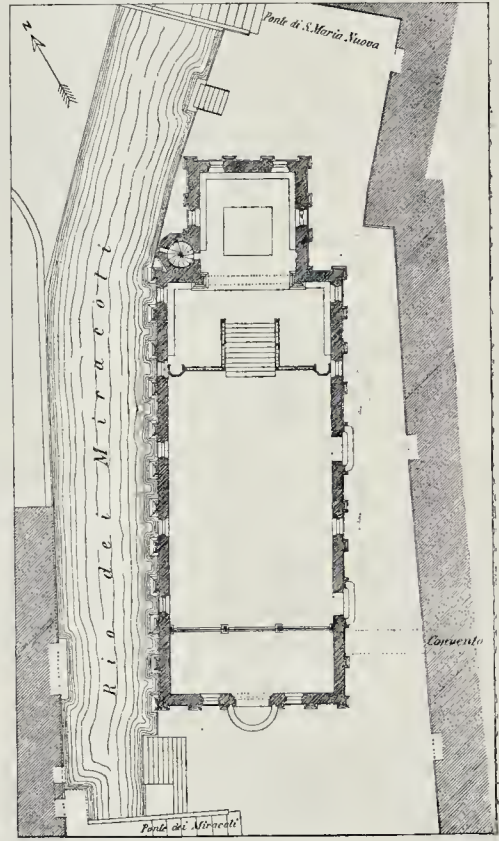
with stones from Verona, red and black, of the best kind that can be found, from the basement to the top cornice, for the price of one thousand ducats, viz., ducats 1,000. This appears from the stipulations and drawing of the model, kept by Ser. Francesco Len, a Procurator of the church.

## XVII.

During the year 1481 a cross of crystal [is] offered to the altar, and a new illuminated missal and many alms. The 1st of April, 1481, an indulgence of one thousand eight hundred days is obtained from Rome, for those who visit and give alms to the church.

## XVIII.

The 2nd day of May, 1481, as the church was founded. I had a large bronze medal put under the plaster at the left corner of the façade. This medal shows the head of myself, Angelo Amadi, in relief, taken from nature, with ancient letters around, like these:— ANGELVS DE AMATIS; and on



Plan of S. Maria dei Miracoli.

psalms in praise of this glorious Virgin. When it passes, the people prostrate (kneeling) to the ground devoutly, with many tears, and the hands folded on the breast, they asked mercy.

## XVIII.

The procession reaches the place, the Patriarch blesses it, and lays the first stone. The image is placed behind an open screen of (gilt) iron, "with several silver offerings."

## XIX.

The Procurators consult the most skillful builders for a model of the church, and the 4th of March, 1481, they contract with Master Piero Lombardo, the same who made the tomb of Ser. Piero Mocenigo, Prince of Venice, at SS. John and Paul, to do the work at his own expense, either of bricks of baked clay, as of stone and lime, and iron bars at the windows. And three doors with three marble figures, viz., a Madonna with two angels at the sides, above the entrance door, and two prophets above the two others. Lined with marbles all around the outside—that is to say, with Pisan slabs from Carrara, which must be veined and beautiful or with Greek ones beautiful and veined, bounded

the back of it a festoon or garland of ears of corn, including the arm (shield) of the Amadi family, divided in two. The half below it is of gold, and the one above has two golden mounds, one besides the other, and another upon them, with a little bird on the top, in azure field; and across the said medal, where is the festoon or garland, are ancient letters, which say: ANNO XPI. OPTIMI. MCCCCLXXXI.

The 3th ditto I had another medal put under the corner on the right; the 16th ditto, one under the corner on the right side of the main entrance; and the 30th of July I had another medal put under the left corner at the head of the church.

## XXI.

The church is already paid for, but the chapel of the great altar is yet to be built, and, together with the roof and the rest of the church above the cornice, will cost 4,000 ducats. As somebody must take care of the church afterwards, the first Procurators had resolved to found a Monastery of Virgins, under the discipline of S. Chiara, who are not visible; they officiate better in a church, and keep it very well. The deliberation is postponed till next day.

XXII.

The election of the Monastery is approved.

XXIII.

Everybody praises Lombardo, and the nobility assemble every day to venerate and look on; many people come also from distant places; the alms are increasing. Barozzi sells his houses at last, and their demolition is undertaken to erect the Monastery.

XXIV.

The Procurators give to Pietro Lombardo the care of doing the drawing of the chapel and the vault of the church, and the 26th of February, 1484, they contract with him that he will superintend the work for 70 ducats a year. More workmen are engaged, materials provided, and the chapel is begun; things go on so well that they could not go better.

XXV.

Up to the time when the nuns enter in the Monastery, there is spent in building it, including what was paid for the houses, as much as 15,000 ducats.

XXVI.

The Procurators agree, every now and then, each in his turn, to see how things go, notwithstanding that Lombardo be a foreman and assistant of the work, and assisting with great diligence indeed, and never goes away, and, so to speak, the visit of the Procurators is superfluous; yet, in order to encourage the workmen, and so that people who give the alms see that the Procurators take care of their being spent rightly, and for the benefit and honour of the holy image.

The buildings rising quickly towards the end of 1488; (March, 1489) they are nearly finished, and one may hope that towards the end of 1489 (March, 1490), the nuns may enter the monastery, but the Procurators want it to remain one year finished, so that the nuns may not be hurt by the freshness of the building.

In the mean time, the church and chapel will be finished, only a portion of the roof still remains to be done.

The church looks beautiful and well built, with thick and large iron (clamps) to hold it together, sparing no expense to consecrate it to eternity; so it may please the Virgin to guard and preserve it.

In November, 1489, the Procurators determine to ask the Patriarch which day he could come to do laudate the nuns, and bless the church and the place; everything being ready,—work for fifteen or twenty days only remaining to be done.

XXVII.

Having arranged the 30th of December with the Patriarch, during the night the image is taken out of the wooden chapel, and placed upon the main altar.

XXVIII.

The last day of December, 1480, the Procurators meet in the Monastery, more than two hours before daybreak, waiting for the Patriarch. Gondoliers twelve in number, like the Apostles; their names are:—Mother Margarita, being old and practised, is elected an abbess; and the mothers Isabetta, Cristina, Lodovica, Franceschina, Benedetta, Cecilia, Brigida, Chiara Teodosia, Aurelia, and Valeria.

They appeared at twelve hours (six o'clock) covered with thick black veils reaching to the ground, thick mantles, with their hands under them and naked feet.

The Procurators met them at the landing and showed them the church and the Monastery, saying that if anything was missing or did not satisfy them they would have it built, and left them in the Capitol, where is an altar with the Madonna and the Child, S. Francis on one side, S. Chiara on the other, several chairs for the Patriarch and attendants, and stools for the nuns.

XXIX.

When the Patriarch arrives it is already clear daylight; he blesses the church, prays before the image, says it is truly well placed, and going thence to the Monastery, where the nuns are kneeling six on each side of the altar, and sitting himself on a chair higher than the others, and having read the papal diploma (*Bulle*), he invests the Abbess, gives her the keys of the Monastery, and crosses the clausum.

THE END.

Here the chronicler of the fifteenth century related the miracles in a chronological order; the compiler of the seventeenth century has distributed them in a physiological order, going from the head to the feet. Besides ordinary determined diseases some general maladies are mentioned, either undetermined, hypothetical, superstitious, or moral turnations, and the *ex voto* of the culprits who succeeded to escape from human justice. These miracles are dated from 1480 to 1486. As time went on the votive tablets covered the walls all around the interior of the church, so that the Procurators, towards the middle of the last century, caused them to be taken away, fearing they might injure the walls.

Ducal Palace, Venice.

## ARCHITECTURE AT THE ROYAL ACADEMY.—IV.

1509, "Church of the Sacred Heart, Liverpool," Messrs. Goldie, Child, & Goldie. A sepia drawing of the interior of this very pleasing and pure example of modern Gothic, of which we published an exterior view some time back. The view looks towards the chancel, showing a portion of a nave arcade of very simple design, octagonal piers with moulded caps; no carving. A figure beneath a canopy is placed on a pedestal against each respond of the arcade. Roof with solid moulded principals cut into arch form (not the purest kind of timber work this), and hoarded over in cants.

1600, "View of Great Northern Central Hospital, Holloway-road," Messrs. H. Hall and K. D. Young. Given as a design merely, without plan. A very good pen drawing, and a design with a certain unobtrusive originality in the details; the windows are very well grouped and differentiated, so as to give a certain variety of expression without departing from the utilitarian character proper to a hospital.

1601, "Local Examinations Syndicate's Office, Cambridge," Mr. W. M. Fawcett. *Simplex munditiis*. A Queen Anne building of the plainest type, but showing distinct perception of the architectural fitness of things, especially in the arrangement of the first-floor windows between the pilasters, and the connexion of the whole by the series of mouldings (it can hardly be called a cornice) over the windows, and breaking round the pilasters. The finials flanking the gables are very ugly. The whole drawing suggests that its author could do something much better if he did not choose to adopt a style with ugly detail.

1602, "Design for proposed Church of All Saints, Peterborough," Mr. J. Martin Brooks. A good drawing of an exceedingly simple and solid design in Early English style, which we had the pleasure of illustrating in the *Builder* of Nov. 20, 1886. We do not quite like the effect of the low slate spire appearing above the tower parapet; it looks somehow as if it should have been higher and had slipped down. But the author has solved the problem of designing a cheap church which does not look mean or flimsy.

1603, "Town-hall, Carlisle: proposed new Wing and Additional Story," Mr. C. J. Ferguson. The new wing, we presume, is the left-hand portion, but there is nothing to show this: horizontally, one can understand the divisions better. As it stands it is an exceedingly simple building, with (as the drawing appears to indicate from the manner of shading), a stone basement story with low windows divided by a mullion and brick walls in the story above. The upper windows are large, of one opening, and with architrave; we gather that the architect proposes to slightly raise the cornice and insert *oils de bois* over the existing windows, and add an attic with square windows, making the original cornice a string course. It would have been much more to the purpose if the author had added some indication as to what his own additions consist in, which he only has done in a general way. It appears to be a case of a very simple and unpretending old building added to in a manner quiet in keeping with the style of the existing portion.

1604, "Church of the Holy Innocents, Hammersmith," Mr. Jas. Brooks, architect. A delightfully solid and monumental looking brick (♯) church, shown in a fine pen-drawing; the aisles narrow, and used for passage only; the upper buttresses of the main wall sloping down in solid masses on to the aisle buttresses; each extreme angle of the building (the main roof runs right through from end to end) is strengthened by an octagonal turret, apparently for stairs, with the walls nearly solid. There is a double-gabled transept with two tiers of lancets under each gable. The windows are all plain lancet; almost the only decoration is over the west doorway, where there are some niches and figures. A small plan is appended. Students should examine carefully this design, to see how much architectural effect and expression may be obtained by mere arrangement of wall-masses, sufficiently accentuated by a few mouldings.

1605, "New Municipal Buildings, Sunderland," Mr. Brightwell Binyon. Hung too high to be well seen; a very municipal-looking Classic building, rusticated ground-story and an order above, and Mansard roof, which are somewhat too lofty, and overpower the substructure.

The central entrance is marked by a wroté with a cupola termination.

1606, "Poroh, Keyford House, Frome," Mr. A. S. Haynes. A pretty little bit of a porch, with a projecting upper story, forming what in church work would be a "parvise" over it; the projection is rather too great, however, and seems to "honnet" the ground-story unnecessarily.

1607, "Staircase Decoration, 4, Ainslie-place, Edinburgh," and labelled "Mr. T. Hall, Decorator, 8, George-street, Edinburgh," in large white letters on the dark ground at the foot of the drawing. This is far too like an advertisement, and the design does not justify the prominence accorded to it. It is well drawn, and shows a good eye for balance of colour, but there is nothing but the merest commonplace in the design.

1608, "Chiorio, Fontegiusta, Siena," Mr. R. Barratt. This is one of several very good illustrative drawings by the same hand, which we may as well notice together. The present one illustrates a pretty Classic chiorium, of a vase form below, with a miniature Corinthian colonnade and entablature above, and a domical porch with a lantern crowning it, and a figure crowning the lantern. The perspective of the drawing is rather too sharp, and the curves in the upper part and base are unsatisfactory to the eye in consequence. By the same author are, 1694, "Altar Shrine, St. Mark's, Venice," and 1696, "La Lupa, Siena." The latter is the best thing Mr. Barratt has here. It is a water-colour sketch, on grey paper, of a Gothic-looking she-wolf, with an immense neck and shoulders, designed, though rudely, with great power, and sketched with equal power. It is, perhaps, as a drawing, the most artistic bit of work in the room. 1694 is an admirably delicate and refined pencil drawing. 1700, by the same artist, is a pencil drawing of a portion of St. Mark's, Venice, equally good. As a point of detail, we may notice the excellent manner in which the effect of the polished marble shaft is given, both in this and No. 1694; not an easy thing to render satisfactorily in pencil drawing. 1751, "Ponte del Paradiso, Venice," is a slighter pencil sketch. Mr. Barratt, we believe, is intending to devote himself to the illustration of architecture. His exhibits in the architectural room show no ordinary powers in this branch of art.

1610, "Entrance and Loggia, 49, Upper Grosvenor-street," Mr. W. H. Powell. A pen-drawing of an arched porch, and arched loggia over, apparently in terra-cotta, and effectively treated with a good deal of decoration. The insertion of hits like this will soon do a good deal to lighten up the architectural deadness of the streets in that fashionable but architecturally dull neighbourhood.

1611, "A Quiet Nook," Mr. Arthur H. Belcher. A little water-colour drawing of a small morning room or study, very tastefully furnished in a quiet way, and the details very well shown considering the small scale of the drawing.

1612, "A Bell-turret, Asciano," Mr. E. G. Hardy. A characteristic little bit of brick work.

1613, "Two Fireside in an Architect's Home," Mr. T. Raffles Davison. Prettily sketched in pen and ink, as their author knows so well how to sketch, but not especially interesting.

1614, "Chelsea Town Hall: Interior Views," Mr. John M. Brydon. These are hung rather too high to be well seen; they appear to be good and careful sketches exhibiting interiors in a style suitable to the general style of the building, which is one very suitable to its object and the associations of its locality, though we think it runs too much into copying of Queen Anne details merely for the sake of repeating them in a neighbourhood so congenial to them as Chelsea.

1615, "Portion of Ancient Retable, Westminster Abbey,—real size," Mr. Gerald Horsley. This is rather an unusual piece of work, being a copy in colour of an ancient piece of coloured decoration, the full size of the original; copied geometrically; a *fac-simile* in colour, in fact. It is admirably done, and shows a great perception of the representation of texture and surface in water colour; whether the result is quite worth the trouble, except as a study, may be questioned. Like Mr. Barratt, Mr. Horsley exhibits several drawings of old work. His next is 1630, "Carving from the Stalls, Amiens Cathedral," and "Trinity

over West Door, Abbaye - aux - Dames, Caen." These are pencil sketches, in rather light pencil, on smooth paper,—the real way to sketch architecture when pencil is employed; and we are glad to see this method of execution, which has been too much neglected by architectural draughtsmen, coming into use again in the hands of good workmen. In the upper of these two sketches the shading and modelling is entirely in line, not in tint; it is like a good drawing for wood engraving. Mr. Horsley sends also a frame of three drawings (1638), "Two Doorways and a Wall Tomb from St. Frediano, Lucca." These are in one sense sketches, inasmuch as the details are not completed in all parts, but for truth and clearness of line and delicacy of effect it would be difficult to surpass them as specimens of illustration of architectural detail. Some architect, who probably could not draw as well as this, wrote to the *Pall Mall Gazette* to complain of the intrusion of so many of these sketches into a room professedly dedicated, as he assumed, to buildings in execution or to be executed. The architectural room may not be the right place for them; but we can only say that they are among the most interesting things in the collection.

#### MARGATE CLOCK TOWER COMPETITION.

From the point of view of professional interests it is to be regretted that this competition has drawn nearly sixty architects into submitting designs, notwithstanding the fact that there was no undertaking in the conditions to employ a professional arbitrator, but only a promise to do so "if thought necessary." We cannot believe that this vague promise has been sufficient to induce any one who signed the competitions memorial to compete, but if it has not done so there must be a considerable number of members of the profession to whom the desirability of signing it remains to be brought home.

The drawings, which were exhibited last week, were fairly well arranged in a well-lighted room in the White Hart Hotel, Margate, though a little confusion was created by the separation, in one or two instances, of the plans of a design from its elevation by nearly the length of the room. The designs show a great variety of opinion as to what may be done for 800*l.*, the sum allowed, but there are at least three or four which, while coming within the limit of cost, represent very neat and architecturally effective monuments. A great mistake was made in not allowing perspective drawings in a competition of this kind, where the appearance is everything, and the plan and other arrangements of merely secondary importance. Many competitors have felt this, and have attempted by carefully coloured or shaded elevations to meet the difficulty, but the deceptive effect of such drawings does not need to be pointed out to any architect.

One of the best designs in the collection is No. 60, submitted under the motto "Comme il faut," and the coloured elevation by which it was shown was quite the best drawing in the room. It represents a small stone structure, of Renaissance design, surmounted by a roof and lantern of wood and metal, and crowned with a pole and falling time-ball. The lower stage is short and rusticated, and separated from the clock-stage by a strong cornice with triglyphs; it contains on one side the entrance-door, surmounted by a medallion of the Queen's head in an architectural framework, and on the other sides neatly-designed drinking-fountains. The clock stage has octagonal pinnacles at the angles, and the four dials between are worked into decorative features surmounted by a well-designed open parapet.

No. 30, "Auspicium melioris ævi," also shows in his design, No. 1, a structure that would do no discredit to the town. The tower consists of a small and rather attenuated square stone shaft entirely undecorated except for four small figures at the base and a niche to contain a statue; the dials at the summit are surrounded by an architectural framework of Early Renaissance character, and surmounted by dormers which break into a high tile hipped roof crowned with a small lantern. The other designs under the same motto are in the early Gothic style, and comparatively poor.

"Karl," No. 48, is an unpretentious design of early Gothic character; the tower is of stone, generally square in plan, but with many projections and breaks; the drawings are unfinished, and possibly do not do the design justice; as shown, there seems too little repose and refinement.

"Tempus" shows a quiet and appropriate design by careful drawings, rather heavily shaded, in Indian ink. The tower is of stone, and designed in the modern French style; like most of the others, it is square in plan. The clock stage consists of four winged figures on the angles, whose wings meet over the dials on the four faces, an arrangement which produces a more pleasing effect than might have been expected. The tower is surmounted by a wooden lantern.

"Zodiac," No. 59. Rather a squat structure, Late French Gothic in style,—the plan an irregular octagon; the clock stage consists of figures in niches on the angles, between which are rather small dials. The lantern is of stone, and surmounted by a gilt crown.

"Forward," No. 18, submits drawings of a very neat and appropriate little structure in stone of Classic character, surmounted by a wooden lantern; at the angles of the clock-stage are shown in neat outline figures of boys holding electric lamps.

No. 1 (monogram of O. F.) has a tall and elaborate structure, consisting of a diminishing shaft of stone rising out of a well-designed Renaissance base, on which, in front of the shaft, stands a bronze statue of her Majesty in her youth, and not as she is in this jubilee year, of which the tower is to be a memorial. The clock-stage rather spoils the design. It is a heavy projecting mass, carried on corbel tables, and consisting of a variety of architectural features, in which some Roman Doric columns carrying but little more than some big Gothic gargoyles are conspicuous. The whole structure is surmounted by an iron framework, in which are hung the chiming bells.

"God save the Queen" submits a design for a tall stone shaft with projecting balconies to large windows just under the clock-stage. At the summit is a statue of the Queen, and at the angles of the base are four lions.

"Vivat Regina" shows a neat design of Classic character, and, in an extra drawing, a very good and effective arrangement of steps and fountains as a base for it to rise from.

We also noticed "Brick," a high structure of Flemish character; "St. Hilda," an elaborate and not ineffective design; "Corona," a solid-looking building in red and buff stone; "Marine," and "Margate."

One or other of the clock-towers represented in the collection shown in the room is to be erected on a good site at the foot of the Marine-terrace Green, nearly opposite the Kent Hotel, and if the committee choose well there is every reason to believe that Margate may have a very good architectural monument by which to remember the jubilee year of her Majesty's reign.

#### FURTHER NOTES ON ACADEMY PICTURES.

HAVING spoken in our last of the pictures which form the salient points of this year's exhibition, we will add some further notes on pictures which claim attention, taking them mainly in the order of hanging, or, at least, in the numerical order of the galleries.

Gallery I. boasts of three portraits of mark, Mr. Onless's "Sir Horace Jones, Architect to the City of London" (12); Mr. Holl's "Sir George Trevelyan" (36); and Mr. Orchardson's "Mrs. Joseph" (67). The latter is the only one of the three which aims at a special artistic effect apart from portraiture; it is a study in colour, to some extent, and an interesting and effective one, but regarding it as a portrait, we must confess that we never like Mr. Orchardson's flesh painting when he deals with figures life size. The face, in this case, seems hoodless and the texture coarse. Mr. Holl's is a very vigorous portrait, as his always are, but with that rather over-acted energy which tends to become a little theatrical. "Sir Horace Jones" is simply a good likeness, with the face very well painted, and, as a portrait, is the best achievement of the three.

Mr. Peter Graham and Mr. Colin Hunter, in Nos. 13 and 23, present repetitions of their

respective receipts for painting sea, of which Mr. Graham's is much the best,—only when we have seen one we have seen all. Mr. F. Walton's "New Year's Eve" (39) is a powerful study of a special effect, bare trees making a network over a golden sunset sky, but it is too yellow in the light. In "Dame Nature's School" (57) Mr. J. White gives us a pretty and characteristic children's group, rather carelessly painted. Mr. Boughton's "Dancing down the Hay, Orkneys: Sea Fog Blowing Away" (64) is interesting as a study of a special *locale* and a special effect; it is hardly one of the most interesting or effective of his paintings. Mr. Storey's "A Young Prodigal" (91) is a picture one regrets to see from a clever painter; the very old joke of the man who gives an entertainment to his friends and cannot pay the bill, illustrated by a gaudy painting of a company of "guys" in gaudy dresses round a table; it is apparently intended to be humorous, but it is very small and humour.

The largest work in Gallery II. is Mr. J. W. Waterhouse's "Marianne" (134), the scene where Herod's falsely-accused wife is sentenced to death. She, with hands chained, and clad in white, stands on the steps in the centre of the scene, the other actors in it forming a semicircle behind her. She half turns her face to Herod, whose head is bowed on his hands. There is some capital painting in this picture: architectural and decorative detail is very well studied, and the grouping very effective; but it does not rise to the expression of the situation; it is a well-arranged tableau, that is all. Mr. W. F. Calderon's painting (147) represents Hampden, when he had ridden, mortally wounded, from Chalgrove Field. He is on horseback, in the midst of quiet meadows and trees, pausing before a brook which he apparently feels unable to leap in his wounded state. This picture of the statesman, patriot, and warrior, alone in this peaceful scene, with his life ebbing away from him, is of pathetic interest; but we have to go to the quotation in the catalogue to realise it. There is nothing to study in the countenance of the figure. It is a man in a musing mood; more might certainly have been made of it than that. The most pointed and characteristic figure picture in the room is Mr. Dendy Sadler's "The Old Squire and the Young Squire" (117)—an interior, with three figures in hunting costume, a kind of Squire Western and his son along with the huntsman, drinking together. This is a capital painting, and there is real character in the figures, especially in that of the good-looking but venacious young man, who is bound to grow into just such an old boozier as his father before him. Miss Dicksee's, "A Dawning Life" (109), an aged woman looking at a new-born baby, is a picture with a story in it, and carefully painted in both figures and accessories. Mr. W. B. Richmond's "The Thoughts of Youth are long, long Thoughts" is one of the frequent irritating examples of total want of intellectual perception on the part of painters of what they are professing to paint. The picture is a brilliant piece of colour, a half-length portrait of a girl, draped for the occasion in sumptuous silks; but where is the expression in the face of anything like the feeling expressed in Longfellow's beautiful line? Among other things in this room are Mr. Hemy's "The Smelt-net" (96), a sea and shipping painting in his best way; Mr. East's, "The Land between the Lochs," a cold and grim landscape, but not commonplace; Mr. Pettie's unnlucky piece of vulgarity, "Two Strings to her Bow" (152,—it should have been rather "Two Beaux to her String"); Mr. Joseph Clark's "Orphans" (166), not equal in interest to many things he has done; Mr. Bridgman's "Horse Market, Cairo" (172), and Mr. F. Morgan's "The favoured Swain" (124), which must have been placed on the line rather on account of what the author has previously done than on its own merits.

Two portraits have the chief interest (next to Mr. Oakes's landscape before mentioned), on the top wall of Gallery III. Mr. Luke Fildes's portrait of Mrs. Fildes (185), a very highly finished and brilliant piece of work, and Mr. Sargent's "Mrs. William Playfair" (197), which shows another sort of brilliancy. The realism of effect obtained with very little elaboration of detail, both in the face and the dress, bears strong testimony to the great powers of Mr. Sargent, sometimes misappropriated (as in the work already noticed in Gallery IV.), in the production of ugly eccentricities; but this is a



very good specimen of portraiture, one of the cleverest of this year; that it is not a more pleasing picture is owing partly to circumstances over which the painter could have no control. Mr. Holl's "Junius S. Morgan, Esq." (222) is, perhaps, the most firm, brilliant, and life-like portrait he has exhibited this year, which is saying a good deal for it. Mr. Britton Rivière's "Portrait of a Lady" (212), an old lady seated with a little "King Charles" in her lap, is a very delicately-executed work. Mr. Faed's principal picture is here (239), an old Scotch guide-wife escorting home her affectionate but tipsy husband; there is a certain character in it, and the man's incapable gait is well conveyed: but was this worth doing? Mr. Tom M. Hemy, who sends a spirited and clever shipwreck picture, "Women and Children First" (240), inherits a good name in sea-painting, and seems likely to do credit to it. Another sea painting of the first order, accidentally omitted in our previous notice, is Mr. H. Moore's "The First Boat's Away" (254), a picture full of freshness, air, and movement. Mr. MacWhirter's "Edinburgh from the Salisbury Craigs" (253) is a very good likeness of "And Reckie" as seen from that particular spot, and makes, as may be supposed, an effective picture. A pretty though affected little figure, by Mr. Marcus Stone, "Morning" (246), a small upright with a young lady in a white dress, will catch most eyes in passing; so also will Mr. W. D. Richmond's "Portrait of Mrs. Baird Smith" (269), an expressive portraiture of a very expressive countenance. Mr. Hodgson has aimed at giving us Burns turning up the mouse in ploughing, "Robert Burns, November, 1785" (270). He has not attempted to bring out the poet in the figure of Burns. He shows us a stalwart figure at the plough, turning round to look at the mouse, with a face not so remarkable or forcible in expression as some portraits of Burns give us. Did Burns really say "I'll immortalise that mouse"? The speech is not very like him. M. Fantin's "Grapes" (262) strikes one at first as very deficient in brilliancy for a still-life picture of that kind, but his grapes will bear looking into, and we are led to question whether some painters of similar subjects have overdone the brilliancy. Among other paintings in this room may be mentioned Bokelman's "Fire in a Village" (178), spirited in grouping and expression, but detestable in colour; Mr. Val Prinsep's "Ayesha" (277), a half-length of an Eastern woman holding a long-necked brass vessel, very effective; Mr. Sant's "A Thorn among the Roses" (312), a graceful group, which recalls some of his earlier pictures; and Mr. Frith's "Sir Roger de Coverley" calling on the beautiful widow, against which we fling a protest at Mr. Frith's ideal of the widow (who "had the finest hand of any woman in the country") as this stout vulgar-looking woman. The same artist's half-length of a flower-girl, "Violets" (95), in Gallery II, is a very pretty and carefully-painted work.

In Gallery IV, Mr. Coodall is in the centre with a very large picture of Christ and the woman taken in adultery, entitled "Misery and Mercy" (338); it is after "the accusers" had departed, and the two figures only are seen in the middle of a large portico of a Classic temple, which seems to be Mr. Coodall's notion of the architecture of the Temple at Jerusalem. The Christ is a more conventional figure with a halo; the woman kneeling on the floor, with her head bared, is both a finely-drawn and an expressive and pathetic figure. Mr. Albert Coodwin's "Shipwreck: Sinbad the Sailor Storing his Raft" (332), is one of his imaginative landscapes; a pile of rocks on the right, with the ship on them, and her masts and cordage black against a lurid red sky; it is a very fine work, a poem in the form of a landscape. Among other landscapes in this room are Mr. Johnson's "Kings of the Forest" (339), a woodland landscape, with the trunks of two massive oaks in the foreground; and Mr. Mark Fisher's "Cattle in Berkshire Meadows" (362), a style of work very admirable and very much removed from commonplace in itself, but which Mr. Fisher has repeated so often that one can really hardly tell one work of the kind from another; his manner of working by minute touches is admirable, and tends towards something like the real infinity of colour of nature, but it is marred by a want of light: there is no sunshine, only a leaden gleam over his scenes.

Mr. David Murray's "Cross on the Dunes, Picardy" (321), a sand landscape, with one peasant crossing himself before a rude cross, should be looked at; and Mr. Anderson Hague's little work, "Ripening Corn" (370), and Mr. Haye's "Sea Grotto" (393), a study of rocks. Among the figure pictures in this room not previously noticed are Mr. Marks's "The Minstrel" (368), a Jongleur proposing a song to a company of monks—there is not, to say the truth, very much of point or humour in the work; Mr. Fildes's portrait of "Mrs. Agnew" (386), a fine effective life-size portrait of a lady in white; and Mr. Pettie's portrait of "Lady Ripley" (400), a three-quarter length, relieved against a red wainscot.

Gallery V. includes a very good likeness of Mr. Herkomer by Mr. Herrman G. Herkomer (413) (the catalogue spells it "Herman," which we presume is a misprint), and what we must consider but a weak and tame portrait of Lord Hartington by Sir J. Millais; also a pleasing portrait of "Mrs. Henry Whitehead" (431), by Mr. Stuart Wortley. Mr. Hindley's cleverly painted picture "The Music Lesson" (452) does not tell its story. There are two very interesting landscapes; "In Clondland,—on the Crest of a Yorkshire Moor" (467) by Mr. T. H. McLachlan, a painting in a broad and powerful but sombre style, reminding one a little of De König; and "Assisi,—Sleeping in the Moonlight" (472), by Mr. Albert Goodwin. This latter, like all the artist's works, is highly original, and, perhaps, one of the nearest approaches to moonlight effect that we have seen in a picture, but there is too much light and definition of objects in it for a true moonlight effect, as there is in nearly every moonlight picture that we see. Mr. Arthur Waase's large painting of "Lancashire Pit-Lasses at Work" (479) has a social interest, but is very ugly in colour.

Mr. Leslie's full-size figure of "Sylvia" (488) in Gallery VI. is a very pretty painting of a fair dame in a green dress with a flowered brocade skirt showing under it, carrying a silver vase of red and white roses; the painting is a change from the painter's usual style of picture, and so successful that one may hope to see more work of this type from his hands. Mr. Nettleship's "Caliban upon Setebos" (497) can only be appreciated by those (but a small proportion of visitors to the Academy, we fear) who have read Browning's remarkable poem under that title. The conception of Caliban is admirable; he is represented writing "prodigious words" in a hook, in imitation of Prospero's magic volumes; the "lumpish seahes" who was his Caliban is seen in the background, and the crane, who is his Ariel, is present. Mr. Browning's Caliban, however, made a hook of "broad leaves," leaves of trees we presume; Mr. Nettleship's Caliban seems to have got a paper hook; but all who know the poem will find the picture worth looking at. Mr. A. C. Gow's painting, "The Garrison Marching out with the Honours of War: Lille, A.D. 1708" (504), is a new subject, and a rather telling one; the garrison, thin and starved, and many of them wounded, march along with a sad dignity, Marlborough and his staff raising their hats as the defeated troops pass them: there is a fine chivalrous feeling in the work, and the groups of the conquerors and conquered are effectively contrasted.

Mr. Laslett Pott's "News of a Victory" (517), in the stagecoach days, is spirited, but coarsely executed, and deficient in grouping; it can hardly be called a picture. There are much worse ones on the line in the same room, however, which we forbear to particularise. Miss Marianne Stokes has a delightful bit of humour in "The Magic Flute" (523), a boy playing on a tin pipe, with his face twisted in grotesque energy. Mr. E. J. Gregory's "When the Cat's away" (525) is a brilliant portrait of a little girl in a light yellow satin dress playing with a tame mouse. Mr. G. G. Kilburne has a very good little work, "An Appeal" (538); a young widow and child wait in the hall of a large house, whilst her late husband's father, seen through the open door of the dining room, reads a letter of appeal; the young widow, though very pretty, is evidently not distinguished, the son had married against the will of his family; the picture is conscientiously finished in every part, and it has the great merit of telling its story thoroughly. Mr. Kilburne, jun., shows his ability in a spirited little painting of greyhounds "in training" (511). Then there is Mr. Macbeth's "Ambrosia" (530), a sort of

grotesque pendant to Mr. Leslie's "Sylvia," a buxom waiting-maid carrying a tray with beer and oysters; it would have done very well half the size, but certainly does not justify the space it occupies, nor does Mr. Fahey's large piece of absolutely mechanical landscape, "On the Buro" (522), as hard as a tea-tray. Miss Clara Montalba has a brilliant Venetian painting in her usual remarkable style (540). Mr. F. W. Calderon's "Running the Gauntlet" (539), a snow scene, where a boy passing on horseback is pelted with snowballs, is well enough painted, but was it worth doing? That is the question that a good many Academy pictures, well enough painted in themselves, suggest to one. Among things in this room which were worth painting is Mr. Stanhope Forbes's "Their ever-shifting Home" (543), a strange-looking dingy painting of a caravan of strollers descending a road, a woman and her infant walking in advance of it; there is a curious pathos in the work, which has a strongly-marked character of its own, though it is unpleasant in colour. Mr. Otto Weber's "Seaweed Gatherers" (548) should be looked at, and Mr. Lobloy's "Village Choir" (555) practising, a small picture with very clever definition of character in it, as also M. Carolus-Duran's portrait of his daughter, not that we admire the style of painting at all, but its brilliancy and effectiveness are undeniable.

Gallery VII. contains a beautiful little work by Mr. Chevallier Taylor—"Hess, O Lord, these thy gifts to our use" (604), grace said in a cottage interior; every figure is thoroughly studied and has its own character; the reverential attitude of the wrinkled old woman at the end of the table has a touch at once of the ludicrous and the pathetic. Mr. Mark Fisher's "Sheep crossing Hill-side,—Moonlight" (628) ought to have been better hung; it is a work of great originality. A fine landscape is that by Mr. Milne, "Tay Backwater, Kirkcubins" (590), and Mr. Waterlow's "The White Sands of Connamara" (607), whose whiteness is intensified by the rich colour of the seaweed which is being piled on the back of a donkey in the foreground. Mr. David Murray's "Autumn's Tinge of Gold,—Picardy" (576)—looks a little like a Corot with colour added; it is from the country of Corot. Near it is an example of Mr. Hook in an inland landscape (583), built up in terraces; fine in itself, but the brook in the foreground is a failure; it hardly looks like water. Mr. Blair Leighton's "Romola" (591) is hardly a success, and Mr. Gindoni's "Council of War after the Landing of the Prince of Orange" is a failure; there is no point or interest in it. But "The Last Long Voyage" (630), by Mr. W. H. Bartlett, is one of the best things we have seen from him for some time. It is the landing of a coffin from a ship, for a funeral at a little desolate-looking church on the left of the picture. The story is well told and the whole of the figures contribute to it. This room also contains the portrait of Mr. David Plunket by Mr. Frank Holl, a rather odd and only partially effective painting in which there is a remarkable predominance of blue tones; and that of Sir E. Henderson, by Mr. Long, in a silver-trimmed uniform, which comes in very well for picturesque treatment.

Mr. Waller's large picture called "The Challenge" (654), in Gallery VIII., tells no comprehensible story and thus entirely fails of interest. It has been a general puzzle to make out what the painter means by it. Mr. Armitage's coloured painting for a fresco for St. John's Catholic Church, Islington, representing "The Institution of the Franciscan Order" (681), has a fine decorative effect; the Pope (Innocent III.) and other gorgeously-draped ecclesiastics occupy the right of the picture, giving a fine body of colour here, though not too rich to be suitable for fresco; the sombre dresses of the monks form an opposing group on the left; their faces have much variety and individuality of character. The whole composition is connected by a background consisting of an arcade with parti-coloured vousoirs on coupled shafts. This is a good example of strictly decorative painting on a large scale, and it is to be regretted that our painters are not often given the opportunity of designing on this scale for mural decoration. Among other pictures in this room is Mr. Leader's best this year, "An April Day" (682), a bright level rural landscape, in which, however, that small church, large tree, and ha-ha fence are old friends, who have done duty rather too often in

Recent works by this artist. Mr. Farquharson's "Summer Days" (670) is a fine landscape, finely composed and good in colour. A painting of people looking out from a pier in a storm, under the title "Ho! Ho! the Breakers roared" (679), by Mr. E. S. Harper, has a certain originality and power; we do not see the sea, but judge of what is going on from the action and countenance of the people on the pier: the young woman stooping forward in anxiety is not quite satisfactory in drawing, but there is something in the picture. Mr. Carter's "Lady Milbank" (684), and Mr. Long's "Cardinal Manning" (680) are two good portraits; a better one is Mr. Herkomer's likeness of "Mr. Britton Riviere" (683). "Evening Reflection" (696), a small landscape by Mr. J. Clayton Adams, is painted but pretty; "Lingering Light" (702), a pendant to it, by Mr. E. Sherwood Calvert, is a better work, but wants force and local colour in the foreground. Mr. MacWhirter has a large and important landscape in this room, "Misty Gleams,—Loch Horn" (715); a sheet of water between the opposing slopes of great hills; there is fine painting and drawing of mountains, and a very Highland feeling about it. Can any one explain for what merits the foolish affair entitled "Rescue" (714) has got placed on the line in this corner of the Gallery?

Gallery IX., once the water-colour room, but now devoted to small cabinet paintings in oil, contains some very clever little things, more than we can particularise. Among them may be mentioned Mr. Logsdail's "The Bank," a study of the old lady in Threadneedle-street, and as a piece of architectural painting very true and correct, except as to the colour of the stonework, which is hardly according to nature (if we may call a wall and columns of hewn stone "nature"). The same artist has a view of St. Paul's looking up Ludgate-hill (846), in which the general street view and the crowd are admirably given, but St. Paul's is not well drawn. The whole scene, however, is more true than that given by Mr. O'Connor in Gallery V.: "Ludgate, Evening" (427), where Ludgate-hill and the Ludgate-circus are shrunk up into half their real extent as seen from Fleet-street (indeed, the circus opening is hardly discernible), in order to give an exaggerated comparative scale to the cathedral, which in this case also is badly drawn,—the gable out of perspective, &c. But to return to Gallery IX.: Mr. Grimmond's "A Scotch Police-court" (768) is a small but admirably finished work; Miss Shorthouse's "Azaleas" (757) are very fine; Mr. Marks's picture of Gilbert White and "the Old Tortoise" (804) is remarkable for the expression he has put into the head and eye of the tortoise plodding over the grass to its benefactor. Mr. Eyre Crowe's "Convicts at Work, Portsmouth" (807) is one of his small highly-finished pictures with a painful kind of interest in the studies of the type of countenance of the men at work. Mr. Leslie's "This is the Way we wash our Clothes" (853) is a pretty study of a child standing on a chair engaged with great earnestness in the operation referred to.

The central portion of Gallery X. is occupied by M. Carolus Duran's brilliant and flashy painting of "Madame la Vicomtesse Grefulhe" (904), a picture of which the force and brilliancy are undeniable; but it is a superficial brilliancy, concentrated on the sheen of a satin dress; the colouring of the face is almost neglected by comparison, and the flesh appears dull and bloodless. The painter has put the required kind of "go" into it, however, as a fashionable portrait,—a painting of what the Comte de Flore would have called "The High-life." Mr. Mackworth's "Christ calming the Sea" (891) is a solemn though shadowy composition; the painter seems to have purposely shrunk from any grappling with the realism of the supposed event; the storm goes off in an indistinct mass of clouds and darkness on the right; but the figures of Christ and of the astonished Apostles are really fine and expressive, though (purposely, perhaps) little more than silhouettes. Mr. Allan's "The Haven under the Hill" (903) is a creditable imitation of Mr. Napier Hemy; Mr. Ratray's "Arran from the Kyles of Bute" (908), a fine and powerfully-painted coast scene. "Idlesse" (927), by Mr. T. B. Kennington, is a very clever study of a nude child on a white sheep-skin rug, with white hangings behind her, looking at gold-fish in a vase. It is essentially a study of colour. Mr. Fletcher's "Evicted" (960) has

feeling and good execution, but would have done as well on a smaller scale, and fills up more room than it is quite worth. Mr. Shannon's "Mrs. Nicholls" (968) is a good portrait, both in flesh-painting and costume.

Gallery XI. contains a very beautiful landscape by Mr. Adrian Stokes, "An Afternoon in February" (985), one of those rare works in which, while the execution is entirely satisfactory, it seems quite subordinate to the feeling of the scene. It is a level pasture-land with cows moving slowly across it through long dank grass, woods behind: a very broad style of handling, and a movement in the whole which reminds us of Browning's lines:—

"The level wind carried above the firs  
Clouds the irrevocable travellers,  
Onward."

There is no landscape in the exhibition we have looked at with more pleasure, though it is not what is termed a "striking" picture. Mr. Colin Hunter's "Beneath Blue Skies" (990) is the best of his coast scenes; also may be mentioned "A Ghost Story" (976), by Mr. Howard Helmick, and "Your Humble Servant" (984), by Mr. Dollman, a kind of Dick Turpin howling low before an announcement of a reward for his own capture, dead or alive; good specimens of the more refined order of artistic joke. Mr. R. Herdman has a good portrait of "Mrs. Hamilton Buchan" (1,052); Miss Rae's charming "Naïad" we have mentioned; and M. Eugène de Blaas exhibits an admirably-drawn and painted life-size figure of a "Venetian Fruit-seller" (1,011), which has, however, no point or interest except as an excellent piece of workmanship.

Of the sculpture we will say something separately.

## Illustrations.

### QUEEN'S HALL, PEOPLE'S PALACE, MILE END ROAD.

THE Queen's Hall, illustrated in our issue of to-day, forms merely a fragment of the scheme of the "People's Palace"; but it is the central feature, and the only one likely to be ornate or interesting to architects. Eventually it will be approached through a "Social Room" on the south end. There will be Technical Schools on the east side, and a small concert-hall, refreshment-room, and Art Schools on the west side, whilst at the north there will be a library, reading-rooms, and trades' shops. The outside of the Queen's Hall as at present seen will thus, when the whole is completed, be entirely concealed.\* Hence the plain exterior. The Hall is 130 ft. long, 75 ft. broad, and 60 ft. high, the roof being elliptical.

The entrances, three in number, face the Mile End Road, and are enclosed by a temporary porch, the doors being hinged so as to open both inwards and outwards, as required in the Metropolis for public buildings. There are other doors for egress provided at the east and west sides and north end of the hall, so that it could be emptied in a very short time.

The orchestra recess is elliptical in form, and half-domed, so as to throw out the sound, the ceiling being divided by radiating, vertical, and horizontal ribs, richly inlaid with panels and mouldings.

A magnificent organ, the gift of Mr. Dyer Edwardes, has been built, but it was not thought judicious to erect it whilst the dust created by the workmen remained. The orchestra will accommodate about 140 performers.

On either side of the hall there is a gallery, supported by iron columns masked or ornamented by very graceful caryatides of Greek type by Mr. Verheyden. About 240 people are provided for in the galleries. The seats are of polished oak, panelled and shaped to the form of the front of the gallery, which is bowed out for acoustic reasons between the supports similarly to the gallery in the Prince's Hall, Piccadilly, by the same architect.

The roof, elliptical in form (as already stated), is divided into nine bays by very broad ribs or principals, the under-side being moulded into panels of various forms, deeply moulded and richly ornamented, the spaces between being coffered in a similar manner. The visible roof or ceiling thus formed is supported by double

\* We gave a plan of the whole group of buildings in the Builder for June 23, last year, accompanied by an elevation of the front.

columns, fitted on the upper part. Between these are placed in standing posture the statues of twenty-two queens, supported on carved pedestals. The queens have been selected from those who have been useful to their country or in sympathy with their people. They are as follows:—

|                                   |           |
|-----------------------------------|-----------|
| 1. Esther of Persia.....          | B.C. 518  |
| 2. Boadicea of Britain.....       | A.D. 61   |
| 3. Zenobia of Palmyra.....        | 273       |
| 4. Helena of Rome.....            | 328       |
| 5. Clotilda of France.....        | 511       |
| 6. Bertha of Kent.....            | 600       |
| 7. Osburga of England.....        | 860       |
| 8. Matilda of Germany.....        | 904-940   |
| 9. Margaret of Scotland.....      | 1093      |
| 10. Maude of England.....         | 1118      |
| 11. Elizabeth of Hungary.....     | 1207-1231 |
| 12. Blanche of Castille.....      | 1253      |
| 13. Eleanor of England.....       | 1292      |
| 14. Philippa of England.....      | 1313-1370 |
| 15. Margaret of Denmark.....      | 1380-1412 |
| 16. Margaret of England.....      | 1423-1482 |
| 17. Isabella of Castille.....     | 1489-1504 |
| 18. Anne of Brittany.....         | 1514      |
| 19. Elizabeth of England.....     | 1534-1603 |
| 20. Anne of England.....          | 1702      |
| 21. Maria Theresa of Hungary..... | 1717-1780 |
| 22. Louise of Prussia.....        | 1806      |

Immediately over the entrance is the figure of her Majesty Queen Victoria seated on a chair (similar to that used on the occasion of her coronation), the whole of the statues, the work of Mr. Verheyden, being worthy of attention as works of art.

The floor of the hall is composed of solid wood blocks laid on fireproof concrete arches, the space underneath the floor being utilised for the storage of the chairs and for other purposes incident to the daily use of the hall.

The lighting is entirely from the roof, the counterlights in the ceiling being filled with painted glass, the centre panels, oval-shaped, being embellished with the Prince of Wales's Feathers, Royal Arms, Royal Monogram, Royal Arms of England, and the Arms of Australia, Canada, India, Wales, and Scotland.

The whole effect is that of a bright sunny light diffused over the interior, which is maintained throughout by the decorations, gilding, and colour.

The hall is ventilated by means of a double continuous ridge, the openings to which are screened off by perforated foliated panels.

The hall is heated by means of hot water, the pipes passing in panels underneath the floor, the warmth being admitted through iron gratings.

The whole work has been carried out from the drawings, and under the superintendence of Mr. E. R. Robson, F.S.A., by the following:—The main structure, Messrs. Perry & Co.; the statues, by Mr. Verheyden; decoration and painted glass, by Messrs. Collinson & Lock; ornamental plaster work, Mr. McCulloch; fireproof flooring and iron construction of roof, by Messrs. Dennett & Ingle; the heating and gas lighting, by Mr. Cannon; the glazing to roof, by Messrs. Mellows & Darby, on their improved system, no putty being required. The clerk of works is Mr. Softly.

The hall is to be opened by the Queen this Saturday, May 14, when her Majesty will also lay the first stone of the Technical Schools.

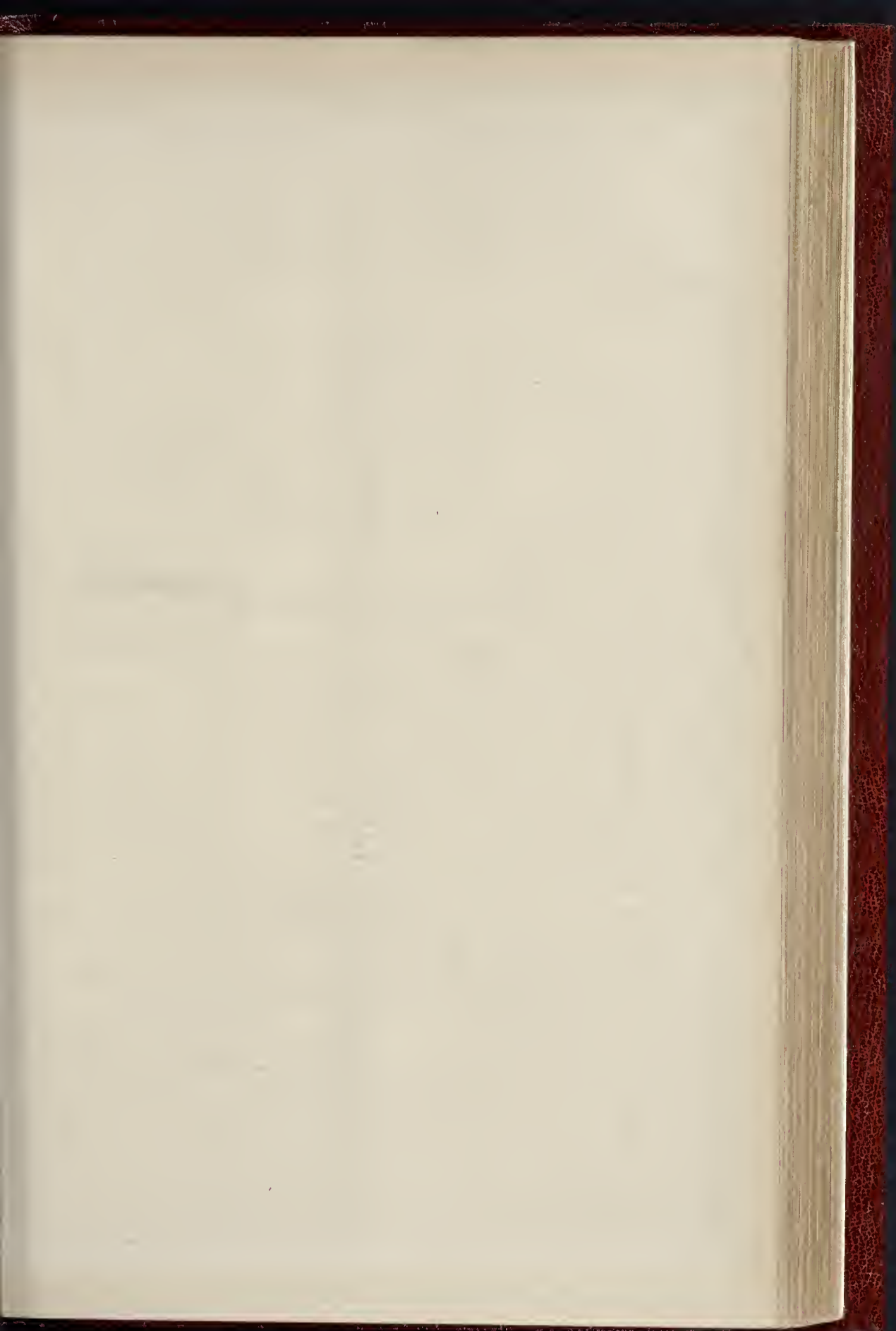
### DINING-ROOM AND FURNITURE.

THIS is an illustration of a room in a house lately built for Mr. H. Goschalk, the wood-work of which has been executed in pine, and painted, the ceiling being also of the same material.

The furniture has been executed in walnut and covered with stamped leather. The settle back and cover is of Lincrusta, highly gilt. Brackets have been arranged on the panelling of walls to carry pieces of statuary. The drawing is by the architect, Mr. R. A. Briggs.

### ALMSHOUSES AT CHARLTON, KENT.

THESE almshouses have been built by the Trustees of the Dutch Church, Austinfriars, at Charlton. The wings provide accommodation for ten inmates, and the centre portion is used as a convalescent home for a small number of children. The building is faced with stock brick, and the dressings are of red brick and Portland stone. The roofs are covered with slates. The buildings were erected from the design of Messrs. E. P. Anson & Son, Messrs. Balaam Bros., of Old Kent-road, were the builders, and Mr. Unwin efficiently discharged the duties of clerk of works.



THE BUILDERS' AND ARCHITECTS' DIRECTORY

THE BUILDER, MAY 14, 1897.

DINING-ROOM AND FURNITURE  
FOR H. GOSSCHALK, ESQ. designed  
by R. A. BRIGGS, A.R.I.B.A.

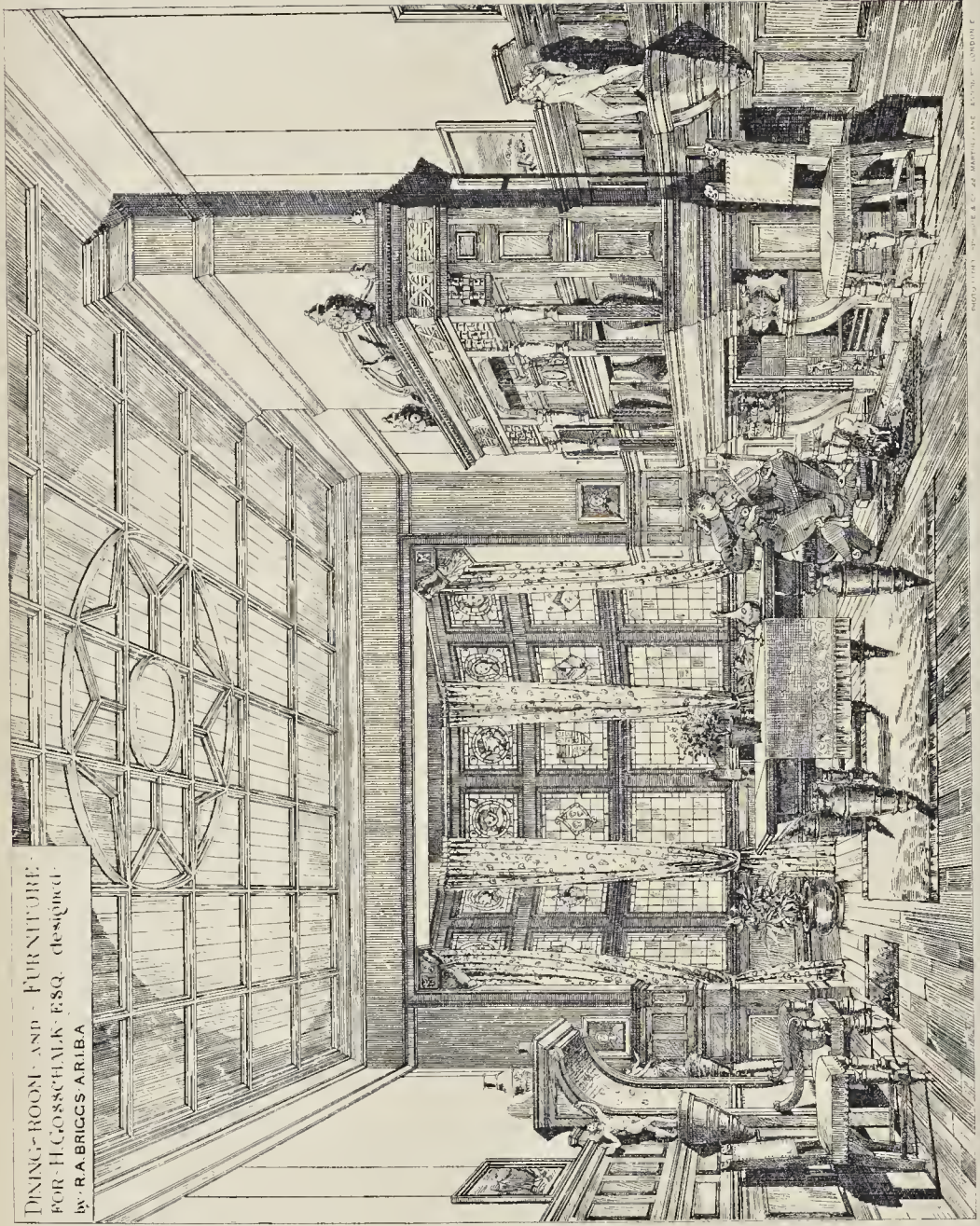
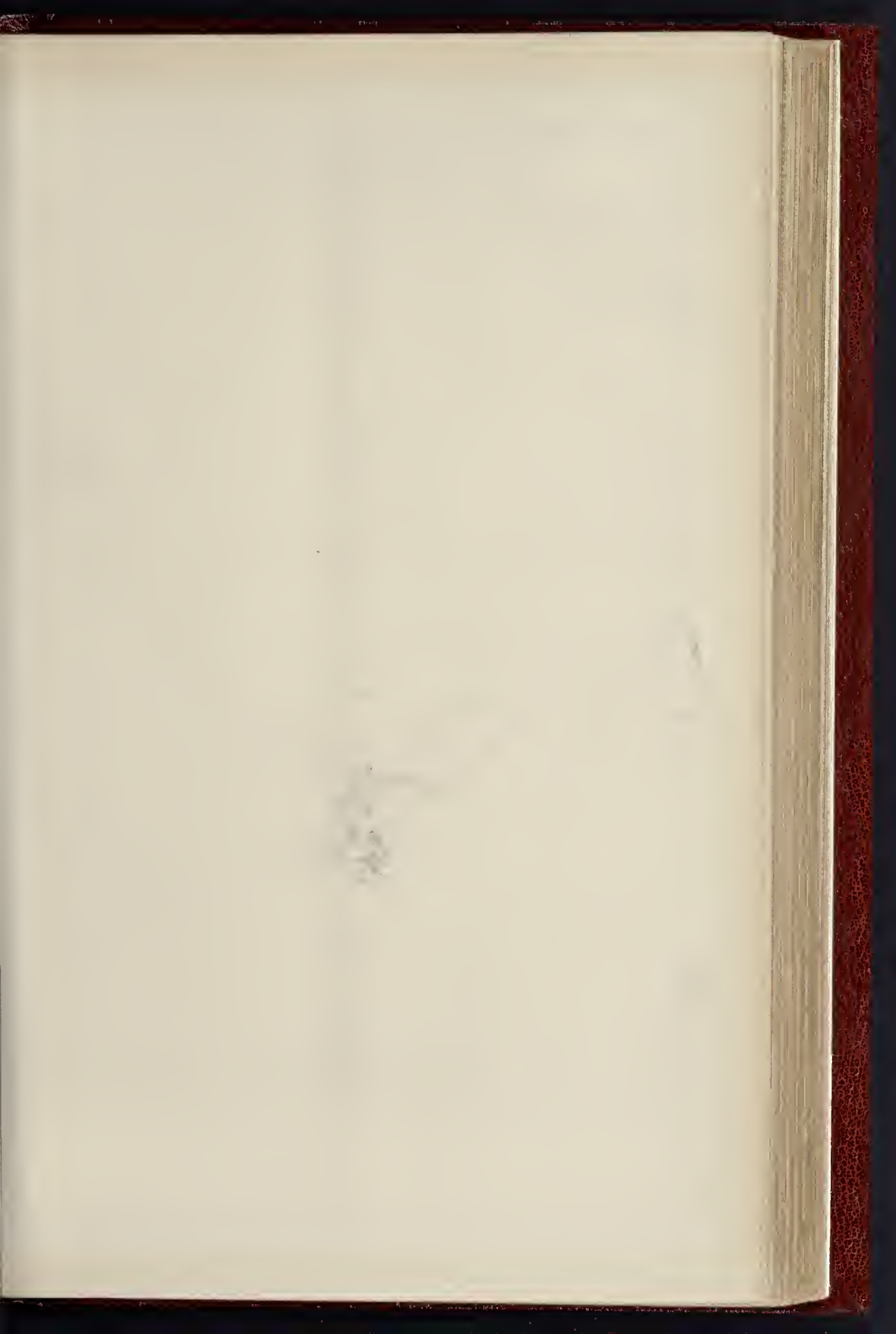
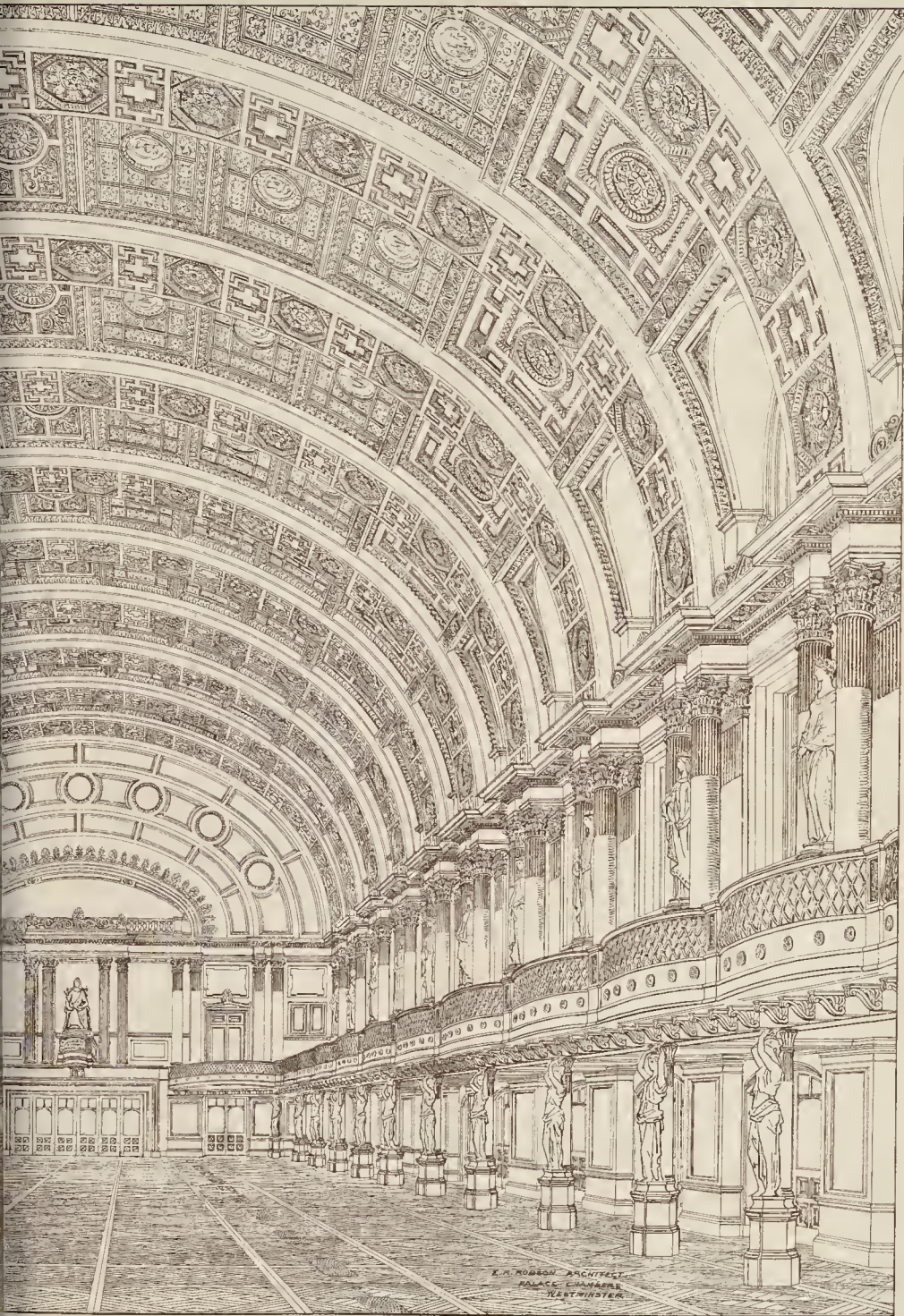


PHOTO BY THE BUILDER & CO. 22, ABchurch Lane, LONDON.





Bedford Lemere & Comp., Photo-Litho



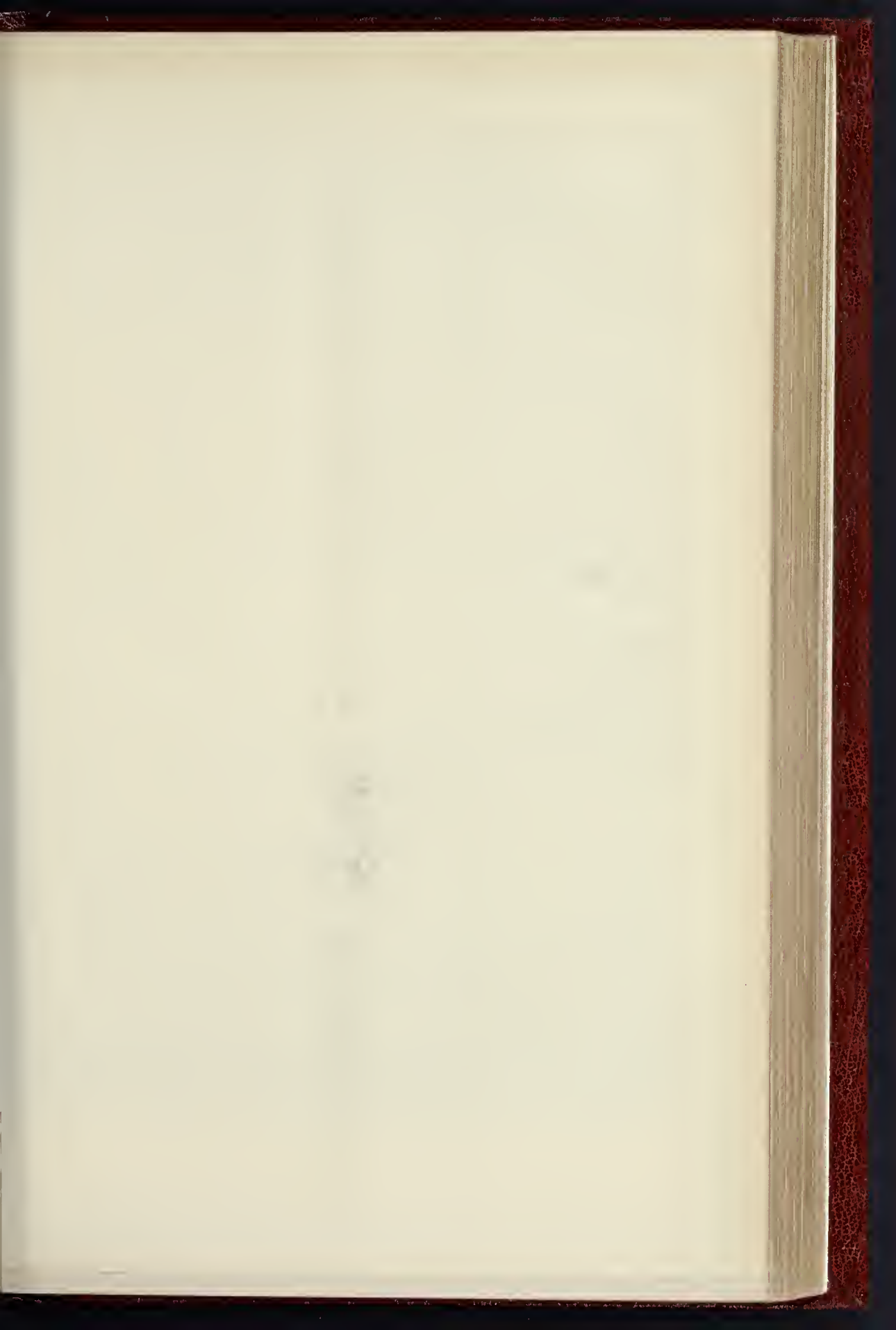
147, Strand, London, W.C.

HALL,  
END, LONDON, E.

MR. E. R. ROBSON, F.S.A., ARCHITECT.

THE UNIVERSITY OF CHICAGO







DETAILS FROM SANTA MARIA DEI MIRACOLI, VENICE.

FROM A PHOTOGRAPH.

The Phototype Co., 200, Strand, Lon



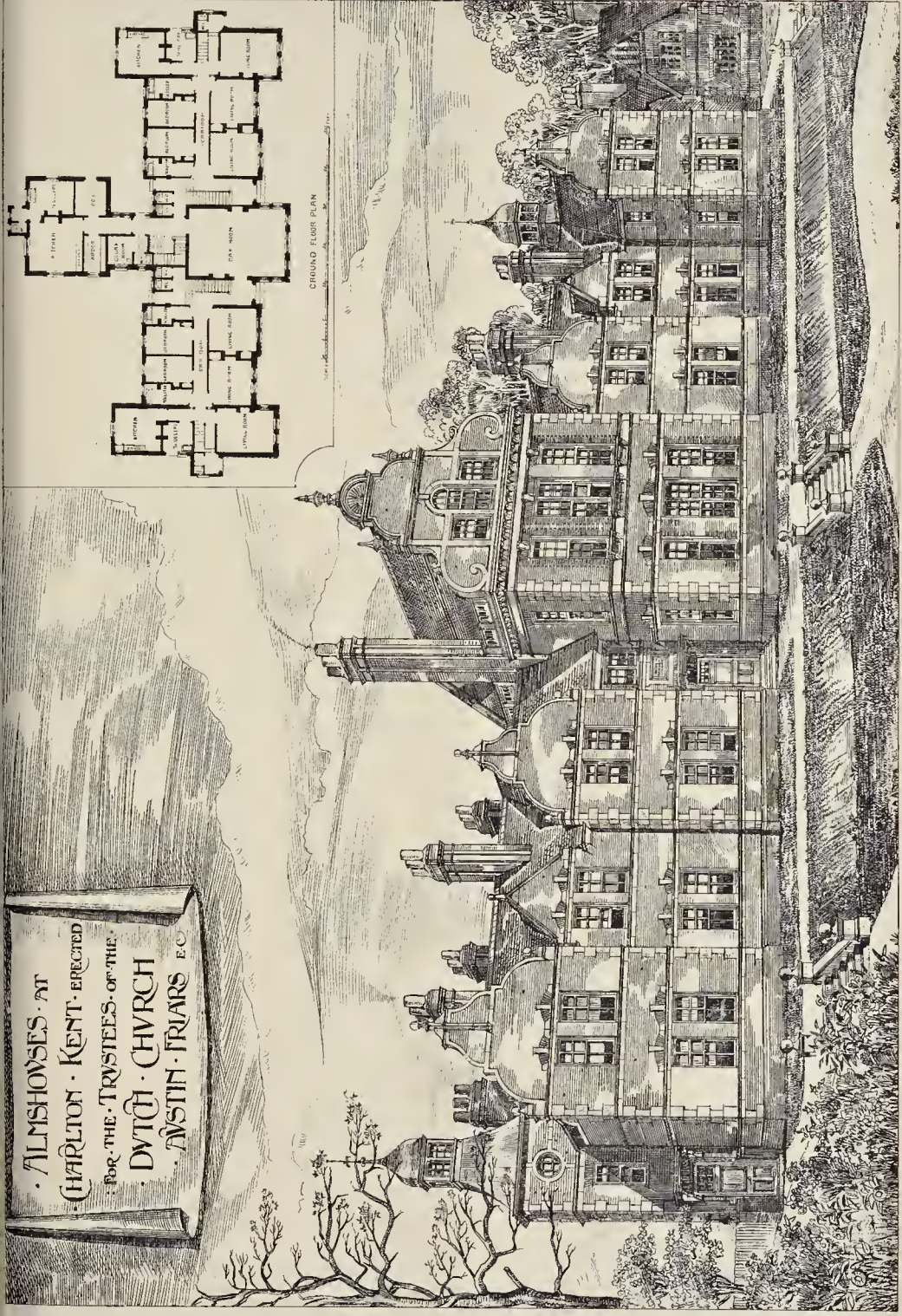
DETAILS FROM SANTA MARIA DEI MIRACOLI, VENICE.

The Phototype Co., 508, Strand, London.

FROM A PHOTOGRAPH.

THE UNIVERSITY OF MICHIGAN LIBRARY

ALMSHOUSES AT  
 CHARLTON, KENT, ERECTED  
 FOR THE TRUSTEES OF THE  
 DUTCH CHURCH  
 BY MESSRS. J. & A. WASTIN, F.R.C.S.



ALMSHOUSES AT CHARLTON, KENT.—MESSRS. E. J. & A. WASTIN AND SON, ARCHITECTS.

PHOTO LITHO. ENGRAVED BY W. & A. GIBSON, 15, SOUTHAMPTON PLACE, LONDON, W.1.

THE UNIVERSITY OF CHICAGO

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

PRESENTATION OF THE ROYAL GOLD MEDAL.

An ordinary meeting of the Institute, for the presentation of the Royal Gold Medal and the Institute Prizes, was held on Friday, the 6th instant, and was open to all gentlemen attending the General Conference of Architects. Mr. Edward P. Anson, F.G.S. (President), occupied the chair, and the following Gold Medalists of previous years were present, viz., Messrs. Charles Barry, F.S.A.; J. L. Pearson, R.A., F.S.A.; and Alfred Waterhouse, R.A.

The President, addressing the meeting, said: Gentlemen,—You, and more especially those who have held the same position in this Institute as I now have the honour to do, will appreciate how great a privilege I feel it, and how pleasant it is, to be in the position to confer on those whom you desire to honour the Gold Medal which, on the recommendation of this body, our Sovereign Lady the Queen is graciously pleased to place at our disposal. I have already been the channel through which your appreciation of the distinguished merit of M. Charles Garnier, a most able and accomplished foreign architect, was expressed; and now I rejoice in being in the position to offer a similar mark of appreciation and esteem to our respected Fellow and Ex-President, Mr. Christian. But before doing so, it may not be amiss to recapitulate some of the events, now almost historical, connected with this annual token of the Queen's sympathy with those of her subjects who belong to the architectural profession. It may not be generally known that this Royal Medal was originally offered as a student's prize. On the 26th of April, 1847,—a little more than forty years ago,—the Institute was informed that the Queen had been graciously pleased to modify the terms of the original gift, and to permit a Royal Medal to be conferred on such distinguished architect or man of science of any country as had designed or executed a building of high merit, or produced a work tending to promote or facilitate the knowledge of Architecture, or of the various branches of science connected therewith, and that the Council would, in January, 1848, take into consideration the appropriation of the Royal Medal accordingly. The following month a notice relative to the proposed award was inserted in certain newspapers; and towards the close of the year (1847) a similar notice was inserted in *Galignani's Messenger*, the *Times*, the *Athenaeum*, the *Literary Gazette*, the *Builder*, and the *Civil Engineer and Architect's Journal*; and copies were forwarded to the Corresponding Members of the Institute. Mr. Wyon, R.A., was commissioned by Her Majesty's Keeper of the Privy Purse to execute the medal. The reverse of the medal was designed by Mr. Ambrose Poynter, then Vice-President, who died only a few months ago; and some subsequent modification made in it by Mr. Wyon was approved. When, however, this design was submitted to the Prince Consort, His Royal Highness suggested that an inscription should be introduced to show clearly that the medal was the Queen's gift. The words "Victoria Regina cudi jussit" were consequently introduced on the obverse; and the first medal was delivered by Mr. Wyon into the hands of the President, Earl de Grey, previous to November, 1848. In the early years of the award notices were sent to foreign societies, and foreign architects were therein invited to make application for the honour. Several well-known men connected with architecture and the allied arts sent in applications, others were recommended through friends. In England applications were also made. The esteem in which it is held on the Continent is seen in a not unusual mode of affix, such as "décoré de la grande médaille de la reine," &c.; while in Great Britain it is necessarily coveted, from historical as well as social and professional reasons. Professor Cockerell was the first recipient of the Medal, and he acknowledging the award, stated,

"I find it difficult to express the very high sense I am bound to entertain of an honour conferred by the united testimony of professional colleagues . . . who stand collectively and individually before her Majesty and the public as the responsible guardians of our noble art and science. . . . Such an honour, as the reward of the sincerity, at least, of the Professor's labours, can be regarded no otherwise than as the triumph of a life, whilst it offers the highest possible incentive to the prosecution of those labours. Since then the medal has been presented,

among Englishmen, to Sir Charles Barry, Professor Donaldson, Sir Robert Smirke, Philip Hardwick, Sir William Tite, Owen Jones, Sir Gilbert Scott, Sydney Smirke, Professor Willis, Anthony Salvin, Sir James Pennethorne, Sir Matthew Digby Wyatt, Benjamin Ferrey, James Fergusson, Thomas Henry Wyatt, George Edmund Street, and Edmund Sharpe, all now deceased, as well as to six other British architects, and one distinguished archaeologist, whom we have, happily, still with us. Fourteen foreigners, four of whom are still living, have also received the medal. Mr. Christian is the twenty-sixth recipient, among our own countrymen, of this honour, and if I keep him waiting yet a little I must ask him to pardon me, and you, gentlemen, to bear with me for a few minutes more. The present year is an exceptional one for all Britons spread over sea and land,—aye, and I venture to think, for all the English-speaking race. It is also an exceptional year for the whole profession of architecture throughout the empire, and, if I dwell on the fact somewhat fondly, it is because I am one of the comparatively few who were working at their several professions or trades when William IV. granted the Original Charter of this body politic and corporate, and when the Queen, barely emerging from girlhood, was suddenly called to the throne, amid the rejoicings of the nation, inspired thus early with the promise of a long, a prosperous, and a progressive reign. I have also had the rare privilege of filling this chair at a moment when the Queen, in the fiftieth year of her beneficent rule, has signed a deed granting to this body increased powers and privileges, not the least being those laid down in the 17th clause of our Supplemental Charter,—that we may "apply the funds of the Royal Institute in furthering professional education and in conducting all Examinations which the Royal Institute may hold or now is or may hereafter be empowered or required by statute to hold." That, gentlemen, is the most important, in my opinion, of the obligations which we have incurred under the terms of the deed just received from the Privy Council office; and I pray that I may live long enough to witness the results of a serious effort to establish, in this country, some complete course of systematic study for architects. So, it may almost be said, shall the original intentions of the Royal giver of our Gold Medal be fulfilled, and in her lifetime. Students who, forty years ago, lost their chance of a great prize, will be eventually recompensed by the substantial and lasting advantages which it is now in the power of the Royal Institute to confer upon them. Nor, indeed, can the time that has elapsed since the Medal was offered as a prize to students be regarded even by them as lost or wasted. In the interim, a corporate body has been consolidated, a profession has been established, an Examination secured. While the Royal Gold Medal remains the great and justly coveted reward of maturity, the seniors, acknowledging a debt to the youth of our profession, offer, so to speak, educational advantages to the whole body of architectural students throughout the empire. And now for the immediate duty before us. Mr. Christian's career is so well known that I need not enter into any details respecting it; moreover, I know that those details, so far as executed works go, are already before you, and that they are the best records of a long and busy life. We know also that that life has been spent in conscientious, honourable work, evincing throughout a thorough knowledge of our art; I am sure that no architect could have more conscientiously studied the best interests of the Ecclesiastical Commissioners of England, by whom he has been so extensively employed, than has Mr. Christian. It is a good many years ago since I was engaged on some business in which he represented the Ecclesiastical Commissioners. I was concerned for an adverse, or, at all events, a different interest, and, as is not unusual, I took a different view of the subject we were upon. I differed from our friend, and I confess I strongly objected to the view which he as strongly advocated. All the time I could not help feeling that I was dealing with a man who was very zealous and faithful in his duty to his employers, and, though I believe I was not convinced, I could not help mentally saying, "Well done, thou good and faithful servant." Mr. Christian, it is my most pleasurable duty to place in your worthy hands this Royal Gold Medal. It is the highest tribute of esteem which your brother

architects can offer to you; and, gentlemen, let me add that, I shall always remember with gratification, during the remaining years I may still be spared to move in the profession in which my already long life has been passed, that I have been allowed to place the Royal Gold Medal in the hands of Ewan Christian.

Mr. Ewan Christian, who was received with much applause, said: Mr. President,—I thank you most cordially for the kind words you have spoken; and you, gentlemen, for the manner in which you have received them. Mine has been a life of independent service, not of exploits. I have undoubtedly done much work, and some I hope of a valuable kind to those most interested; but I could not think of comparing myself with many of the men of mark who have preceded me in receiving this distinction; with the indomitable explorers, or the great architects and archaeologists of our own and other countries. My highest ambition has been that of doing to the best of my ability the duty from time to time set before me to accomplish, and of maintaining unsullied in every sense the high character of an honourable and independent architect. This Medal, the gift, on your recommendation, of her most gracious Majesty the Queen, I take to represent the general opinion of my brother architects that I have not been unsuccessful in attaining that end, and for that reason I accept, and must ever most highly value it, as the best reward and greatest honour I could possibly desire, after a long career of professional labour. We most of us know what a laborious life is that of an architect; how numerous its risks; how many its disappointments; and although these are not unmixed with joys and delights of no ordinary kind, yet the burden is sometimes heavy, and the ordinary rewards hardly proportionate in value. At such times the possession of this visible token of your regard cannot fail to be cheering, and therefore, instead of regretting that it comes so late, I would rather rejoice that it has not reached me until the time when the evening light is approaching, and soothing thoughts are not unwelcome (applause). Gentlemen, again I thank you for your kind welcome.

A letter was read from Sir Horace Jones, expressing regret at his inability to be present at the presentation of the Royal Gold Medal to his old and excellent friend, Mr. Ewan Christian.

Mr. Charles Barry, F.S.A.—Sir, in the eloquent address which you have delivered to us, you have told us the history of the Royal Gold Medal; how, originally, it was intended for the younger members of the profession, and how afterwards it was changed to a reward for those who had had a long and laborious career. You could not possibly have a more fitting example of those two conditions of the medal than the recipient of it this evening. It must be known to many in this room, and in the profession, that one peculiarity of our late President, and one which does him such infinite honour, is connected with those who are young in the profession, and who are striving to attain the celebrity which he has achieved. It must be known to many how numerous have been the almost daily applications by young members of the profession for many years past to our good friend, Mr. Christian, for advice, counsel, and suggestion, and how invariably he has never complained of the time or pains involved in supplying them with information gathered from his own ripe experience (applause).

Other Medals and Prizes.

The President then distributed the prizes to the successful competitors.

The *Pugin Travelling Studentship* was gained this year by Mr. Thomas Maclaren; and in the same studentship a medal was awarded to Mr. Arnold Bidlake Mitchell, B.A. The latter gentleman being laid up through overwork, Mr. Gerald Horsley received the medal on his behalf. In the same competition a medal was also awarded to Mr. Selby, who was heartily complimented by the President on his beautiful set of drawings. A Certificate of Honour was awarded to Mr. Rowland W. Paul, of 31, Spring-gardens.

The *Tite Prize* of 30*l.*, and a Certificate, were won by Mr. Frank W. Simon, of Edinburgh, and a Medal of Merit fell to Mr. John Keppie, of Glasgow, and a Certificate of Honour to Mr. William Stirling, of Upper Chadwell-street, London. The two first-named gentlemen were

unable to be present. In presenting the Certificate of Honour to Mr. Stirling, the President, remarked upon the fact that the three successful competitors in the Tite Prize were Scotchmen. There was no doubt, he added, that in Scotland the love for Classic architecture had been kept alive.

The *Grissell Gold Medal* and the sum of Ten Guineas were awarded to Mr. James Strong, of Liverpool, who, when at Chester, gained the Institute Silver Medal for Measured Drawings. Mr. J. H. Cook, of Liverpool, received the medal for Mr. Strong.

For *Measured Drawings* Mr. Cook received on his own account the Institute Silver Medal and Ten Guineas for measured drawings of Stokesay Castle. In the same competition a Medal of Merit and Five Guineas were awarded to Mr. Frank Bellis for measured drawings of Haddon Hall.

The *Soane Medallion* and 50*l.*, subject to certain conditions relating to travelling for six months, were awarded to Mr. Francis Edward Masey, of 18, Gordon-street, Gordon-square; and the same competition Certificates of Honour fell to Mr. Alfred Whitehead, of Leeds, and Mr. Arthur Sykes, of Brunswick-square.

For *Essays*, the Institute Silver Medal and 25 guineas were won this year by Mr. R. Elsey Smith for his essay on "Detached Wall-Piers, Balusters, and Buttresses." Mr. Smith, being on his way to study in Venice, the prize was received by his father, Professor T. Roger Smith.

#### The Royal Jubilee.

The President referred to the great pleasure it gave him to hand Professor Smith a medal for his son.

Mr. Charles Barry.—I have a suggestion to make before we separate, which, I believe, will receive the unanimous support of every gentleman in the room. It is that the Council may be requested to consider, during this year of Jubilee of our gracious Majesty the Queen, a proper address to be as our patron (applause). We have especial reason this year to do so, inasmuch as we have received an additional mark of royal favour at her hands, and I think in the midst of the loyalty which is showing itself throughout the length and breadth of the land, it would ill become the Royal Institute of British Architects to be found wanting (applause).

The President.—Certainly; this matter, I can promise you, will be taken up by the Council.

The meeting was then adjourned until the 23rd of May, when a paper will be read by Mr. John Phillips on "The Drainage of the City and Palace of Westminster."

#### DINNER OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The completion of the fifty-first year of the corporate life of the Institute, the conclusion of the General Conference of Architects, held last week under the Institute's auspices, as well as the recent grant of the new Supplemental Charter of the Institute, were celebrated by a dinner, held in the large banqueting hall of the Freemasons' Tavern on Saturday evening last.

Mr. Edward Panson, President of the Institute, was in the chair, and the company, which numbered about 130, included Lord Crewe, Sir Frederic Leighton (President of the Royal Academy), Professor Babcock, Mr. H. S. Milman, Mr. Edward Woods (President of the Institution of Civil Engineers), Sir John Coode, Mr. Ewan Christian, Mr. Charles Barry, Sir John Pringle, Mr. E. J. Poynter, R.A., Professor Hayter Lewis, Mr. Edward Ryde, Mr. William Simpson, Mr. Henry Currey, Mr. Alma Tadema, R.A., Mr. Thomas Hawksley, F.R.S., the Hon. H. A. Dillon, Mr. A. Waterhouse, R.A., and a large number of provincial architects, mostly members of the Institute.

The loyal toasts having been duly honoured, Mr. Charles Barry, F.S.A., a past President of the Institute, proposed the toast of "Art, Literature, Science, and Practice." In the course of his speech he reviewed the position held at the present time by the various departments of activity included in the toast, and, with reference to art, he remarked that an old proverb said "Art is long and life is short," and that all artists could dare to hope to do was to add

some suitable link to the golden chain which bound the art of the present to that of the past, and to be sufficiently pure and good in their artistic ideas to offer the link which they had forged as one of sufficient value to those who should forge the links of the future.

Sir Frederic Leighton, P.R.A., in responding for "Art," said,—It often, I know it seems to me, Sir, that the most fitting acknowledgment of that part of the toast for which you have asked me to rise and respond is not a speech, but rather a well-filled and pregnant pause of silence; for art is the most eloquent form of human utterance, and I cannot but think that the evoked memory of one only of its masterpieces is a fitter sequel than any words that man can devise to the toast which has just been proposed. But you, Sir, have preferred the beaten track. You have suffered yourself to miss an opportunity of encouraging a practice which would have conferred a benefit upon you as well as upon myself, and you have summoned, through the mouth of Mr. Barry, an individual who, believe me, rejoices that he has the opportunity to be here among you on an occasion so full of significance, both prospective and retrospective, to the great institution of which we are the guests. Permit me to thank you, Mr. Barry, most sincerely for the very friendly and flattering terms in which you have introduced not my name only, but the names of certain brilliant colleagues of mine in a body of which your illustrious father and lamented brother were distinguished ornaments. Well, Sir, this toast of "Art" is, I rejoice to think, very frequently proposed at festive boards like this, sometimes alone and sometimes in noble connexion with literature and science; but as proposed and received here this toast has distinctive characteristics and a distinctive complexion. In responding to it, stand before you an initiated one amongst initiated ones; I stand here as an artist whose art is of faith, and before artists who share that faith with me. I venture also to think that your choice of a representative to respond for "Art" on this occasion has another characteristic and significant feature. The individual on whom you have called is one who generally describes himself in his passports as a painter, but he is one also of whom his friends, in their more indulgent moments, speak of as being in some degree and in some kind a sculptor; and I cannot refrain from expressing the hope that Mr. Barry, in associating my name with this toast, has desired to re-assert, in the name of British architects, the close and intimate kinship between the art of the builder and the work of the painter and sculptor which every true artist should constantly keep before him.

When I say this, I have not merely by-gone and past days in my mind; I am not merely thinking of those days when simpler scientific problems and conditions obtained, and—I am afraid I must add,—when more rudely-equipped human intellects suffered the same hand to build, to carve, and to paint. Nor am I thinking only of those days in which the dignity of every edifice was enhanced and crowned by the labours of the sculptor and the painter, and when the work of the painter and sculptor was in its turn chastened and restrained by the graver art with which you are associated. I was thinking also of the present day, and of the future, and of the power for good which the three arts may still exercise one upon the other. It is not without very considerable diffidence that I venture to hint at the advantages which architecture and architects may derive from the study of the graphic and the glyptic arts, but perhaps I may be permitted to say that at a time when the utilitarian spirit confronts the architect in all his studies, and in some degree tends to modify his practice, he may perhaps find some strength and assistance in contact with the arts in which the eternal principles of beauty have free scope, untrammelled by the tyranny of utilitarianism. And this certainly I will take upon myself to say, that the study of the graver art of architecture is now,—and never was so more than now,—a wholesome one for those who practise the calling of the painter or the sculptor. We live in times marked, I think, by a rather restless craving for novelty, and characterised by a singular impatience of every form of restraint and discipline and tradition,—a period in which the young seem tempted to write down as foolishness that which the sanction of many generations has pronounced to be wise, perhaps on

account of that sanction. Well, gentlemen, I am, I assure you, not of those who are prone to be horrified at the impatience of ebullient young life; indeed, I should be almost inclined to whisper, if I thought it would go no further, that I rather like it. Of this I am profoundly convinced, that the study of architecture,—as an art in which proportion, balance, purity of form, and other kindred qualities, are either cardinal virtues or elements of stability and greatness,—furnishes a most wholesome corrective to the rebellious appetites of the young of our generation. Therefore, it is quite as much for the sake of the vast influence which the arts might exercise upon each other, and it is in view of the splendid results that they may jointly attain, that I heartily desire to see the union between the three arts of architecture, painting, and sculpture grow every day more close, more intimate, more beneficent to their mutual strength; and in giving utterance to this desire I believe that I am simply re-echoing the sentiments of those on whose behalf I have been called upon to respond. (Applause.)

The Hon. H. A. Dillon (representing the Society of Antiquaries) responded for "Literature." Mr. Edward Woods (President of the Institution of Civil Engineers) for "Science," and Mr. Edward Ryde (a past President of the Surveyors' Institution) for "Practice."

Mr. Ewan Christian, F.S.A., proposed the toast of "Our American Professional Brethren," and this was responded to by Professor Babcock, of Cornell University, Ithaca, United States of America, who expressed his conviction, at some length, that a style based on the Romanesque was that best adapted for all public buildings of a monumental character. That conviction was rapidly gaining ground in America, and it was largely shared in and acted upon by the late H. H. Richardson.

Mr. Alfred Waterhouse, R.A., proposed the next toast, that of "The British Architectural Societies in correspondence with the Institute." Mr. Waterhouse said they all knew the good work which those societies were doing—the anxiety which prevailed both at headquarters and at distant centres to secure more systematic education for the architect of the future, and a higher status in consequence of having passed a qualifying examination. They were conscious also of the recently revived freemasonry of the craft,—of the way in which one architect shared his ideas, his inventions, his experience, with others quite ungrudgingly. For that change they had to thank the Institute, the different local societies, and, above all, the Conferences.

Mr. J. Wreggitt Connon, of Leeds, and Mr. W. H. Ellerker, Vice-President of the Victorian Institute of Architects, Melbourne, responded.

Mr. H. S. Milman, M.A., Director of the Society of Antiquaries, in proposing "The Prosperity of the Institute and the Health of the President," said he thought the Institute was to be congratulated on the hopeful prospects of increased usefulness and influence under its new Charter. In spite of much criticism levelled against architects, he thought that all persons who had known London as long as he had would see how great was the progress which had been made in its street architecture, and would realise how desirable it was that Architecture should be under the tutelage of a great society like the Royal Institute of British Architects. In the words of the old Roman poet—

"Diruit, aedificat, mutat quadrata rotundas."

Great changes were going on continually in London: old buildings were removed, new ones put up, and the appearance of our streets was altered—on the whole greatly to the credit of the architects concerned.

#### THE ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS' EXAMINATIONS.

The following gentlemen, having satisfied the Examiners at the Examination held in London on the 22nd and 23rd ult., have been granted certificates of competency by the Council of the Association, viz. :—

|                                |                                 |
|--------------------------------|---------------------------------|
| Adeock, C., Liverpool.         | Nichols, F. J., Leeds.          |
| Cooper, F. E., Liverpool.      | Rich, E. W., Poplar.            |
| Doarlen, H., Leeds.            | Sanders, Jas., Newark-on-Trent. |
| Franks, T. W., West Brom-wich. | Verschoyle, B., Liverpool.      |
| Nichols, A. E., Leeds.         |                                 |

The next Examination will be held at Manchester in October.



ARCHITECTURAL ASSOCIATION.

REMINISCENCES OF EXCURSIONS.

THE thirteenth ordinary meeting of this Association for the present session was held on the 6th instant at 9, Conduit-street, Mr. J. A. Gotch (President) in the chair.

A vote of thanks was passed to the churchwardens of St. Bartholomew-the-Great, Smithfield, for allowing the members to visit that church.

Mr. H. D. Appleton (Hon. Sec.) read the following letter from the President of the Chicago Architectural Sketching Club:—

"115, Dearborn-street, Chicago, April 19, 1887.

To the Sec. of the London Architectural Association.

Dear Sir,—As President of the Chicago Architectural Sketch Club, I have constant applications from architects in the different States for first-class Assistants at good salaries. At present, the demand far exceeds the supply, and it just now occurred to me that I should be doing my countrymen a good turn by notifying you of this fact. Good steady men cannot make a mistake in coming out, and to any really good draughtsman calling at my office, I shall be pleased to give the best advice and instruction I can. Young men just out of their studies, quantity surveyors, architectural fossils, and drunkards are of no use here. My being a Member of the R.I.B.A. should be a sufficient guarantee that this communication is in good faith.

Yours faithfully,  
(Signed) GEORGE BRACKMONT."

Mr. John L. Robinson, R.H.A., of Dublin, then read a paper entitled "An Irishman and his Camera in England,—a Dark Seance," illustrated with dissolving views. Mr. Robinson said,—

Last session Mr. S. Flint Clarkson read a paper before the Association on Architectural Photography, and pointed out how useful a knowledge of the art of photography must prove to the architectural student. I do not intend to go over the same ground, but simply propose to bring under your notice this evening a selection from the series of views taken by me during the last seven excursions of the Architectural Association, and claim your indulgence for any defects which may appear in them, as the transparencies, as well as the original negatives, have all been prepared by myself.

The first excursion in which I took part was in 1880, when Norfolk was visited, with Norwich as our headquarters. The Church of St. Peter Mancroft was being restored at the time, the scaffolding affording the members unusual facilities for examining and measuring the roof, timbers, &c. Norwich Cathedral stands well in a close, called Tombland, entered by four gates, St. Eithelbert's, Erpingham, the Bishop's, and Water Gate, and has a remarkably fine Norman nave, with Perpendicular groining, ornamented with a very fine series of bosses. The west front and central tower were being restored at the time of our visit. The cloisters are well preserved, and the grammar school, deanery, and remains of Bishop's Palace, are interesting. There are forty-nine churches in town, all built during the fifteenth century, and so much alike in detail as to become monotonous. The Guildhall, with its chequer work in stone and flints, and some timber houses, were visited and sketched. As almost all the places visited during the week lay some distance from the town, we proceeded each day by rail to the nearest station, where the carriages met us. Several fine Perpendicular churches with beautiful open-timber oak roofs, were seen at Cawston, Aylsham, Salle, Walsham, Trunch, Knapton, Worstead, East Dereham, Walshingham, Wymondham, Edingtonthorpe, Atleborough, Ellingham, Hingham, and Deopham. Aylsham is a cruciform church, with a good font and rood-screen; Cawston also has a fine rood-screen, with paintings in the lower panels in tolerable preservation. Salle Church has a good square tower, with angle pinnacles. North Walsham Church is Late Decorated, with a rich south-west porch. The font-cover is very elaborate with tabernacle work and pinnacles. Trunch and Knapton have two fine fonts, and were in a most neglected condition,—the roofs leaking, the walls damp, and an air of dirt and desolation everywhere: the chancel-stalls in the latter church were falling to pieces, and the entire fabric seemed likely to follow their example. Edingtonthorpe Church has a round tower, the upper stage being octagonal, and the roof is covered with thatch. There is a good rood-screen, on which I recollect the Christmas story and decorations were still hanging in August. Worstead Church has a good hammer-corn roof. East Dereham has two towers, one at the crossing and the other detached, the

central tower being found too weak to carry the bells. At Walshingham are the ruins of the Augustinian Priory,—the refectory and gatehouse are full of good early detail. Houghton-in-the-Dale is a little wayside chapel, now a farmer's house, which was much frequented in the Middle Ages by pilgrims to Walshingham. Wymondham has two towers,—a square one at the west end and an octagonal one at the crossing. The nave piers and arches are Norman, with a Perpendicular clearstory and roof. Hingham Church has a beautiful tower in six stages. Flint panelling is largely used in all the Norfolk churches, which are chiefly remarkable for their fine open-timber roofs, rood-screens, and fonts,—the latter being lofty and well-proportioned, with oak covers, in some cases, as at Salle, reaching nearly to the roof of the church. The mansions visited were Blickling Hall and East Barsham. Blickling is a fine brick mansion with stone dressings, and has a good entrance doorway and courtyard. The library ceiling is a good example of Jacobean plaster work, the panels filled with allegorical subjects. East Barsham, now a farmhouse, is a remarkably good example of Tudor cut brickwork and terracotta.

In 1881 we had an opportunity of seeing a totally different class of work in Worcestershire. The cathedral at Worcester has been too much restored externally, our friend the late Sir Edmond Beckett having had a finger in the pie. The transepts and Lady-chapel are very fine, the tomb of Prince Arthur being an elaborate specimen of Perpendicular work. Almost all the Domestic work seen during this excursion was half-timbered, including several old houses in Worcester, Tewkesbury, and Ledbury, the splendid manor-houses at Svern End and Mere Hall and the Court-house at Haddington, the exceptions being Woolas Hall and Madresfield Court. Even one of the churches, Besford, and portion of Droitwich Church are also half-timbered. Tewkesbury Abbey, with its fine Norman nave arcade and Perpendicular groining and deeply-recessed west window; Pershore, with its Early English choir and tower; and Malvern, were the most important churches visited. Huddington, remarkable for its oak porch and general dilapidation, and Ledbury were also seen. Madresfield Court, the seat of Earl Beauchamp, has been practically rebuilt. Westwood Park is a brick Elizabethan mansion with angle towers, covered with high-pitched roofs, and is approached through an interesting gate-house of the same date as the mansion.

Kettering, with its fine church, was our headquarters in 1882, our worthy President acting as our guide, philosopher, and friend. Amongst the churches visited was that of Oakham, in Rutlandshire, a fine building with wide nave and lofty tower and spire. The Shire Hall, hard by, is of the Transitional period, and has some good carved corbels. One of the walls is covered with horsehoes deposited by each peer of the realm who has passed through the town. There are two good market crosses, and the village stocks are still preserved. Exton church has a good octagonal lantern, and Elizabethan monuments. The Elizabethan hall, which is in a ruinous condition, has many points of interest. The other churches seen were Warkton, which has been turned into a heathen mansoleum; Weekly; Geddington, where there is an ancient bridge and Eleanor cross; Rushton; and Brigstock, a portion of which is of Saxon date. Lyddington Church and bedehouse form a most picturesque group, and Ledwick is remarkable for its fine tower and octagon lantern and monuments to Ralph Green and his wife, 1420, and Edward Stafford, Earl of Wiltshire, dated 1499. This excursion was rich in domestic work, the members having an opportunity of inspecting the most important works of Sir Thomas Tresham at Lyveden, Rothwell Market-house, and the curious symbolical triangular lodge at Rushton. The principal building, was without doubt, Kirby Hall, which has been so often sketched, and which is still grand and imposing notwithstanding its sadly-dilapidated and ruinous condition. Rushton, with its fine quadrangle and Elizabethan gables; Rockingham Castle, forming a picturesque group of buildings of various dates; and Drayton House, where the owner gave us every facility to inspect the grouched cellars, beautiful Italian gardens, and exquisite ironwork in the gates and railings surrounding the mansion, were also visited.

In Somersetshire, the following year, Montacute was the most important Domestic building. This is a fine Elizabethan mansion, the garden front being particularly good. The garden is enclosed with an ornamental balustrade, with quaint summer-houses at the angles. Barrington Court is another interesting Elizabethan mansion, a portion of which is used as a farmhouse, the remainder being a cheese and cider store. Lytes Cary is a manor-house; portion dating from the Decorated period, with a Perpendicular room, with oriel and plaster ceiling. The Domestic chapel is still to be seen, but it, as well as the rest of the building, is in a very indifferent state of preservation. Trent, Somerton, and Newtown, near Yeovil, are small and interesting manor-houses. An entire day was spent at Sherborne, the Abbey, Almhause, Coudait, and Castle affording sufficient material for the day. At Cerne Abbas and Mulchelney were seen the remains of two fine abbeys; and in the churches at Trent and Queen's Camel good open roofs; Bradford Abbas, Cerne Abbas, Yetminster, Stok-sub-Hamdon, South Petherton, and Martock were visited. The best of all the churches, in my opinion, was Huish Episcopi, with its noble Perpendicular tower, enriched with panelled bands, with a highly-ornamental crenellated parapet. The stone used in this neighbourhood is of a warm colour, and in almost every village the majority of the houses are of stone, with mullioned windows, quaint gables, and oriels, the style being that generally known as Late and Flat. The fonts also are characteristic, the bowls being octagonal, with square pendants at the angles, as at Queen's Camel and Mulchelney. The surrounding country is very beautiful, several of our drives being through lanes cut in the stone to reduce the hills, the sides being covered with ferns, mosses, and verdant foliage.

In 1884, that portion of East Anglia known as Suffolk was visited, with Bury St. Edmund's as our headquarters. Little remains of the once splendid abbey except the abby-gate and Bishop's Bridge, the position of the other buildings being indicated by shapeless masses of masonry. One of the natives, who was evidently proud of the care now taken of them, assured us that they were the best preserved ruins in Europe. The Norman gate has been rebuilt near St. Mary's Church. The two churches of St. Mary and St. James are long and lofty, Late Perpendicular in style, and a pretty fair type of all the churches seen during the excursion. The nave arcades are slight and gaunt, the wall space in clearstory reduced as much as possible, the effect being that you are in a house of glass, like—

"Hardwick Hall,  
More glass than wall."

When the large and numerous windows were filled with stained glass the large amount of light was, of course, mellowed and tinted to an extent that must now be left to the imagination. Lavenham and Long Melford were the two largest churches visited. The latter church deserves its prefix, for if the Clopton Chapel to the east be included it must be the longest parish church in England. Icklingham, a good fourteenth-century church, with a thatched roof, was found to be in a most neglected condition. Mildenhall has good oak open roofs to nave and aisles, and there is an octagonal cross in the village covered with lead, bearing a close resemblance to that of Oakham. Woolpit is a very late church, with nave and ill-proportioned detail, particularly in the south porch. Hengrave Hall, a white brick Tudor mansion; Rushbrooke and Kentwell Hall (both moated), and Coldham Hall were the principal mansions seen during this excursion. The materials of the three latter being red brick, with stucco dressings, in imitation of stone. Rushbrooke and Kentwell are E-shaped on plan, with octagonal turrets at the angles. The manor-house at Bardwell is quaint, and has a good gable with cut brick chimneys.

Our next excursion, to Banbury and its neighbourhood, was one of the best that I have joined in. The beautiful mansion at Compton Winayates, seen on the first day, is the most charming old house I have ever visited. Its position in a vale at the foot of a steep hill, the beautiful colour of its brick and stonework and tiled roofs, and picturesque grouping of gables, tower, and chimneys continue to form a picture that can never be forgotten. There is a small courtyard leading to the hall, which has a good oriel and is hung with tapestry. In Banbury there are a number of picturesque houses, and

the Reindeer Inn has a room panelled in oak, with an elaborate plaster ceiling. At Canons Ashby our genial host, Sir Henry Dryden, was indefatigable in his attention to our party, whether in pointing out the beauties of his house or of the church hard by, or in pressing his hospitality upon us. Broughton Castle is a large mansion of various dates, where nearly four hours were profitably spent in sketching the castle and church, which contains several interesting monuments. King's Sutton Church has a graceful spire; Adderbury, a large church, was being restored; Bloxham, Swalcliffe, Cropredy, Clipping Warden, Middleton Cheney, Deddington, Alkerton, and Wigginton were amongst the churches visited.

The professional journals have given such full descriptions of the excursion to Kent last year that I shall simply say that the most important churches visited were Rochester Cathedral and Maidstone, and that Penshurst Place and Coham were the principal mansions.

Having thus, as briefly as possible, given a résumé of the last seven excursions, I may be permitted to record the impressions made on my mind by them. I have been in the first place very much struck at the manner in which local materials have always been used in olden times, and the influence which such materials have had on the style of building. In Norfolk and Suffolk flint is largely used from the thirteenth century to the present day, and the flint panelling in Norfolk is more delicate and better proportioned than in Suffolk. In Worcestershire timber framing and tiled roofs are to be seen of all dates; in Northamptonshire, a stone district, all the buildings are of stone, and the type of work is that known as late and flat. In Somerset a warm-tinted limestone is used, and is so plentiful that nearly all the cottages can boast of mullioned windows, stone forges, and other extravagances; whilst in Kent timber framing is largely used, and almost all the cottages are of the one type. In the same manner, the churches in each district all bear a family resemblance to one another, and the same may be said of the fittings. I was particularly struck with the manner in which the same type is repeated in the fonts in each district, notably about Banbury, where the earliest fonts are stunted and ill-proportioned like washing-tubs, as at Broughton, and preserve the same form, notwithstanding how they may be covered with panelling, as at Wroxton or Bloxham. I bring two cameras with me, one for views 8 in. by 10 in., and the other for smaller pictures, 5 in. by 4 in. I have on the seven excursions taken about 705 photographs, and shall now, with the aid of the optical lantern, place before you a selection of the places visited on each excursion.

Mr. Robinson subsequently exhibited on the screen a large number of photographic transparencies of buildings visited by the Association. Each view called forth some characteristically racy remark from the lecturer, who was accorded a hearty vote of thanks at the close.

The nomination of officers and committee for session 1887-88 then took place, Mr. John Slater, B.A., being nominated President. The election of officers will take place at the next meeting.

#### THE MONEY VALUE OF SANITATION.

At the closing meeting for the session of the Association of Public Sanitary Inspectors, held on Saturday, at the Westminster Town Hall, an address was delivered, written by the President of the Association, by Mr. Edwin Chadwick, C.B., Mr. Alexander (Shoreditch Vestry) occupying the chair in the absence of Mr. Jerram, the Chairman of the Council. There were present with Mr. Chadwick, Earl Fortescue and Dr. B. W. Richardson, honorary members, Lord Fortescue reading the address for Mr. Chadwick, who was suffering from a cold.

Mr. Chadwick, taking up his favorite financial argument to show the cost in money and life of sanitary ignorance, compared the aggregate annual incomes of the life insurance companies and the provident societies with the annual charges for the defence of the nation by the Army and Navy, and arrived at the conclusion that the neglect of sanitation and the continued bad condition of the defences against it were as fatal and costly as an annual invasion by a great army of enemies. Preventive disease was, in fact, an enemy which annually slew 100,000 people, and the total monetary

loss of the killed and wounded in civil life might be estimated at two-thirds of the estimates voted by Parliament for the government of the empire. Even in this metropolis, which in comparison with any European capital, or any of the great towns of America, had a low death-rate, 20,000 were annually killed or wounded by disease, whom efficient sanitary measures of defence might have saved. In a subsequent portion of the paper, the President stated that, with all the shortcomings still existent in our local administration, the sanitary improvements made during the reign of her Majesty the Queen had been greater than in any other country. In France the death-rate was 3 per 1,000 higher than in England, which meant a preventible slaughter of 112,000 lives more than at present in England. In Germany, with a mortality in its army the lowest in Europe, the death-rate of the civil population was 6 per 1,000 higher than here, representing a sacrifice of 135,000 lives more than in England. The waste of life in Italy was 8 per 1,000 more, and in Austria 11 per 1,000 more, a total loss in these two countries of 624,000 lives annually over and above the corresponding waste in England and Wales, while Russian statistics showed a still more terrible state of things, both in the army and among the civil population. In the United Kingdom the mean duration of life had advanced during the reign of Queen Victoria from thirty years to thirty-eight years. These favourable results were due in a great measure to improved administration, and the substitution of permanent officers giving undivided attention to the application of their sanitary knowledge for the unpaid and incompetent officials to whom sanitary duties were formerly too often entrusted. It was a great fact which ought no longer to go unnoticed that the services of some 20,000 paid union officers, of whom 5,000 exercised sanitary functions, saved the country 3,000,000l. annually, as compared with the expenditure for similar purposes under the régime of unpaid parish overseers and officers. Further reductions, both in the money expenditure and in the waste of vital power, could be effected in carrying further that principle, and by returning to the first principles of the measure propounded in 1832, and in the Report of 1839, for the organisation of a police force. Addressing himself especially to the sanitary inspectors, Mr. Chadwick thus concluded:—When you are doing what some would call unmenial service; when you are taking part in the removal of the most offensive causes of disease and death, you are conveying a practical lesson to the world of the methods whereby the happiness, the brightness, the comfort, and the strength of the world is secured. You are giving health to man, and out of this some poet may even extract poetry in a future day. Meantime, accept it as true, from one who has seen eighty-six summers, that yours is as good a work as the sun ever shone upon, and that long before another eighty-six summers shall have passed away it will be recognised as work which deserves the fullest recognitions and the most hefting rewards if it be carried out,—as I am sure it will be,—in the spirit as in the letter, faithfully, vigorously, hopefully, manfully.

Earl Fortescue, Dr. Richardson, and several members of the Association, subsequently addressed the meeting, Lord Fortescue testifying to the enormous decrease in the death-rate of the Army by the improved sanitary arrangements of the barracks buildings. The Army death-rate used to be far higher than the civil death-rate, but now it was scarcely half as high. Dr. Richardson, while not agreeing with all the views of the President, said he believed there was no one living in this kingdom who could have drawn from the rich stores of his experience so valuable a body of facts as he had given them in his address. Although we stood quite ahead of the rest of the world in sanitary matters, there still remained an immense work to be done by the future, even in London alone. Germany and Italy were making rapid advances, and so was America, where medical officers and sanitary inspectors were better treated than in this country, but in some of the new countries, where one would have expected to find the wealthiest places in the world, the conditions were often worse than in the countries of the old world. In Sydney, Melbourne, and Adelaide, for example, they found the death-rate among children three times as high as that of the worst of London slums.

#### OBITUARY.

Mr. Samuel Cousins, R.A., the well-known engraver, died on the 7th inst. He was eighty-six years of age.

Mr. Thomas Stevenson, C.E., died on the 8th inst., at his residence in Edinburgh. He had been in ill-health for some time. Born in 1818, Mr. Stevenson was a son of Mr. Robert Stevenson who built the Bell Rock Lighthouse. He was engineer to the Commissioners of Northern Lighthouses from 1855.

#### VISITS IN CONNEXION WITH THE GENERAL CONFERENCE OF ARCHITECTS.

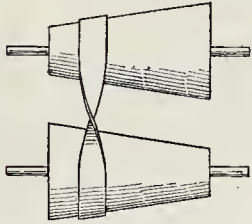
IN our Supplement this week we give particulars of several of the visits made by members of the Architectural Conference last week, and we here append notes of those visits, which we had no space to mention in the Supplement.

#### The City and Guilds of London Central Institute, South Kensington.

A party of the members of the Conference visited the Central Technical Institution on the morning of Thursday, the 5th inst. They began by inspecting the Mathematical Classroom, where the members were received by Professor Henrici and Mr. Lawrence Harvey, the models illustrating Professor Henrici's teaching in geometry being exhibited with the models made by the Architectural Association's Class of Masonry, theoretic geometry and scientific masonry being closely connected subjects. Professor Henrici explained to the members his system of teaching the higher branches of geometry by means of models made of threads, geometry being in his tuition the foundation of many of the other branches of mathematics. Mr. Harvey described how the Class of Masonry had been carried on, and of the great importance of both masonry and geometry to the artistic development of architecture; he referred the members to models showing the lines of curvature of surfaces, lines which the joints of masonry must follow, and which also served as a guide to the decoration of plastered surfaces,—good decoration being intended to bring out the character of surfaces.

The visitors then passed to the Laboratory of Chemistry, where Professor Armstrong explained the construction of the stink closets and the ventilation of the laboratory generally; after which the Electrical and Physical Department was visited, under the guidance of Professor Ayrton, beginning, firstly, with the laboratory, where experiments on heat and dilatation of metals were carried on. For the dilatation of metals tubes are used heated by water; the results are examined with the aid of the microscope. Secondly, the laboratory for the study of acoustics was visited. Thirdly, the electrical experimental laboratory for beginners. Fourthly, the laboratory for testing lightning conductors. An electric machine was shown which Professor Ayrton compared in its principle to the effect produced by moving clouds during storms. In the same laboratory the use of an optical bench was explained for making experiments on light, its rapidity, its absorption by various substances, such as different qualities of glass, the measurement of the amount of light received in any part of a building, as is required in light and air cases, chemical analysis by measure of the absorption of light by various liquids, photoprisms, &c. Fifthly, the visitors inspected the laboratory in the basement at the south end of the building for the most delicate experiments, such as the measurement of very weak electric currents. The instruments are placed on blocks of masonry built quite independently of the building; to diminish vibrations from the earth itself caused by carts in the streets, these blocks of masonry are constructed hollow and filled in with slag wool, the slab of stone forming the table resting directly on the slag wool and not on the masonry. Professor Ayrton explained that on account of the iron girders which support the floors of the building, experiments on earth magnetism were rendered impossible. All the above laboratories being destined in general for delicate experiments are placed on the south side of the building, so as to be as far as possible from the dynamo-room at the north end of basement, where experiments requiring great electric power

were carried on. In the dynamo-room Professor Ayrton explained how mechanical energy was converted at one end into electric power, whereas by means of a converter, electric power was at the other end converted into mechanical power, thus furnishing the means of using the power of distant waterfalls. Then Professor Ayrton showed the working of the dynamo-machine invented by himself, by which he can regulate its speed to a nicety. It is very simple in principle, consisting in a gearing made to pass over



two parallel cones opposed in direction, so that the strap passes over the thin end of the one cone to the broad end of the other, or on any intermediate space *ad libitum*, thereby varying the proportions of the radii of the circles on which the gearing acts.

Professor Henrici showed some of his machines for studying the law of motion, and Professor Unwin made experiments in the large physical laboratory with the 100-ton testing-machine, and showed the results of the crushing of various sandstones wherein their planes of shearing were made apparent. Professor Unwin showed the company also the results of a series of experiments he had made with various qualities of Portland cement, by which it is quite evident that all kinds of Portland cement swell in setting. The visitors left the premises much gratified with what they had seen.

*The Drainage Works of the Houses of Parliament.*

On the morning of Friday, the 6th inst., the members of the Conference visited the new drainage works of the Houses of Parliament, under the guidance of Mr. John Phillips. It is only a few months since we very fully

nearly full of sewage, which enters by gravitation through the pipe A. D is an inverted cup, attached to a rod connected below to another similar cup, turned upwards (E), and above to the lever opening the compressed-air valve. When the sewage rises above the cup D, the air is compressed within the cup and lifts it to the top of the chamber, opening the valve and admitting the compressed air at C. The sewage is immediately forced downwards and up the exit pipe B, the inlet A (fig. 2) being stopped by the pressure forcing the ball into its seat. As the ejector becomes nearly empty the cup E is left full of sewage, the weight of which pulls it down again to the position in fig. 1, shuts off the compressed air, and releases the ball at A, and the process of filling is at once repeated.

*The National Gallery and Royal Academy.*

On Saturday morning a large party of members visited the new National Gallery, where the new central staircase, as well as four or five new galleries, are approaching completion, under the direction of Mr. John Taylor, of H.M. Office of Works. Of these we will say more in a future number. Unfortunately while the party of visitors was inspecting the work a painter named Snowden, in the employment of Messrs. Grace, fell from a high scaffolding on to the new staircase, and he died very shortly afterwards.

Some of the party afterwards visited the Diploma and Flaxman Galleries of the Royal Academy, which contain many pictures and some sculpture well worth seeing. It is not generally known that these galleries are open daily, free. The visitors also had an opportunity of inspecting some of the Academy Schools, under the guidance of Mr. Pickersgil, R.A., the Keeper, and Mr. Phené Spiers.

In the evening a great many of the members who had been attending the week's Conference were present at the Dinner of the Royal Institute of British Architects, which is reported on another page of this week's *Builder*.

AN ARCHITECTURAL STUDIO.

SIR,—Will you kindly allow me to state that an "Architectural Studio" such as that advocated by Professor Roger Smith in his paper at the General Conference of Architects, has already been organised, and is now being successfully carried on at the Royal Architectural Museum, Westminster.

R. STEPHEN AYLING.  
Royal Architectural Museum, Westminster,  
May 10th.

NELSON COLUMN.

SIR,—I have endeavoured to find a measured drawing of the Nelson Column and base, but without success. Perhaps some of the readers of your journal may know if such a drawing exists, and where it is to be seen. Neither can I find any dimensions or proportions of the column in any of the standard works on architecture.

JOHN M. WOOD.

TRABEATED CONSTRUCTION.

SIR,—It is pleasant to hail Mr. Sedding a convert to the modern school of architecture, as evidenced in his design for a church in your last issue.

Will he kindly explain the construction of the entablatures? This is a point that was discussed in several numbers of the *Builder* two or three years ago, on my suggestion that concrete hearers, with an iron core, would provide great facilities in that direction.

EDWARD J. TARVER.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

2,736, Hip-and-Valley Tiles. A. Jones.  
The principal improvement embodied in this invention is in the use of special dies for producing hip-and-valley tiles, and of a cutting-off and finishing apparatus used in conjunction with the dies.  
5,031, Water-closet Apparatus, &c. R. Weaver.  
The main feature in this invention is the "flush fan" attachment, whereby the water delivered from the flush-tank is divided into streams flowing along each side of the basin, and the water, after thoroughly scouring the basin sides, descends vertically into the basin, and thoroughly washes out the trap. The trap is also contracted in the water-way so as to ensure the full force of the water in flushing.

6,817, Metal Doors and Frames. John Partington.  
Doors are made with one or more corrugations run

around the outer edge, and a centre space, either plain or embossed. The configuration is obtained by passing the sheet metal through rolls. The frames for doors and windows are also nitrated in a somewhat similar way, the nitrated angles being also formed by rolling the bars or plates before fixing.

5,391, Cistern for Flushing Closets. W. C. Baldwin.  
In siphon cisterns used in combination with this water-waste-preventer it is claimed that it is impossible for any water to run into the cistern when the lever is pulled for discharge or otherwise tied down. A lock ball-valve is the essential feature of the invention, and this lock is actuated by an eccentric cam upon the lever, which shuts the ball-valve.

10,055, Windows and Door Fasteners. A. S. Andrews.  
The fastener constructed in accordance with this invention is secured in the ordinary way, but to the inner sash is affixed a plate to receive a slotted pin for the knob, which being pressed down into a socket when the fastener is fixed, effectually secures the bolt from being forced backward.  
2,435, Packing for Doors and Windows. G. B. Thornton.  
This invention consists in the use of india-rubber tubing triangular in section. It is, therefore, more easily forced into the crevices or joints which it is desired to make draught-proof. It may be fixed with cement, and yielding to the pressure of the door or window when closing it entirely prevents draughts from the joints or openings where it is used.

NEW APPLICATIONS FOR PATENTS.

April 28.—6,251, H. Skerrett, Doretalting Machine.—6,256, W. Kneen, Latches for Doors, &c.—6,265, T. Robson, Safety Cleaning Sliding Window-Casbes.—6,283, A. Murray, Bricks, Mouldings, Ridges, &c.—6,288, A. Boulé, Shelf Brackets.  
April 30.—6,307, E. Zahn, Water Tap.—6,309, E. Marston, Fittings for Baths and Lavatories.—6,345, A. Morse, Roofing and Wall Tiles.  
May 2.—6,351, F. Ferguson, Clay, Terra Cotta, or Cement Blocks having a Hollow Tube formed in same, and Constructed to form a Continuous Pipe on the Faces of Buildings.—6,353, F. Bosshardt, Levels.—6,410, G. Rodfern, Lime Kilns.  
May 3.—6,435, J. Woodfield, Door and Window Fastenings.—6,478, W. Thompson, Wood-working Machines.—6,494, L. Sagendorf, Metallic Roofing.—6,496, C. Chambers, jun., Brickmaking Machines.—6,513, A. Itter, Facing Bricks, Tiles, &c.  
May 4.—6,528, J. Balhime, Fireplaces, Grates, and Stoves.—6,548, S. Fisher, Wall or Ceiling Coverings.—6,573, J. Kiehl and W. Garland, Preventing the Escape of Noxious Gases from Drains, and Sewers, &c.—6,582, P. Molyneux, Paint or Coating.  
May 5.—6,605, J. Tucker, Cisterns.—6,616, L. Marguerie, Vitro-Metallic Material for Glazing, &c.—6,630, C. Winstone, Cooking Ranges.

PROVISIONAL SPECIFICATIONS ACCEPTED.

2,820, A. Boulé, Paving.—4,463, H. Allan, Soil Pipe Connections for Water-closets, Lavatories, &c.—4,593, W. Murray, Stone-dressing Machines.—4,594, E. Sturdy, Fastening Doors.—4,909, A. Nicholas, Door-hells, &c.—5,037, Asher and Buttress, Locks and Latches for Doors, &c.—5,288, G. Wooliscroft, Attaching Door Knobs to Spindles.—5,667, J. Drummond, Chimney Cows.—5,751, J. Horrocks, Ventilating Buildings, &c.—4,415, T. Latham, Locks and Bolts.—4,855, W. and N. Haigh, Flooring Cramp.—5,115, D. Cowan, Stoves or Detached Fireplaces.—5,188, M. Syar, Water-waste-Preventer.—5,234, J. Bousfield, Funneled or Straight Smoke Ventilators for Bottoms of Chimneys.

COMPLETE SPECIFICATIONS ACCEPTED.

*Open to Opposition for Two Months.*  
7,338, E. Picard, Manufacture of Glass.—7,438, Kery and Campbell, Bricks.—7,670, G. Mason, Fastenings for Window Sashes.—13,621, E. Hancock, Metallic Lattice Work for Ventilators.—16,697, W. Buchanan, Feed Mechanism for Logs or Deals in Vertical Saw Frames.—3,442, W. Thomas, Flushing Sewers.—6,121, J. and W. Matthews, Brick-making Machinery.—6,212, E. Edwards, Compressed Blocks for Building Purposes.—7,068, W. Smeaton, sen., Flushing Water-closets, &c.—3,607, P. Milligan, Bricks.—3,665, W. BaracloUGH, Door Chains and Locks.—5,699, R. Meubush, Wood-workers' Cramp.—3,725, J. Bennett, Pigments.—5,139, P. Born, Flushing Apparatus.

OPEN TO OPPOSITION FOR TWO MONTHS.

The New Council of the R.I.B.A.—By an unfortunate omission on the part of our printers last week, the name of Mr. James Brooks was not included in the list of the new Council of the Institute which we published on p. 663; and we regret that in the pressure of work entailed by our detailed reports of the Conference, the omission remained undetected until the whole of our impression had been published. We understand that in the election Mr. Brooks stood nearly at the top of the voting.

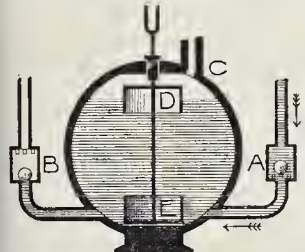


Fig. 1.—Filling.

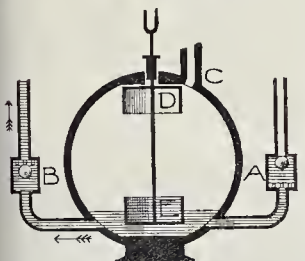


Fig. 2.—Emptying.

Sketch Sections of Model of Shone's Ejector.

described and illustrated \* these works, and it is not necessary that we should say much more about them here; but we append two diagrams, sketch sections of the model of the ejectors which was shown at work in the ejector-chamber, and which will serve to explain the principle of working. In fig. 1 the ejector is

\* Vide *Builder*, Jan. 29 last, pp. 178-9.

LEVEL BOOK N°1

| DISTANCES | STAFF   | REDUCED LEVELS | LINE OF COLLIMATION | REMARKS |
|-----------|---------|----------------|---------------------|---------|
|           | 3·71 ✓  |                | 117·94<br>121·65    |         |
| 0         | 5·06    | 116·59         |                     |         |
| 200       | 7·88 ✓  | 113·77         | 123·17              |         |
|           | 9·40 ✓  |                |                     |         |
| 375       | 10·20   | 112·97         |                     |         |
| 400       | 12·30   | 110·87         |                     |         |
| 414       | 13·89 × | 109·28         |                     |         |
|           | 3·87 ✓  |                | 113·15              |         |
| 426       | 11·71 × | 101·44         |                     |         |
|           | 2·63 ✓  |                | 104·07              |         |
| 433       | 12·41 × | 91·66          |                     |         |
|           | 14·62 ✓ |                | 106·28              |         |
| 450       | 8·95    | 97·33          |                     |         |
| 475       | 0·85 ×  | 105·43         |                     |         |
|           | 4·47 ✓  |                | 109·90              |         |
|           | 2·99 ✓  | 106·91         |                     |         |
| 510       | 5·06 ✓  | 104·84         |                     |         |
|           | 6·72 ✓  |                | 111·56              |         |
|           | 2·25 ✓  | 104·31         |                     |         |
| 512       | 8·36    | 103·20         |                     |         |
| 516       | 4·59    | 106·97         |                     |         |
| 520       | 5·12 ×  | 106·44         |                     |         |
|           | 6·95 ✓  |                | 113·39              |         |
| 540       | 7·28    | 106·11         |                     |         |
| 560       | 7·60    | 105·79         |                     |         |
| 580       | 7·80    | 105·59         |                     |         |
| 600       | 8·29 ×  | 105·10         |                     |         |
|           | 52·37 ✓ | 12·84          |                     |         |
|           | 65·21 × | 117·94         |                     |         |

LEVEL BOOK N°2

| BACK SIGHT | FORE SIGHT | RISE  | FALL  | REDUCED LEVELS | LENGTHS | REMARKS |
|------------|------------|-------|-------|----------------|---------|---------|
| 3·71       |            |       |       | 117·94         | 8 M     |         |
| 5·06       | 5·06       |       | 1·35  | 116·59         | 0       |         |
| 9·40       | 7·88       |       | 2·82  | 113·77         | 200     |         |
| 10·20      | 10·20      |       | 0·80  | 112·97         | 375     |         |
| 12·30      | 12·30      |       | 2·10  | 110·87         | 400     |         |
| 3·87       | 13·89      |       | 1·59  | 109·28         | 414     |         |
| 2·63       | 11·71      |       | 7·84  | 101·44         | 426     |         |
| 14·62      | 12·41      |       | 9·78  | 91·66          | 433     |         |
| 8·95       | 8·95       | 5·67  |       | 97·33          | 450     |         |
| 4·47       | 0·85       | 8·10  |       | 105·43         | 475     |         |
| 2·99       | 2·99       | 1·48  |       | 106·91         | —       |         |
| 6·72       | 5·06       |       | 2·07  | 104·84         | 510     |         |
| 7·25       | 7·25       |       | 0·53  | 104·31         | —       |         |
| 8·36       | 8·36       |       | 1·11  | 103·20         | 512     |         |
| 4·59       | 4·59       | 3·77  |       | 106·97         | 516     |         |
| 6·95       | 5·12       |       | 0·53  | 106·44         | 520     |         |
| 7·28       | 7·28       |       | 0·33  | 106·11         | 540     |         |
| 7·60       | 7·60       |       | 0·32  | 105·79         | 560     |         |
| 7·80       | 7·80       |       | 0·20  | 105·59         | 580     |         |
|            | 8·29       |       | 0·49  | 105·10         | 600     |         |
| 134·75     | 147·59     | 19·02 | 31·86 |                |         |         |

LEVEL BOOK N°3

| BACK SIGHT | FORE SIGHT | RISE  | FALL  | REDUCED LEVELS | LENGTHS | REMARKS |
|------------|------------|-------|-------|----------------|---------|---------|
| 3·71       |            |       |       | 117·94         | 8 M     |         |
|            | 5·06       |       | 1·35  | 116·59         | 0       |         |
| 9·40       | 7·88 ×     |       | 2·82  | 113·77         | 200     |         |
|            | 10·20      |       | 0·80  | 112·97         | 375     |         |
|            | 12·30      |       | 2·10  | 110·87         | 400     |         |
| 3·87       | 13·89 ×    |       | 1·59  | 109·28         | 414     |         |
| 2·63       | 11·71 ×    |       | 7·84  | 101·44         | 426     |         |
| 14·62      | 12·41 ×    |       | 9·78  | 91·66          | 433     |         |
|            | 8·95       | 5·67  |       | 97·33          | 450     |         |
| 4·47       | 0·85 ×     | 8·10  |       | 105·43         | 475     |         |
|            | 2·99       | 1·48  |       | 106·91         | —       |         |
| 6·72       | 5·06 ×     |       | 2·07  | 104·84         | 510     |         |
|            | 7·25       |       | 0·53  | 104·31         | —       |         |
|            | 8·36       |       | 1·11  | 103·20         | 512     |         |
|            | 4·59       | 3·77  |       | 106·97         | 516     |         |
| 6·95       | 5·12 ×     |       | 0·53  | 106·44         | 520     |         |
|            | 7·28       |       | 0·33  | 106·11         | 540     |         |
|            | 7·60       |       | 0·32  | 105·79         | 560     |         |
|            | 7·80       |       | 0·20  | 105·59         | 580     |         |
|            | 8·29 ×     |       | 0·49  | 105·10         | 600     |         |
| 52·37      | 65·21      | 19·02 | 31·86 |                |         |         |

LEVEL BOOK N°4

| BACK SIGHT | INTERMEDIATE | FORE SIGHT | RISE  | FALL  | REDUCED LEVELS | LENGTHS | REMARKS |
|------------|--------------|------------|-------|-------|----------------|---------|---------|
| 3·71       |              |            |       |       | 117·94         | 8 M     |         |
|            | 5·06         |            |       | 1·35  | 116·59         | 0       |         |
| 9·40       |              | 7·88       |       | 2·82  | 113·77         | 200     |         |
|            | 10·20        |            |       | 0·80  | 112·97         | 375     |         |
|            | 12·30        |            |       | 2·10  | 110·87         | 400     |         |
| 3·87       |              | 13·89      |       | 1·59  | 109·28         | 414     |         |
| 2·63       |              | 11·71      |       | 7·84  | 101·44         | 426     |         |
| 14·62      |              | 12·41      |       | 9·78  | 91·66          | 433     |         |
|            | 8·95         |            | 5·67  |       | 97·33          | 450     |         |
| 4·47       |              | 0·85       | 8·10  |       | 105·43         | 475     |         |
|            | 2·99         |            | 1·48  |       | 106·91         | —       |         |
| 6·72       |              | 5·06       |       | 2·07  | 104·84         | 510     |         |
|            | 7·25         |            |       | 0·53  | 104·31         | —       |         |
|            | 8·36         |            |       | 1·11  | 103·20         | 512     |         |
|            | 4·59         |            | 3·77  |       | 106·97         | 516     |         |
| 6·95       |              | 5·12       |       | 0·53  | 106·44         | 520     |         |
|            | 7·28         |            |       | 0·33  | 106·11         | 540     |         |
|            | 7·60         |            |       | 0·32  | 105·79         | 560     |         |
|            | 7·80         |            |       | 0·20  | 105·59         | 580     |         |
|            |              | 8·29       |       | 0·49  | 105·10         | 600     |         |
| 52·37      |              | 65·21      | 19·02 | 31·86 |                |         |         |

The Student's Column.

FIELD WORK AND INSTRUMENTS.—XX.

Levelling Instruments.

IV.—THE LEVEL BOOK.

**WE** illustrate this week four different forms of level-books. The same readings upon the level staff are used in each case in order that the reader may be able to compare the merits of each form of Level Book. In form No. 1 all the staff readings are entered in the same column. This system will therefore show the order in which the staff readings booked in forms Nos. 2, 3, and 4 are taken. In forms Nos. 2 and 3 the staff readings are divided into back-sights and fore-sights, all readings after the first with the level in any single position being entered as fore-sights.

*Intermediate Sight.*—In form No. 4 all

readings between the first and last sights before changing the position of the instrument are entered as intermediate sights.

*Back Sight.*—The first sight read off the level staff is hooked in forms Nos. 2, 3, and 4, as a back-sight, and gives, as shown in form No. 1, the height of the line of collimation in the instrument, above the point upon which the level staff is placed.

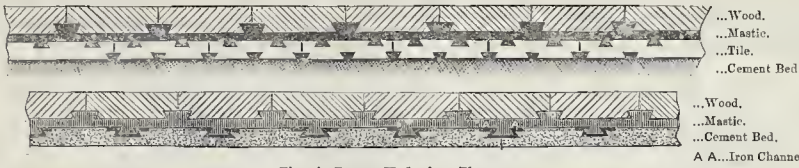
*Fore Sight.*—In forms Nos. 2 and 3, all sights read off the level staff after the back-sight, and in form No. 4 the last sight or reading read off the level staff before changing the position of the instrument, are booked as fore-sights.

Horizontal distances are expressed in links, and are localised by description in the column headed Remarks, which usually occupies the whole of the right-hand side of each double page of the book.

The reading of each intermediate and fore

sight gives the vertical distance between the line of collimation, found as above, and the points upon which the level staff is held. The next back-sight is booked in its own column upon the same line as the last fore-sight, in forms Nos. 2, 3, and 4, because the description of that point is the same, the level staff being replaced upon the same point as that upon which the last fore-sight is taken, for ascertaining the figures to be hooked, when reading the next back-sight, with the instrument in a new position. In continuous levelling great attention must be paid to this.

In form No. 1 the column headed Distances and Staff are entered in the field. The columns headed Reduced Levels and Line of Collimation are subsequently arrived at by addition and subtraction. In forms Nos. 2, 3, and 4, the columns headed Back Sight, Intermediate, Fore Sight, and Lengths, denote the entries



Eber's Patent Hydrofuge Floors.

made in the field, while the columns headed Rise, Fall, and Reduced Levels, denote the entries afterwards made in the office. The columns marked Reduced Levels and Distances or Lengths are the columns used in plotting the levels. Sometimes the location of the level staff is referred to by a letter, without any measured distance or length being taken. A very accurate plan is in this case necessary to localise the description.

In reducing the levels to a common datum, an intermediate sight, in form No. 4, serves as a fore-sight to the sight booked in the line before it, and as a back-sight to the sight hooked in the line following it. The difference between the sum of the back-sights and the sum of the fore-sights is equal to the difference between the total rise and fall, and also to the difference between the last and first reduced level. To check the accuracy of the column of reduced levels in form No. 1 the first sights and last sights are each distinguished at the side by a special mark, and then separately added up. In form No. 2 the previous fore-sight is written as a back-sight, unless the instrument has changed its position. In form No. 3 these sights are treated in the reduction as back-sights, as well as fore-sights, without being rewritten in the back-sight column. In form No. 4 they are written in a separate column, and headed as intermediate sights, there being no occasion to add the same figures to both sides as in form No. 2, in order to obtain the total rise or fall between the first and last reduced level. The letters B. M. at the top of the column for lengths, indicate a heuch mark, the level of which is given in the column of reduced levels, and from which all the succeeding levels are calculated.

EBNER'S PATENT HYDROFUGE FLOORS.

MR. J. F. EBNER, of Clerkenwell-road, has called our attention to the most recent improvement in fixing parquet or wood blocks direct on to a concrete or stone bed, or any fire-proof construction, without the aid of joists or wood underflooring. The system is based on that of M. M. Dammann & Cassard, of Brussels, the English patent for which Mr. Ebner has acquired, and simplified, with a view of reducing the cost of such flooring, and adapting it to the requirements of English architects.

Among the special features claimed for this system, as improved by Mr. Ebner, are—First, perfect direct keying of the wood to the concrete (not the bitumen) by means of a hard-setting bituminous composition which runs into the undercut recesses both of wood and cement, and dovetails them securely together. Secondly, the difficulty of cutting or making satisfactorily the undercut grooves in the cement is overcome by introducing specially-made corrugated iron channels, and fixing them into the floating of the concrete whilst it is plastic, the very shape of the iron channels holding them firmly in the cement, the straight flange A of the iron effectually protecting the edges against breakage whilst the builder's work proceeds. The channels are not intended to be removed.

It will be seen that the concrete bed in the lower section has undercut channels the same as the wood; thus a direct key into the bed by means of a bituminous damp-course is provided, which makes it impossible for the wood to become detached from the foundation. The upper section shows the use of a grooved tile between the mastic and the cement bed.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

| APRIL 27.                                                                                                                          |       |
|------------------------------------------------------------------------------------------------------------------------------------|-------|
| By W. W. LEWIS & SON.                                                                                                              |       |
| Bermooesey-street—A rental of 65 <i>l.</i> a year, term 65 years                                                                   | £900  |
| MAY 2.                                                                                                                             |       |
| By J. BAKER & SON.                                                                                                                 |       |
| Regent's Park, Chester-place—Ground-rent of 17 <i>l.</i> a year, term 35 years                                                     | 235   |
| Sudbury—1, Grove Villas, 61 years, ground-rent 5 <i>l.</i> 5 <i>s.</i>                                                             | 130   |
| By GRAYES & SON.                                                                                                                   |       |
| North Kensington—68 and 70, Wormington-road, 88 years, ground-rent 15 <i>l.</i>                                                    | 675   |
| By MR. CURTIS.                                                                                                                     |       |
| Barking—Twelve cottages, and 16 <i>z.</i> 2 <i>z.</i> 2 <i>z.</i> , freehold                                                       | 2,850 |
| Coppyhold house, and the Wellington Windmill                                                                                       | 610   |
| MAY 3.                                                                                                                             |       |
| By MESSRS. CROXIN.                                                                                                                 |       |
| Portland-place—Profit-rent of 60 <i>l.</i> , term 33 years                                                                         | 890   |
| Edgware-road—Queen street, freehold                                                                                                | 700   |
| Regent's Park, Albany Tavern—Profit rental of 28 <i>l.</i> , term 18 years, and reversion for 17 years                             | 7,170 |
| 53, Park Village East, 36 years, ground-rent M.                                                                                    | 400   |
| Paddington—Improved ground-rents of 80 <i>l.</i> , term 50 years                                                                   | 1,445 |
| St. John's-wood—Improved ground-rents of 50 <i>l.</i> , term 52 years                                                              | 1,045 |
| By RUSSELL & STAVENS.                                                                                                              |       |
| Streatham-hill—The residence, Gwynfafn, term 61 years, ground-rent 24 <i>l.</i> , and ground-rents of 28 <i>l.</i> , term 61 years | 1,500 |
| By REXNOLDS & EASON.                                                                                                               |       |
| Highgate—1, Pond-square, copyhold                                                                                                  | 365   |
| Stoke Newington—31, Lord-park, 87 years, ground-rent, 10 <i>l.</i> 10 <i>s.</i>                                                    | 1,410 |
| By T. B. WESTCOTT.                                                                                                                 |       |
| Belgravia—Improved ground-rents of 56 <i>l.</i> 1 <i>l.</i> 4 <i>s.</i> , term 23 years                                            | 725   |
| Montagu-square—Ground-rents of 28 <i>l.</i> 5 <i>s.</i> , term 17 years                                                            | 295   |
| Camden Town—11, James-street, 24 years, ground-rent 5 <i>l.</i> 5 <i>s.</i>                                                        | 205   |
| Improved ground-rent of 21 <i>l.</i> , term 25 years                                                                               | 260   |
| Easton-road—Improved ground-rents of 58 <i>l.</i> 12 <i>s.</i> , term 19 years                                                     | 615   |
| By B. BROWN.                                                                                                                       |       |
| East India-road—29 and 31, St. Leonard's-avenue, freehold                                                                          | 460   |
| 131 to 115 odd, St. Leonard's-road, freehold                                                                                       | 3,155 |
| The Wellington Arms beerhouse, freehold                                                                                            | 394   |
| 50, 52, and 54, Byron-street, freehold                                                                                             | 840   |
| 56, 58, and 60, Byron-street, freehold                                                                                             | 770   |
| The New Zealand Ironworks, freehold                                                                                                | 1,140 |

| By DEBENHAM, TEWSON, & CO.                                                                                         |        |
|--------------------------------------------------------------------------------------------------------------------|--------|
| St. James's—108, Jermyn-street, freehold                                                                           | £4,410 |
| Regent's Park—38, St. John's-wood-road, 28 years, ground-rent 16 <i>l.</i>                                         | 720    |
| 19, Lorne-gardens, 25 years, ground-rent 6 <i>l.</i>                                                               | 330    |
| Pimlico—67 and 69, Catherine-street, 7 years, ground-rent 8 <i>l.</i> 5 <i>s.</i>                                  | 300    |
| Paddington—4, Tamplin-mews, 78 years, ground-rent 4 <i>l.</i>                                                      | 130    |
| Camberwell—168 and 170, Camberwell-grove, 36 years, ground-rent 23 <i>l.</i>                                       | 550    |
| By A. RICHARDS.                                                                                                    |        |
| Tottenham—1 to 32, Brunswick Cottages, freehold                                                                    | 3,000  |
| Edmonton—1, 2, and 3, Park-place, freehold                                                                         | 710    |
| 1 and 2, St. Malo Villas, freehold                                                                                 | 730    |
| MAY 4.                                                                                                             |        |
| By NEWBERRY & CO.                                                                                                  |        |
| Victoria Docks—18 to 40 even, Martindale-road, 73 years, ground-rent 54 <i>l.</i>                                  | 675    |
| By R. TRIST & SON.                                                                                                 |        |
| St. Giles's—26, 27, and 28, High-street, 43 years, ground-rent 20 <i>l.</i>                                        | 2,550  |
| Bryanston-square—Ground-rent of 10 <i>l.</i> 10 <i>s.</i> , term 24 years                                          | 105    |
| Kingland—69, De Beauvoir-road, 31 years, ground-rent 6 <i>l.</i>                                                   | 390    |
| By PHILLIPS & DYER.                                                                                                |        |
| Brompton—15, Brompton-square, 28 years, ground-rent 10 <i>l.</i>                                                   | 950    |
| MAY 5.                                                                                                             |        |
| By ROGERS, CHAPMAN, & THOMAS.                                                                                      |        |
| Pimlico—56, Wilton-road, freehold                                                                                  | 2,100  |
| South Lambeth—Ground-rent of 16 <i>l.</i> 10 <i>s.</i> , reversion in 32 years                                     | 360    |
| Ground-rents of 6 <i>l.</i> 10 <i>s.</i> , reversion in 30 years                                                   | 220    |
| By C. A. RICHARDS.                                                                                                 |        |
| Mile End—12, 13, and 16, St. Peter-street, 43 years, ground-rent 9 <i>l.</i> 1 <i>s.</i> 8 <i>d.</i>               | 1,030  |
| 7 and 9, Nicholas-street, 43 years, ground-rent 7 <i>l.</i>                                                        | 875    |
| By J. M. GRAHAM.                                                                                                   |        |
| Fulham—1, 3, and 5, Dimadale-road, 80 years, ground-rent 18 <i>l.</i>                                              | 700    |
| 3 to 6, St. Thomas-road, 64 years, ground-rent 12 <i>l.</i>                                                        | 150    |
| Little Woodham, Surrey—Rose Cottage, freehold                                                                      | 530    |
| Brixton—33 and 35, Ingleton street, and 5 and 6, Ingleborough-street, 2 years, ground-rent 5 <i>l.</i> 1 <i>s.</i> | 165    |
| 37 and 39, Ingleton-street, 2 years, ground-rent 4 <i>l.</i> 18 <i>s.</i>                                          | 35     |
| By NEWSON & HENING.                                                                                                |        |
| Hornsey, Rayleigh-road—Three leasehold houses, 95 years, ground-rent 18 <i>l.</i> 10 <i>s.</i>                     | 825    |
| Highgate—77, Highgate-hill, freehold                                                                               | 755    |
| Finchley—Ground-rent of 18 <i>l.</i> , reversion in 81 years                                                       | 400    |
| 1 and 2, Albion Villas, freehold                                                                                   | 680    |
| Greenwich—1 to 4, Providence-row, freehold                                                                         | 2,120  |
| Highgate—5 and 6, North-hill-terrace, copyhold                                                                     | 635    |
| 1 to 4, Prospect Cottages, copyhold                                                                                | 990    |
| North-hill—Providence and Ward's Cottages, copyhold                                                                | 1,820  |
| Finchley—23, Litchfield-grove, 79 years, ground-rent 6 <i>l.</i>                                                   | 250    |
| Clerkenwell—47 and 48, Myddelton-street, 24 years, ground-rent 8 <i>l.</i>                                         | 705    |
| 4, Garnault-road, 24 years, ground-rent 5 <i>l.</i>                                                                | 370    |
| MAY 6.                                                                                                             |        |
| By D. J. CHATTELL.                                                                                                 |        |
| Greenwich, Lower East-road—Freehold corner house                                                                   | 450    |
| By H. C. NEWSON.                                                                                                   |        |
| Lee—84 and 86, Brent Ash-road, 76 years, ground-rent 12 <i>l.</i>                                                  | 800    |
| Stratford—Ground-rent of 10 <i>l.</i> , reversion in 80 years                                                      | 230    |
| By W. B. HALLIST.                                                                                                  |        |
| Holloway—48, Regent-road, 17 years, ground-rent 6 <i>l.</i> 6 <i>s.</i>                                            | 255    |
| Barnsbury-square—West Lodge, 21 years, ground-rent 4 <i>l.</i>                                                     | 375    |
| By B. A. REEVE.                                                                                                    |        |
| Southwark Park-road—Improved ground-rent of 16 <i>l.</i> , term 55 years                                           | 250    |

MEETINGS.

|                                                                                                                                                                                  |        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| SATURDAY, MAY 14.                                                                                                                                                                |        |
| Artist's General Benevolent Institution.—Anniversary dinner (Freemasons' Tavern).                                                                                                | 6 p.m. |
| St. Paul's Ecclesiastical Society.—Visit to Broxbourne.                                                                                                                          |        |
| Train leaves Liverpool-street Station at 2:43 p.m.                                                                                                                               |        |
| Edinburgh Architectural Association.—Visit to Linlithgow Palace and St. Michael's Church.                                                                                        |        |
| MONDAY, MAY 16.                                                                                                                                                                  |        |
| Institution of Mechanical Engineers.—Spring Meeting. (First day).                                                                                                                | 8 p.m. |
| Victoria Institute.—8 p.m.                                                                                                                                                       |        |
| TUESDAY, MAY 17.                                                                                                                                                                 |        |
| Institution of Civil Engineers.—Sir Lowthian Bell "On the Manufacture of Salt near Middleburgh." 8 p.m.                                                                          |        |
| Institution of Mechanical Engineers.—Spring Meeting (second day).—Annual dinner.                                                                                                 |        |
| Parkes Museum (Lectures for Sanitary Inspectors).—Mr. J. F. J. Sykes, B.Sc., M.R.C.S., on "Nature of Nuisances, including Nuisances the abatement of which is difficult." 8 p.m. |        |

**The Wesleyan Centenary Hall in the City.**—A large company was attracted to the Auction Mart on Wednesday last on the occasion of the Wesleyan Centenary Hall and Mission-house, in Bishopsgate Within, being offered for sale by Messrs. Fox & Bonfield. The building was offered in consequence of the Wesleyan body being about to remove their chief business centre to the Thames Embankment, where a large and costly new hall and mission-house will shortly be erected. The premises in Bishopsgate were built in the year 1839, now nearly half a century since, in order to commemorate the then centenary period of the Wesleyan body. The building covers an area of 8,030 ft., having a frontage of about 66 ft. and a depth of 165 ft. It was described as occupying a position unequalled within the monetary and trading area of the city, and as the last site of equal prominence in that locality available for the construction of a banking house, insurance office, or for a pile of offices. Mr. Fox, the auctioneer, before offering the property, made some lengthened remarks as to its great value. Judging from the price at which freehold land in the locality had been sold during the last few years,—in some instances for as much as 32*l.* per foot,—he considered that the minimum value of this particular land was 20*l.* per foot, which, according to the area it occupied, amounted to 166,000*l.*, and to that must be added the value of the building itself. The biddings commenced by an offer of 70,000*l.*, upon which there was an immediate advance to 75,000*l.*, and by similar advances of 5,000*l.* each, 100,000*l.* was quickly reached. The biddings having arrived at 119,100*l.*, and there being no higher offer, the property was bought in at 135,000*l.*

**Addington, Kent.**—A new stained-glass window, representing the Ascension of Our Lord, has recently been placed in the church here; the work has been designed and executed by Messrs. Warrington & Co., of London.

Statistical Society.—Mr. Charles Booth on "The Inhabitants of the Tower Hamlets (School Board Division), their Condition and Occupations." 7-45 p.m.

Birmingham Architectural Association.—Election of officers. 7.30 p.m.

WEDNESDAY, MAY 12. Society of Arts.—Mr. William Henry Preece on "Progress in Telegraphy." 8 p.m.

Civil and Mechanical Engineers' Society.—Annual dinner (Holborn Restaurant), 6.30 p.m.

Royal Meteorological Society.—7 p.m.

THURSDAY, MAY 13. Society for the Encouragement of the Fine Arts.—Mr. Louis Fagan on "The English School of Engraving," 8 p.m.

Parke's Museum of Hygiene.—Major Lamourck Flower on "The River Lark," 8 p.m.

Institution of Mechanical Engineers.—7.30 p.m.

FRIDAY, MAY 20. Architectural Association.—Mr. R. W. Paul will read a paper entitled "A Travelling Student's Notes in Gloucestershire," 7.30 p.m.

Royal Institution.—Mr. Benjamin Baker on "Bridging the Firth of Forth," 8 p.m.

Parke's Museum (Lectures for Sanitary Inspectors).—Dr. Charles Kelly on "Sanitary Law.—General Enactments, Public Health Act, 1875, Model By-Laws." 8 p.m.

Institution of Mechanical Engineers.—7.30 p.m.

Miscellaneous.

The Railway and Canal Traffic Bill.—At the ordinary monthly meeting of the Council of the Railway and Canal Traffic Bill.

That the Council, having considered the Railway and Canal Traffic Bill, as amended on report, read their resolutions of the 20th of April (see Builder, p. 685, ante), having reference to the Bill as amended in Committee, and hereby express their regret at the numerous amendments which have been made in the interests of railway companies, the most objectionable of which are those to Clause 7, to the effect that the Board of Trade may require security for costs as a condition of granting certificates to Associations and other bodies as to their fitness to make complaint before the Railway Commissioners, and to Clause 12, which provides that claims for repayment of overcharges must be limited to one year before the complaint is made.

The Sun and Planet Engine.—Messrs. Whitbread & Co. have offered to the Association of Foremen Engineers, through Mr. Joseph Newton, the venerable Sun and Planet engine which was constructed for them 102 years since by James Watt, the condition being that the Association or any of its members should find a home for it. The owners of the engine, who are no longer able to find room for it in their establishment, are naturally anxious to prevent its becoming converted into old iron, which would be a regrettable fate for this historical piece of mechanism. We understand that, since this offer was made, Messrs. Whitbread have extended it to the engineering profession at large, from which it would appear that the Association has not accepted it, and that the engine is going begging. We hope, however, it will be preserved to the profession by one or other of our engineering institutions. The Patent Office Museum would form the most appropriate repository for this memento of James Watt, but it would seem that the limited space at command there is already hopelessly overstocked.—Iron.

The New National Liberal Club.—The eighth Saturday afternoon visit of the Architectural Association was made to the new National Liberal Club, Victoria Embankment, on Saturday last. The members were conducted over the building by Mr. Thomas Warburton, the Clerk of the Works, by whom the drawings were laid out for the members to examine. We have a detailed description of this important building (which was visited by the members of the Architectural Conference last week) in type, accompanied by plans, but want of space obliges us to hold it over until next week.

Registration of Plumbers.—At the meeting of the quarterly court on Monday, April 25, Mr. Alderman Knill, Master of the Company, presiding, it was resolved, on the motion of Mr. George Shaw, G.C., Chairman of the Registration Committee, that plumbers passing the theoretical and practical examination of the City and Guilds Institute should be entitled, on the production of the Institute certificates, accompanied by satisfactory testimonials, to be enrolled upon the Company's register for plumbers.—City Press.

Comber (Ireland).—The re-opening of Comber First Presbyterian Church, after alterations and enlargements, is reported by the Belfast Newsletter, which says that the old church was built about 300 years ago, after the shape and appearance of an ordinary barn building. Its first enlargement was an extension of the western gable, which made the building 79 ft. long by 29 ft. wide. That was about 250 years ago. Another addition was made fifty years later, when a wing or return gave the structure the form of the Roman letter T, and a further extension, made in the year 1740, gave it a cruciform shape. The present alteration consists of a complete removal of the roof, galleries, flooring, and pews, as well as the internal projections of the Greek cross-diagonal walls, and the former four corners of the projections are supplanted by massive granite and stone pillars, supporting arches from the junction of the old and the new walls. The whole of the works of construction have been carried out by Mr. W. Kerr, of Lagan Village, Belfast, from designs by and under the supervision of Mr. A. H. De Wind, C.E., architect.

Birmingham Architectural Association.—At the eleventh ordinary meeting of the current session, held at Queen's College on Tuesday evening last, the following gentlemen were elected to serve as the officers for session 1887—1888:—President, Mr. F. B. Osborn, F.R.I.B.A.; Vice-President, Mr. W. Doubleday; Hon. Treasurer, Mr. F. Cross; Hon. Librarian, Mr. W. H. Bidlake, M.A.; Hon. Secretary, Mr. Victor Scruton, A.R.I.B.A. As other members of the Committee: Messrs. H. Beck; H. H. McConnell, A.R.I.B.A.; A. Reading, A.R.I.B.A.; A. V. Ingall, W. H. Kendrick, T. W. F. Newton, and F. B. Peacock. A hearty vote of thanks was accorded to Mr. John Cotton on his retiring from the office of Vice-President,—an office which he had held most efficiently and disinterestedly for the past three sessions.

Proposed Hospital for Montreal.—Sir George Stephen, President of the Canadian Pacific Railway, and Sir Donald Smith, one of the directors, have just addressed a letter to the Mayor of Montreal, offering to contribute a sum of 1,000,000 dol., or 200,000l., for the erection of a hospital in that city. The hospital, which is intended for the benefit of the poorer class of the city, will, if permission is granted, be constructed on the declivity of the Mont Royal. The institution will be insectarian, and it is proposed to call it the "Royal Victoria Hospital." The money will be placed in the hands of the Governor-General as soon as certain conditions stipulated for by the donors have been accepted by the Corporation of the city. The site selected for the structure is a most appropriate one, and it is to be hoped that the founders will succeed in obtaining it, since their efforts to procure a suitable plot of land elsewhere have proved fruitless.

Cathcart, Cape Colony.—The new English Church, dedicated to St. Alban, was opened for divine service in February last. The consecration service has been postponed owing to an accident incapacitating the Bishop of Grahamstown. The church is built of local stone, pointed on both sides, and the roofs, seats, and other joiner's work are of pitch-pine. The architect is Mr. Lennox Canning, of Bloemfontein, Orange Free State, and London.

Trinity College, Connecticut.—According to the American papers, Mr. Junius S. Morgan, the well-known London banker, recently presented Trinity College, at Hartford, Connecticut, with 6,000 dollars towards the cost of erecting a new building for scientific purposes. A spacious gymnasium has just been completed in connexion with the college, the cost of which has also been partly defrayed by the liberality of Mr. Morgan.

Sonthampton.—The new Catholic Schools erected in Middle-street, Sonthampton, and which will accommodate about 150 children, have been completed. They have been built by Messrs. W. R. & C. Light, of Portsmouth, from the designs of Mr. W. Lunn, architect, Portsmouth.

Kendal "Jubilee" Market.—The Town Council have selected the design submitted in competition by Mr. D. Brade, of Kendal, for the above.

New Pier at Ventnor, Isle of Wight.—Messrs. H. R. Trehearne & Co., of Battersea, write to say that they are the contractors for this work, and not Messrs. Burligh & Co.

PRICES CURRENT OF MATERIALS.

Table with columns for material names (e.g., Greenheart, Oak, Pine, Lath, Deals, etc.) and prices in £, s., d. and other units.

TENDERS

- ANERLEY.—For the erection of two pairs of semi-detached houses at Wheathill-road, Anerley. Mr. F. C. Dyer, architect, Gracechurch-street, B.C.
BEXLEY.—For the erection of a new house and stable for Mrs. F. J. Newman. Messrs. Newman & Newman, architects, Tooley-street, London E.C.
CROYDON.—For a pair of semi-detached villas in Dingwall-avenue, Wellesley-road. Mr. Alfred Broad, architect, Great George-street, Croydon.

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS. Epitome of Advertisements in this Number.

COMPETITIONS.

Table with 5 columns: Nature of Work, By whom required, Premium, Designs to be delivered, Page. Includes entries for New School and School House, Jubilee Memorial, Chard, Broken Gurnsey Hospital, School Board Offices.

CONTRACTS.

Table with 5 columns: Nature of Work, or Materials, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes entries for Completion of Hugglescote Ch., Leicesterhire Smith's Work, Repairation and Cleansing of Sewers, etc.

PUBLIC APPOINTMENTS.

Table with 5 columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes entries for Engineering and Surveying Assistant, Tracing Clerk, Clerks of Works, etc.

BAILING.—For additions, alterations, &c., to Hatherton House, Bailing, for Mr. E. A. J. Crossley, Mr. Charles Tesque, architect:—

MAPLES & CO. £288 10 0
HAYES & SON 247 0 0
THOMAS GREEN 242 0 0
WHITLEY'S (accepted) 239 0 0

HAMMERSMITH.—For the erection of warehouse, &c., for Mr. W. W. Welch. Mr. J. Hume, architect, Hammersmith:—

WRIGHT, KENSINGTON £255 0 0
KINTON, HAMMERSMITH 245 0 0
GREENHAM, HAMMERSMITH 239 0 0

ISLINGTON.—For building warehouse in rear of 28, Park-street, Islington, for Mr. B. Levi. Mr. J. J. Burton & Son 2989 0 0
JARVIS & SON 908 0 0
STEEL BROS. 899 0 0
GODFREY & SON 887 0 0
ROOM 845 0 0

KNEBWORTH.—For rebuilding the Lytton Arms, Knebworth, for Messrs. Hawkes & Co. Mr. G. W. Tuxford Hallatt, architect, York-buildings, Adelphi, W.C. Quantities supplied by Mr. W. Saville, Strand:—

SCHERER & ULMER, LONDON £1,554 0 0
OLDFRY & CO., LONDON 1,375 0 0
SPENCER & CO., LONDON 1,250 0 0
BATES, STEVENAGE 1,248 0 0
GLASCOCK & SONS, BISHOPS STORTFORD 1,230 0 0
LAWRENCE & SONS, DACHWORTH 1,195 0 0
GREGORY, LONDON 1,195 0 0
WILMOTT & SONS, HITCHIN 1,070 0 0

LEWISHAM.—For alterations to business premises, Lee-road, Lewisham, for Messrs. J. & A. Austin. Mr. Henry Hopson, architect, Dashwood House, New Broad-street, E.C.:

SHUMMERS £475 0 0
LAIRD 471 0 0
BRIDGE 444 0 0
BOBSON (accepted) 410 0 0

LONDON.—For alterations to the Cleopatra Hotel, Beaufort-buildings, and Herbert's passage, Strand. Mr. C. F. Hayward, F.S.A., architect, Museum-street, W.C.:

TITMUS £1,177 0 0
HOLLOWAY 1,120 0 0
ROYAL 1,040 0 0
OLDFRY & CO. 997 0 0

LONDON.—For rebuilding the Ship Tavern, Hart-street, Mark-lane, and works in connexion therewith, for Old Broad-street. Mr. M. E. Collins, architect, Old Broad-street:—

LASCELLES £4,362 0 0
M. GENTRY 4,280 0 0
CROAKER 3,966 0 0
OLDFRY & CO. 3,884 0 0
ASHBY & HORNER 3,670 0 0
KIRK & RANDALL 3,338 0 0
COLLS & SONS 3,597 0 0
W. DOWNS 3,807 0 0
J. D. RICHARDSON 3,603 0 0

LONDON.—For rebuilding on the sites of 478 and 477, Orchard-street, W. Messrs. T. Chaffield Clarke & Son, architects, Bishopsgate-street, W.:

T. W. HAYLOCK £10,003 0 0
COLLS & SONS 9,380 0 0
ASHBY & HORNER 9,320 0 0
HALL, BEDDALL & CO. 9,145 0 0
PETO BROS. 8,980 0 0
B. E. NIGHTINGALE 8,928 0 0
E. LAWRENCE & SONS 8,778 0 0
PATMAN & POTHERINGHAM 8,763 0 0
BROWN, SON, & BLONFIELD 8,630 0 0
A. BASH 8,609 0 0
C. COY. 8,230 0 0
J. MORTER 7,900 0 0

LONDON.—For works at Union Wharf, Wapping Wall, for Messrs. Giggell & Sons:—

COLLS & SONS £3,400 0 0
W. SHURMUR 3,393 0 0
MOWLEM & CO. 3,240 0 0
M. GENTRY 3,240 0 0
JAY, MORTER 3,187 0 0
HARRIS & WARDOP 3,173 0 0
W. GLIDDING 3,154 0 0
B. E. NIGHTINGALE 3,077 0 0
ASHBY & HORNER 3,060 0 0
H. A. GREENWOOD 2,898 0 0
J. GROVER & SON 2,788 0 0

LONDON.—For alterations and additions at the Oxford Arms, Portico-road, W., for Mr. W. Pincet Hummerston. Mr. Edward Clark, architect, Strand:—

W. SMITH £749 0 0
T. L. GREEN 687 0 0
JACKSON & TODD 628 0 0
J. ANLEY 618 0 0
J. BEALIE 610 0 0
J. OLIVER 697 0 0

LONDON.—For converting Nos. 287 and 289, Old Kent-road, S.E., into shops, for Mr. Trickett. Mr. R. A. Briggs, architect, Devonshire-square, Bishopsgate:—

KILLEY & GAYFORD £783 0 0
EASTMAN & SON 745 0 0
H. L. HOLLOWAY (accepted) 733 0 0

NORTHAMPTON.—For water-tower and iron tank, for the Northampton Corporation. Messrs. T. & C. Hawley, engineers, Great George-street, S.W. Quantities by Messrs. Hunt & Steward, Westminster:—

WATER-TOWER.
J. WINGROVE, NORTHAMPTON £2,189 0 0
G. FISHER, NORTHAMPTON 2,034 19 6
G. WHITE, NORTHAMPTON 1,955 1 6
CLAYSON BROS., COOKHOE 1,738 0 0
SMITH & SON, NEWARK 1,569 14 6
D. IRESON, NORTHAMPTON 1,539 11 11
C. BAINE, NEWARK-ON-TRENT 1,389 0 0
C. CLARKE, BANBURY 1,327 0 8
R. FINIGAN, NORTHAMPTON 1,188 11 6

IRON TANK.
Laidlaw, Sons, & Cain, Glasgow 917 0 0
E. CATER & SON, MILLWALL, LONDON 847 10 0
H. MOBBS & CO., NORTHAMPTON 813 0 0
NEWTON, CHAMBERS, & CO., THORNCHIFFE 636 10 0
\* Accepted.

NORTHAMPTON.—For the erection of new shoe factory, for Mr. H. E. Randall, Mr. C. Dorman, architect. Quantities supplied by the architect:—

T. COSFORD, NORTHAMPTON £4,490 0 0
REYNOLDS & SON, NORTHAMPTON 4,374 0 0
WOODFORD & SON, NORTHAMPTON 4,700 0 0
WALKIN BROS., NORTHAMPTON 4,700 0 0
D. IRESON, NORTHAMPTON 4,644 0 0
GREEN BROS., NORTHAMPTON 4,640 0 0
H. MARTIN, NORTHAMPTON 4,630 0 0
HICKMAN, NORTHAMPTON 4,500 0 0
CLAYSON BROS., COOKHOE 4,290 0 0
WINGROVE, NORTHAMPTON 3,913 13 0
\* Accepted.

NORTHAMPTON.—For erecting pavilion, refreshment-bars, and entrances, at Franklin's Gardens, for Mr. John Campbell Franklin. Mr. C. Dorman, architect. No quantities:—

CLAYSON BROS., COOKHOE £1,725 0 0
GREEN BROS., NORTHAMPTON 1,680 0 0
J. B. CLARKE, NORTHAMPTON 1,676 0 0
H. MARTIN, NORTHAMPTON 1,630 0 0
D. IRESON, NORTHAMPTON 1,630 0 0
J. WINGROVE, NORTHAMPTON\* 1,641 0 0
\* Accepted.

NORWICH.—For making up Grant-street. Messrs. Wright & Ratcliffe, surveyors:—

CLARK £105 15 0
J. L. CATTILL, LOWESTOFT 98 0 0
H. LOONEY 93 0 0
T. NORTH (accepted) 88 0 0

NOTTINGHAM.—For the sewerage of Wash-pool-lane and Gedling-road, Arnold, near Nottingham, for the Arnold Local Board of Health. Quantities supplied by the engineer, Mr. Fredk. Jackson, Low Pavement, Nottingham:—

JOHN HALFORD £123 10 0
JOHN GREENE, FRONT-STREET, ARNOLD\* 119 0 0
WM. CORDON 109 18 11
EDWIN MORRIS 99 19 0
\* Accepted for 99l. 19s.

ORPINGTON (Kent).—For repairs and decorations at Church-hill House, Orpington, Kent. Mr. G. St. Pierre Harris, architect:—

HEATH, ORPINGTON £231 0 0
W. E. TAYLOR, ORPINGTON 218 0 0
F. WOOD, CHISHLESTON 197 0 0
H. SOMERFORD & SON, CLAPHAM 176 0 0
\* Accepted.

PECKHAM.—For the erection of a handrail and stables in the Nutcroft-road, Peckham, for Mr. D. Dickie. Mr. A. E. Bolton, architect, Acton:—

W. WALLACE £1,490 0 0
LYFORD 1,395 0 0
H. L. HOLLOWAY 1,280 0 0
BALSAM BROS. 1,240 0 0

PLASHET (Essex).—For the erection of three houses in the Whitfield-road, Plashet, for Mr. F. Colton. Mr. Chas. E. Jackson, architect, Grove-road, E.:—

C. EVERARD, STRATFORD £390 0 0
BOULTER & LEE, FOREST-GATE 330 0 0
A. WORLAND, HACKNEY-ROAD 915 0 0
C. BAINE, HIFORD 800 0 0
D. HODGES, UXTON 875 0 0
J. BARTRAM, HACKNEY\* 660 0 0
\* Accepted.

SOUTHEND-ON-SEA.—For the forming and sewerage of roadways and pathways on the Killworth Estate. Mr. Bradshaw Brown, F.S.A., surveyor, Fenchurch-street:—

K. CHANDLER, EDMONTON £4,063 0 0
G. BELL, TOTENHAM 2,268 0 0
A. OLIVER, HASTINGS 2,160 0 0
J. B. HOWARD, FRIELWELL 2,132 0 0
J. BLONFIELD, TOTENHAM 1,972 0 0
W. HARRIS, CAMBERWELL 1,948 0 0
JACKSON BROS., PENNY STRATFORD 1,848 0 0
J. JACKSON, LEIGHTON 1,825 0 0
PELL & SONS, BROMLEY 1,779 0 0
DARKE & SONS, SOUTHEND 1,690 0 0
J. REEVES, WALTHAMSTOW 1,988 0 0

TADLEY (Hants).—For new rectory at Tadley, Hants., for Mr. Arthur Wallington, architect, Basingstoke:—

D. MASTELL, BASINGSTOKE £1,135 0 0
J. C. COOK, READING 1,150 0 0
JOHN BOTTRILL, READING 1,097 0 0

TILEHURST.—For St. George's Vicarage, Tilehurst, Reading. Mr. S. Gambier Parry, architect, Westminister:—

S. BILHOTT, NEWBURY £2,280 0 0
HIGGS & SONS, READING 2,023 0 0
G. WERNHAM, READING 1,738 0 0
JOHN BOTTRILL, READING 1,994 0 0

TUNBRIDGE WELLS.—For pair of semi-detached villa residences, Prospect Lodge Estate, Tunbridge Wells. Messrs. Coulhurst & Booty, architects, Derby. Quantities supplied:—

Table with 2 columns: Name and Amount. Includes T. Hyder, J. Jarvis, C. Gallard, Judd, Thurbon, Strange & Sons, W. H. Canty, W. Oakley.

WELLINGBOROUGH.—For converting the Priory into Sunday schools, and erecting large hall, &c. Messrs. Talbot Brown, & Fisher, architects, Wellingborough:—

Table with 2 columns: Name and Amount. Includes C. Claridge, Green Bros., D. Ereson, Clayton Bros., Marriott, Edwin Brown, G. Hanson.

WEST HAM (Essex).—For the erection and completion of a block of school buildings, to be known as the Stock-street Schools, in the parish of West Ham, Essex, for the West Ham School Board. Mr. J. T. Newman, architect, Fan-court, Fenchurch-street. Quantities by Messrs. R. L. Curtis & Sons:—

Table with 2 columns: Name and Amount. Includes W. J. Maddison, B. E. Nightingale, A. Reed, J. Carley, Hearle & Sons, E. Hoskings, J. Morter, W. Grogan.

WIMBLEDON.—For pair of semi-detached villa residences, for Mr. P. G. Wright:—

Table with 2 columns: Name and Amount. Includes J. A. Holding, R. Lacey, E. M. Bartlett, E. L. Price, J. Hall.

WIMBLEDON.—For house and shop, Durham-road, Cottenham Park. Mr. Alfred G. Olley, architect:—

Table with 2 columns: Name and Amount. Includes J. Sullock.

WIMBLEDON.—For finishings, &c., to house, Haydon Park. Mr. Alfred G. Olley, architect:—

Table with 2 columns: Name and Amount. Includes W. Woolley.

WOKING.—For additions to the Oriental Institute, Woking. Mr. William I. Chambers, architect:—

Table with 2 columns: Name and Amount. Includes James Whitburn, A. A. Gale, Geo. Shears.

\* Accepted, subject to modifications. Gardener's Cottage, &c. Charles Fifield, Goldsworth:—

Table with 2 columns: Name and Amount. Includes Charles Fifield.

\* \* \* SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.O., not later than 12 Noon on THURSDAYS.

TO CORRESPONDENTS. Registered Telegraphic Address, "THE BUILDER, LONDON."

T. G.—A. G.—E. T. W.—W. & Co.—J. P.—T. A.—N.—& R.—B. H. C.—D. F. H.—E. F. B.—M. F. R.—A. F. H.—H. J. J. (we have a much clearer idea of what the lecturer did and did not say than you seem to have, and of what we said, also. We offered no explanation of our own as to the creeping action of the rolled sphere on the cylinders; we only suggested that an important practical point had been apparently overlooked.)—H. (to space this week)—E. S. (shall have consideration)—G. R. D.—V. E. K. (we do not know what your post-card refers to.)

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

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# Supplement to The Builder,

MAY 14, 1887.

## GENERAL CONFERENCE OF ARCHITECTS.

**W**e resume our report of the proceedings of the Eighth General Conference of Architects, held last week under the auspices of the Royal Institute of British Architects.\* We will take first of all the Conference matter proper, and will then proceed to describe the visits made to new buildings and public institutions by members of the Conference.

### ARCHITECTURAL EDUCATION.

In the discussion which took place on the eight papers read on this subject by Professor Babcock (of Cornell University, U.S.), Mr. E. C. Robins, Mr. Arthur Hill, Professor Aitchison, A.R.A., Professor T. Roger Smith, Mr. R. Phœnix Spiers, Mr. Lawrence Booth, and Mr. J. A. Gotch (the whole of which papers were printed *in extenso* in our supplement last week).

The Chairman (Mr. Arthur Cates) said that as touching Mr. Robins's paper, he had received a letter from Sir Philip Magnus, Director of the City and Guilds of London Institute. He was unable to be present at the meeting, being in Italy, otherwise he would have been present to speak for himself. Sir Philip's letter was as follows:—

"For some little time I have been instituting inquiries as to the best course of education for those who are training to become architects. As you are aware, there is a special course of instruction occupying four or five years at most of the polytechnic schools of Germany. At Berlin, for instance, there were 133 students in attendance last winter in the Architectural Department of the school. These students receive a training that qualifies them to act as architects, and the system of sending a youth to an architect's office to receive there his training does not prevail to anything like the same extent abroad as here. It seems to me that there are distinct advantages in our own system; but having regard to the scientific knowledge which architects now require in the construction of all buildings, our present system, I venture to think, needs to be supplemented by special instruction in a technical school. Without going into details, for which, on the eve of my departure, I have not now time, I may say that I should think the best course would be to recommend all youths, prior to their being articled, to spend a year at some technical institution, where they would receive instruction in the principles of science that would be applicable to their future work, and in geometrical drawing, specialised according to their future requirements. Such a systematic course of study would be of great advantage to them as supplementing their school education, and would better enable them to profit by the valuable experience they would acquire in an architect's office. But alone this would not suffice. After going through this course, and passing a satisfactory examination, the student should be articled, say for three years, to an architect; and during this time he should be required to attend at the technical institution for a decreasing number of hours each year. During the first year he might be required to attend on three or four afternoons a week. During the second year, when he would be more useful to his employer, it might suffice if he attended on parts of two afternoons a week; and during the third year he might attend some special courses only after the ordinary office hours. The instruction during these three years would embrace such subjects as the strength of building materials, the principles of building construction, the application of geometry to construction, the history of architecture, and special applications of physics to the problems of ventilation, acoustical arrangement, &c. The designing of buildings, and all the practical details connected with his work, the student would, it seems to me, learn best in the architect's office as he now does."

Professor Roger Smith asked to be allowed to anticipate the discussion and to suggest that a special vote of thanks should be accorded by the Conference to Professor Babcock for having come amongst them from the other side of the Atlantic and shown that he was willing to help architects in this country by pointing out the way in which the American architects had secured for themselves that which we were hoping also to secure, namely, systematic education. He would not add a single word more except that it was a great pleasure to all of them, and it had been exceptionally so to himself, that an architect from the other side of the ocean should come there that day and give them the benefit of his experience (applause).

\* See last week's *Builder*, p. 653, and Supplement thereto, pp. 691-706.

Professor Aitchison, A.R.A., seconded the proposition that a vote of thanks be given to Professor Babcock for coming to England and giving the Conference the advantage of his knowledge and experience of how architectural teaching was carried on in the United States. Although, perhaps, it was rather ungracious to do so, he wished to take one slight objection to what Professor Babcock had said when he excluded any knowledge of hydraulics from the education of an architect. In view of the provision of cisterns and large tanks it was important that an architect should have some elementary knowledge of hydraulics. Most of them knew that one division of St. George's Hospital was washed down and several persons killed, through the failure of a tank, some years ago. He was exceedingly pleased to hear the remarks Professor Babcock made on the subject of Byzantine architecture, partly, perhaps, out of vanity, because he had arrived, from entirely independent sources, at the same conclusion himself. When he had had occasion to read papers on the subject of architecture, he had pointed out that which Professor Babcock had pointed out that day, viz., that the true Roman architecture was the Byzantine. He might say that he did not know of any buildings that were so fine as the great Byzantine buildings he had seen. He did not know anything to surpass some of the churches in Ravenna, and St. Mark's, Venice. He thought he might say all architects, and more especially the young ones, owed a great debt of gratitude to Mr. Phœnix Spiers, who organised and carried on so admirably the Architectural School at the Royal Academy (hear, hear). When he (Professor Aitchison) was a student there was no architectural teaching there at all except the six lectures.

The motion was then put and agreed to.

The Chairman, addressing Professor Babcock, said that he had pleasure in conveying to him not only the thanks of the meeting, but also the thanks of the Institute and the thanks of the profession at large in this country for his great kindness in coming over here, at an earlier period than he had intended, for the express purpose of attending that meeting and reading his paper, and for the very valuable results they all hoped would follow from the paper with which he had favoured them.

Professor Babcock expressed his sincere and hearty appreciation of the kindness of the meeting in the reception they had given him. If he had been or could be of any service to them in formulating their ideas in regard to architectural education he should feel himself amply repaid for the trouble he had taken in order to enable him to come to the Conference. Had he had notice at an earlier period he could have come in comparative ease, but as it was he was obliged to crowd two months' work into two weeks, and he had not therefore been able to devote the time he could have wished to the preparation of his paper. His paper, from his own point of view, was extremely imperfect. He was almost ashamed it should make its appearance in print alongside the much more finished papers which had been read. Inasmuch as Professor Aitchison had taken occasion to criticise a portion of the paper in which he had spoken of the architect not dealing with hydraulics, he wished to say that in America they were coming to the conclusion that architects had better not undertake to do what an engineer could do better. An engineer was a specialist in these matters, and architects were not specialists. It gave them time to attend more particularly to the architectural and artistic part of the design. They (American architects) put all that was mechanical upon those who made a speciality of it. He should not have ventured to make that

remark except that it might be the only opportunity he might have. He thanked the Conference for the honour they had conferred upon him and his country. It was hardly customary for an older country to call upon the younger, for the mother to call upon the daughter, but they must not be surprised if the daughter soon got up alongside the parent; but be that as it might, he felt that the honour conferred upon him was a great one.

Mr. Hugh Stannus said that he had intended to propose a vote of thanks to all the readers of the papers, and he felt that Professor Roger Smith and Professor Aitchison had taken the nicest plum out of his pudding. He was sure, however, it would be more pleasing to Professor Babcock to have had the thanks of the meeting proposed by men so much abler and better known in the profession. He would, however, ask that the best thanks of the Conference be given to the other gentlemen who had prepared such exceedingly interesting and exhaustive papers as those to which they had listened. He took it that the general consensus of all that had been said appeared to be that a young fellow ought to learn the underlying science before he learned the art of his profession, and that he ought to learn both the science and the art before going into an office at all. The point was, at what age should he commence, speaking roughly and generally, and not with regard to any particular cases. Suppose a young man remained at school until he was eighteen, and went to some architectural college until he was twenty or twenty-one. It would be exceedingly difficult to article any young man when about twenty years of age, because no contract would bind him after he was twenty-one. Therefore, he had better continue at College until he was twenty-one, and he could then go into an office until he was twenty-three. As his parents would have spent a great deal of money in fitting him for the profession, he considered it would be a proper thing, seeing that he would go into any office at twenty-one much better fitted than at an earlier age,—not to ask for a premium. The 200 guineas or thereabouts that would be asked would have been expended in a far better way upon his preliminary education at an architectural college. If he stayed with his principal until he was twenty-three he could become a clerk of the works at twenty-four, and, therefore, at twenty-five he might hope, if he had an uncle who was a capitalist or large estate agent, to enter into practice. He knew some young fellows who had paid heavy premiums, and had gone to gentlemen of mature age in large practices, and he had known others who had paid smaller premiums, and had gone with younger men, and they spoke with far more gratitude than those who had gone with older men. In the first place, the young man preserved more of his enthusiasm than the older one; and again, he was not too far removed by age from his pupil. He would also have more leisure to attend to his pupils, and in a smaller office the pupil would be put to a greater variety of work in the different branches of the profession. During his pupillage he should be allowed to attend lectures. Mr. Robins's suggestion of one day a week for such instruction was an admirable one; but two or three days, if possible, alternately with office practice, would be desirable. There were things to be learned in the office that could not be learned academically, and there was no royal road to what a man learned during his pupillage, but lectures that he might bear at a college were of exceeding value. They could have approached that subject in one of two ways. They might, as in the *Jeu-de-Paume*, take an oath that they would not separate that afternoon until they had settled a scheme of education for the profession, and then, having settled it, they

could consider how it was to be carried out; or they might consider how the existing means of education could be improved and consolidated for the common benefit. Much as he sympathised with Prof. Smith's idea of setting up the atelier, he would prefer that they should endeavour to consolidate what they possessed. If they considered for a moment, they had the Royal Academy, King's College, University College, the Science and Art Department, Technical Institute, and last, but not least, the Architectural Association. It was possible for the Institute to consider itself not so much an educating body as an examining body, a body which was to act as a go-between of all the others; if they could approach the Royal Academy and unite the professors,—Prof. Roger Smith, Prof. Kerr, Prof. Aitchison, and others,—and invite the Architectural Association to arrange some common ground of work, so that there should not be such dissipation of energy, he thought there would be some practical outcome of their conference that afternoon. While Prof. Bagnall was speaking he filled him (Mr. Stannus) with envy, for he longed to have had the privilege of sitting under such a man, and to have learned that thorough way of treating the subject which he so slightly touched upon. They of course knew that their American cousins started with nothing to unlearn. They were able to make a perfectly symmetrical scheme of education.

Mr. John Slater, B.A., said he had listened with great pleasure to the various papers that had been read. He did not think any one could appreciate, who had not investigated the subject, all the difficulties there were in the way of consolidating the present system of education to which Mr. Stannus had referred. Those difficulties were very great indeed, but he was sure that considerable help would be given by what had been done, and that a great impetus would be given to the educational work of the Institute by what had transpired that afternoon.

The Chairman said that Professor Roger Smith in his paper indicated an ideal teacher who should establish such a studio as he shadowed forth. Some little time ago he (the Chairman) happened to be in correspondence on the subject of education with a gentleman who had distinguished himself in the highest degree in the profession in the academical point of view, and in writing on the subject this correspondent referred to a gentleman whose unselfish and untiring energies in helping the students, and whose influence upon the circle of which he had been the centre, had been exceedingly beneficial to him in his studies, and from whose instruction and advice he had derived the greatest possible advantage. He (the Chairman) had also received an intimation entirely apart and distinct from Professor Roger Smith's paper that two gentlemen who were well known in the Institute, and who had distinguished themselves in various ways, had arranged and matured a scheme very similar to that which Professor Smith had shadowed forth. They had had the matter in hand for some months past, and were now actually in treaty for premises suitable for the purpose which they had in view in the immediate neighbourhood of the Institute; and when he said that one of those gentlemen was Mr. F. T. Bagnall, who had distinguished himself at the Institute,—as Pugin Student and otherwise,—and that the other was Mr. Walter Millard (the gentleman referred to,—and deservedly so,—in each high term by his correspondent), he thought they would say that in that combination Professor Roger Smith was seeking had been found. If those gentlemen succeeded in establishing the studio they must heartily wish them every success.

Mr. W. J. N. Millard said that what he and Mr. Bagnall had in their minds was almost the very scheme Professor Roger Smith had put before the Conference in his paper, though they had not been aware of what Professor Smith's proposal was. They were negotiating for suitable rooms, and they proposed to keep their atelier open all day, and also in the evening, at reasonable fees. It was proposed to have a library, casts, and models, and they hoped the whole thing would supply both a preliminary training to young men before they went into offices, and a supplementary training to those already in offices. There were a great

many things they thought of an office than in one. These things they proposed to assist the student in.

Mr. F. B. Osborn (Birmingham), on behalf of the Society he represented (the Birmingham Architectural Association), assured the Conference of the great interest they were taking in this question of education. Only recently the Mason Technical College in Birmingham had decided to open a course of lectures on Architecture and Engineering, and that course would, no doubt, be of great assistance. Those who resided in Birmingham were at a considerable disadvantage compared with the advantages gentlemen residing in London had in the Architectural Association and in the Royal Institute and the Academy school. They felt that in any scheme of education and examination which was established there should be guided from the commencement, so that he could know he was pursuing the right course and reading the right books. If there was only one examination a student in the country might easily find at the end that he was on the wrong course altogether, and for that reason he believed that there should be a division of the examinations,—preliminary, intermediate, and final. On that account they thought the guidance of this educational question should be left to the Royal Institute of British Architects. He thought the outcome of the papers and discussion that afternoon would be to that effect, and he would, therefore, move:—

"That it is desirable that the guidance and direction of the education of those entering the architectural profession should be undertaken by the Royal Institute of British Architects."

Professor Kerr seconded the motion. It was, he said, one of the most important functions which must depend upon the Institute very soon,—to become a more academical institution than it had been. He then explained what was done at King's College. A young man might enter King's College at sixteen years of age, and in the course of two years, if he had a head on his shoulders and paid attention, he would pass through the entire curriculum of applied science, including drawing, mathematics, physical science, engineering, and building generally. At the end of two years he might leave, and he was then fit to go into an architect's office under a very great advantage. Young men did pass out of King's College classes into engineers' offices at a salary. If on leaving the College he entered into articles with an architect for two or three years, and attended an atelier and the Royal Academy classes, at twenty-one he might become as thoroughly well educated as anywhere in Europe. He, therefore, strongly recommended that King's College should be kept in view, and he presumed University College also.

The resolution was put and carried unanimously.

Mr. Charles Aldridge (Liverpool) then proposed:—

"That, to realise this end, the Royal Institute of British Architects should prepare a scheme of a complete system of examination."

He, in common with most gentlemen present, had always felt the great want and the necessity for some supplementary system of education over and above that which the pupil received in a working office. In this matter he could remember the great advantage he received through being a member of the Architectural Association in London. When he went to Liverpool seventeen years ago, he endeavoured to bring before the Society a very similar system of education and classes to those existing in London, but unfortunately he did not meet with the success he anticipated. It was true that classes for design were formed, and were now going on; but he wanted other classes, more particularly for the study of construction; and in conjunction with some older members of the profession in Liverpool, he drew up a syllabus of lectures to be delivered. There were forty students belonging to the Society, and at the first lecture there were only two present, which was a discouragement to him. In consequence of that the lectures were abandoned. Recently, however, there had been some excellent lectures delivered for the assistance of students in architecture and civil engineering in connexion with University College, Liverpool, under Professor Hele Shaw, and several architectural students had availed themselves of those lectures, and he believed derived considerable advantage from them. As to the suggested system of education, he

thought it would be of immense advantage to young men in the provinces, and it could be best brought about by the system of federation which had been before the Royal Institute of British Architects for some time. He had always believed that that was to be one of the most valuable outcomes of federation; that was to say, that the Institute would give to provincial architects some of the advantages which gentlemen in London possessed, and which he was sorry to say they were still lacking in the country. Those in the country had none of the advantages of the courses of lectures that were delivered in the colleges in London, and they had no South Kensington Museum. If, however, the Institute would put them in the right way, and help to formulate a proper system of education in conjunction with the training that the students received in architects' offices, he believed it would be of immense value; and if federation produced only that result, it would be no small or mean one. The great difficulty they had to contend with in the provinces, and in every town, was to provide some stimulus to young men. How were they to persuade young men that there was something more to be learned than during the few hours they were in an architect's office? Unfortunately, some young men had got it into their heads that they had only to spend three or five years in an architect's office, and would then be turned out full-fledged architects. They could not do too much in enforcing upon young men that that was not efficient, and that, however clever they might be, they were not competent to practise as architects at the end of their articles. If the Institute, by formulating a system of education, would assist in that way, architects in the provinces and elsewhere would be very thankful to them.

Mr. G. A. T. Middleton seconded the motion, and, referring to a proposed Federation Bill, read one clause which, he said, permitted him to enjoin such a resolution as that. Of course, a qualifying examination was made compulsory in the Bill. It was intended to be compulsory that men should go through an examination before they were allowed to practise as architects. That Bill placed the Royal Institute of British Architects in its proper position as the sole professional examining body for the United Kingdom, and on that ground he had great pleasure in seconding Mr. Aldridge's motion.

The Chairman said although some little time must elapse before they could persuade Parliament to grant those powers to them or any other body, it was desirable that the Institute should pave the way to show how it could be done.

Professor Aitchison said he should be very glad if he could get his suggestion seconded, namely, that in drawing up this scheme for architectural education, the Royal Institute be particularly asked to make one course of examination to take in that which was purely necessary to enable the architect to design what was wanted properly; he wanted to have that which was necessary to know separated from that which was unnecessary.

The resolution was then adopted unanimously.

Mr. J. A. Gotch, President of the Architectural Association, moved:—

"That such system should comprise,—1st. Preliminary, for pupils entering the profession, as a test of general knowledge, those passing this to be 'Probationers, R.I.B.A.' 2nd. Intermediate,—for pupils in their third year or earlier, for those general principles of art and construction,—those passing this to be 'Students, R.I.B.A.' 3rd. Final,—pass examination to qualify for 'A.R.I.B.A.' at twenty-three years of age, or earlier. Note.—No subscription to be required from Probationers or from Students."

Continuing, Mr. Gotch said that no subscriptions need be demanded from the students or probationers, and some title should be given them. If they were called "Probationers" and "Students" they would assume a dignity and feel an interest in the Institute which they might otherwise not do. As the reason for proposing this resolution were practically given in his paper, he would not detain the Conference further.

Mr. J. Wreghitt Cannon (Leeds) seconded the motion, which was agreed to unanimously.

Mr. J. L. Robinson (Dublin) next proposed:—

"That this system should be arranged with the co-operation of the local societies, by whose agency

the details of the Examinations could be carried out."

He represented the Royal Institute of the Architects of Ireland at the Conference, and he might say on their behalf that they would be very willing to undertake the examination of all candidates who would present themselves in Dublin for examination. So far as he could see, the three questions of examination, registration, and federation were mixed up.

Mr. J. C. Moncrieff (Bristol) seconded the motion.

The Chairman said that in regard to Bristol he had a letter from Mr. Hansom, of that city, urging that Bristol should be made one of the centres for the Institute examinations, and stating that steps were now being taken to reorganise and bring into active operation the Bristol Society of Architects, and that hopes were entertained of good results. He had no doubt that what they had done that day would give fresh life in provincial centres, and if the co-operation of local societies could be obtained the examinations would attain an end they all desired.

The resolution was put and agreed to.

The Chairman said that it would be his duty as Chairman of the meeting to formally communicate the resolutions that had been passed to the Council of the Institute, and to request in the name of the Conference that they would take the necessary steps to organise a scheme for carrying them into effect.

Mr. Lawrence Harvey said he was entirely opposed to examination. There were other ways by which they could test a man's capacity. The competitions for the various medals of the Institutes could be made use of for examining men much better than any such examination as suggested.

The Conference then adjourned.

#### NEW MATERIALS AND INVENTIONS.

We last week\* published the paper by Mr. John Slater, B.A., on this subject. The paper, it may be mentioned, was very fully illustrated by drawings and specimens.

In the discussion which followed,

Professor Unwin said that the Chairman had called on him very unexpectedly to open the discussion. He had listened with great interest to Mr. Slater's paper, which dealt chiefly with matters which were not specially within the experience of an engineer. But he should like to correct one impression conveyed in the paper before it crystallised into an accepted conclusion. It was rather implied in the paper that wrought-iron columns were first used in America. In fact, they were used certainly as early as 1860 in this country. His first chief, Sir W. Fairbairn, had been mainly instrumental in introducing the so-called fireproof construction, in which cast-iron columns, cast-iron girders, and brick arches were used. The defects of these came to be understood, and certainly about 1860 Sir W. Fairbairn constructed buildings with wrought-iron columns, wrought-iron girders, and brick arches. Mr. Slater had referred to the experiments of Wöhler, as showing that the breaking-weight of a material depended on the variation of stress and the number of repetitions of the loading. Strictly speaking, the law that the breaking-weight depended on the variations of stress was known much earlier, but it took a long time before the demonstration of a law was succeeded by a full and practical recognition of its consequences. In the early experiments of the Railway Commission, in 1849, it was shown that cast-iron bars broke with half the statical breaking-weight when subjected to continued repetitions of load. Subsequently Sir W. Fairbairn carried out an experiment on a riveted girder, the results of which were registered from week to week by himself. The girder was subjected to continual loading and unloading for a period of two or three years. It broke with two-fifths of the statical breaking-load, and, after repairing, with one-third the statical breaking-weight after over one million changes of load in each case. He believed that this experiment suggested Wöhler's researches. What Bauschinger had done was to find the rationale of Wöhler's results. He had shown that the range of stress through which a bar was perfectly elastic was dependent on the kind

of variations of stress to which the bar was subjected. Now, if in any case the elastic limit came very near to the actual stress the bar rapidly deteriorated and broke. This matter was one more interesting to engineers than to architects, because engineers had continually to deal with cases in which there was continual variation or reversal of stress. A railway axle might be subjected to 200 million reversals of stress before it became unsafe. Still it was desirable that it should be known that the statical breaking stress was not, as commonly assumed, the exact measure of the structural value of a material. Two materials might have the same breaking stress in the testing-machine, and yet not be equally safe for given working stresses, when those stresses were continually varying. Professor Unwin apologised for saying so much on this point, but Mr. Slater had rather challenged him to say something further with regard to Bauschinger's experiments. He hoped that next day some of the members when visiting the Central Technical Institute at South Kensington would see ordinary statical testing of materials carried out.

Professor Babcock, of Cornell University, U.S.A., said that Mr. Slater's paper had interested him exceedingly. He would like to ask whether the use of porous terra cotta was at all prevalent in this country? It was made simply by mixing saw-dust with the clay. The value of it was that, having been burnt at a certain heat, it was perfectly fireproof, and although spongy, unless dipped in water it was not absorbent, but was rather a dry material, besides being one of the best non-conductors of heat and of sound. It weighed only about half as much as ordinary brick, and if it was desired to make a fireproof partition it could be laid on wood joists. It did not weigh more when plastered on both sides with one coat of plaster than an ordinary lath-and-plaster partition with three coats of plaster on it. It was of value to line outside walls with, in order that they should be perfectly dry; and nothing could be more admirable than porous terra cotta for fixing-blocks, because the nail could be driven into it more easily than into deals or ordinary pine, and held very strongly. Then, again, it was the best material for a fireproof roof. It was customary to take a T-bar and put the flange downwards, and between the flanges to lay sheets of the material, which could be had in pieces of almost any size. These were laid between the T-bars, and came up a little higher than the edge. The slates or tiles were nailed directly on this, and thus there was an absolutely fireproof roof inside and out. He might also add that fireproof flooring bricks were made of terra cotta, and were a great saving of weight. Now, supposing they wanted to leave their houses for a year, what did they do with the traps? The best thing to do was to take ordinary calcium chloride, which was the by-product of a chemical process, and was very cheap. This was exceedingly hygroscopic, having a great affinity for water; consequently, on leaving a house for some time the best thing to do was to flush out the traps, and leaving them full of fresh water and putting some of this material in, so that the traps would remain full of water for any length of time. Mention had been made of a simple small portable battery, but in America they had an invention which was exceedingly useful in connexion with the exhibition of lantern slides for the purpose of illustrating lectures. A simple portable machine had been invented into which a certain fluid was put, and which was able to supply an electric light for the lantern, sufficient for four hours' exhibition. Some reference had been made to the use of stamped wood-pulp for ornament. That had been used a good deal, but had been now superseded by real wood ornament. The great objection to those things was that they were so "inferentially cheap" that everybody used them. There was no doubt they were exquisite specimens of what could be done by machinery; they were done on the end of the grain, and in many different kinds of wood, which was steamed, and by heavy pressure from a steel die. The ornament was produced as sharp and clean as anything could possibly be made. Indeed, as far as it went, it was the very perfection of ornament.

Mr. William Woodward remarked that it might be due to his obtuseness or want of due appreciation, but for some considerable time past he had been under the impression that the readers of papers at that Institute had somewhat disregarded their audiences by reading

communications which were, to his mind, more fitted for the Architectural Association, or for students of architecture (oh, oh!). In saying this he did not wish to say a disrespectful word about the Architectural Association. But that night they had had a paper of a different character to what they had been accustomed to hear in that room for many years, a paper full of the greatest possible interest to many who were practising as architects. And although many of the inventions and materials mentioned by Mr. Slater were well known to them, he had shown such a remarkable grasp of the details connected with these inventions and materials that he had been able to produce a paper of considerable value, and to teach them a great deal more than they knew before. As to the steel decking, some years ago Mr. Lindsay pointed out to him its wonderful advantages, particularly with reference to the enormous weight it would bear and the slight depth of the floor. With regard to lifts, he would be very pleased if any man who manufactured these would do something to prevent accidents, and deaths, such as had recently occurred through persons falling down the shafts made for the lifts. He was not aware from Mr. Slater's description of the Otis lift whether the immediate stoppage necessitated action on the part of some of the attendants. Referring to the veneering material, for cheapness, sharpness, and beauty there was nothing that struck him so much at the recent Building Exhibition.

Professor Kerr remarked that though Mr. Woodward was an exceedingly able man, he sometimes allowed his words to run away with him, and on that occasion he ought not to have cast discredit on the papers that had been read before the Institute, and some of which were exceedingly valuable (applause). He would like to ask if any one present could tell them a little more about the probable services of steel in building? They knew that rolled iron, although an invaluable material, had very serious faults; and that as regarded fireproof work, when they came to the City of London and the wharfs by the water-side it was hopeless to produce anything unless it were a building similar to what engineers erected for resisting shot. The use of iron, he might say, had never yet been brought into such a condition as to be absolutely safe, and he would like to know if there was any chance of improving on this state of things by the introduction of steel? The question of fireproof building was a most important one, not merely in regard to Mr. Slater's suggestion that the offices which were now chary of insuring these buildings might be induced to do so if they were better constructed, but also with regard to the comfort of the whole community and the general safety of property, which now became a large consideration in a place like this metropolis. Professor Kerr concluded by moving a vote of thanks in the very warmest manner to Mr. Slater, who, he said, was a man of great promise and one whom he had admired for years for his behaviour in that room.

Mr. Ralph Nevill, F.S.A., remarked that he had endeavoured to find some way of improving the fixing of weather tiles, because he had worked a good deal in Surrey. He was discontented with the manner in which they were generally fixed, by either being nailed to the battens or boards. One constantly found the boards rotting away in about twenty years at the outside, and there were many other difficulties and objections. People had tried nailing them into the joints, but that, again, was objected to by many; and there seemed also to be the difficulty of the gauge coming wrong. A gauge of 3 in. was too small for tiles, 4 in. being about the ordinary gauge for weather tiling. What he had done was to get some blocks made, 1½ in. in thickness, and generally for the top story of buildings to run in the inside of the wall two carriers and stretchers and a course of headers. They thus got a course to each course of tiles. The objection might be met by varying the battens, but in the arrangement before them the battens came only 3 in., and it was not practicable. Weather tiling ought to be headed between the two tiles, and if they could get close to the wall, the little space between the wall and the heading might be filled up with cement. He was sorry that the veneered wood had been brought there. They would agree with him that they could not have cheap art; they might have plain things, and do well; but when they went in for ornament, it should be good and costly.

\* *Builder*, May 7, Supplement, pp. 703-6.

Mr. William White, F.S.A., seconded the vote of thanks, and added that they must have all learned a great deal from Mr. Slater's paper. At the same time, he should be sorry indeed to pass any intimation that certain papers delivered in that room had not been equally valuable, although they took a very different line. Theory and practice were equally essential, though practice came down more to the level of everyday life in working out to a great extent what theory had been able to suggest. With reference to the use of overhanging tiles, it appeared that the porous terra-cotta could be produced as cheaply as brick, and if the outer half brick of the wall were built with that material it would receive the nails for the tiling at whatever place they might choose, without there being any necessity for limiting the bond to the brick courses. They had seen some interesting specimens of square turning that evening, and he remembered being shown the mode of drilling a square hole by a very simple contrivance. Therefore, if that could be done, he did not see why a square haluster should not be turned.

Mr. Edwin T. Hall said that Mr. Ralph Novill had referred to the difficulty in fixing tile hanging on 3 in. courses. There were, however, two ways of getting over the difficulty. He did not see why the bricks should not be used on edge  $\frac{1}{2}$  in. high, when the tile-hanging could always be fixed to the joint. No doubt in some local districts, among them, he believed, Tunbridge Wells, it was against the rules to use bricks on edge, but there again the difficulty was easily got over. He invariably nailed the tile into the joints, using as a rule 3 in. nails, and preferably French nails. Where the 4 in. gange would not work the tiler punched out a small hole at the side of the tile, the result being that the 4 in. gange was got and the nail driven through the side of the tile. With regard to the mode of fixing hooks for floors he could never see why it was necessary to have a space under the floor-board at all any more than to have a space at the back of the dado. In his practice he had constructed floors with coke breeze concrete, nailing the floor-board into it. The concrete could be floated to a perfect surface and the nail would hold absolutely. Of the merits of the P-trap, which had been referred to, there could be no question, but he considered that the separate air-shaft shown could be dispensed with and a much better thing introduced. That shaft was, to a certain extent, charged with foul air, and when a flood of water came running down the large soil-pipe it drew this air down the smaller one. Some time since he had to erect a building containing 120 water-closets in various ranges, and in lieu of having a second shaft he carried the small pipe through the wall to the open air, and used a mica valve. By that means fresh air was constantly brought into the branch, and this was more sanitary than having two shafts balanced with foul air. Mica valves were stated to have a tendency to decay, but that had not come under his notice.

Mr. Lindsay, of Paddington, said that his firm had tested mild steel very fully, and that the experience thus gained had led them to make the material used in their flooring as nearly as possible approximating to best Low Moor iron, namely, having an ultimate tensile strain of from 26 to 28 tons per square inch, and giving an elongation of about 24 per cent. So tough was the material that a hole might be punched within one sixteenth of an inch of the edge of a bar without hursting or breaking the steel.

Mr. Smallpeice (Assoc. M. Inst. C.E.) remarked that the mild steel spoken of was in reality almost pure iron. The difference between cast iron and steel was only in the proportion of the carbon, pure iron containing no carbon whatever. The steel generally used for girder-work and plates contained perhaps two-tenths per cent. of carbon, and directly it got to 0.5 it became almost tool steel, while at 1 and  $1\frac{1}{2}$  it became cast iron. He wished to know what proportion of carbon the mild steel contained, so as to be able to understand what it was, and to find out its strength to resist compression. What had been spoken of was in reality pure iron.

Mr. James Donlon said he had seen the slabs mentioned by Professor Balcock at Chicago some time since. He understood they were used for tiling at the waterworks after the very severe fire in that city. He brought some away with him. It was no doubt sur-

prising to find that the introduction of sawdust enabled one to drive a nail into the material as firmly as into wood. While it was a good fireproof material, he failed to see that it could be used for the fireproofing of floors. It seemed to him that by the introduction of the sawdust the clay lost a great deal of its density, and would be liable to be crushed up under very heavy strains. He was quite willing to admit that they had derived the idea of their floor from America, and in consort with Mr. Basil Peto had carried out a system which they believed to be very valuable.

Mr. J. P. Seddon remarked that they all knew the extreme difficulty of finding any material that would take colour decoration. Colour when applied to walls continually failed, while mosaic was difficult, and not altogether satisfactory. He had, however, lately seen a material invented by Mr. Heaton which was well deserving the attention of architects. It was on the principle of *cloisonné* work, and could be applied in large sheets of about 6 ft. by 3 ft. There was a metal lining, as in *cloisonné*, and it was filled in with colour. The material was washable, and altogether was most admirable for decoration.

Mr. Gibson (of the American Lift Co.) said that on the Continent the suspended lift had been prohibited, on the ground of being unsafe, and quite recently a contract had been taken in the City of Berlin, but the carrying out of it had been prohibited. A report had, however, since been prepared on the question, and the result was that permission had now been granted, for the first time, to erect the suspended lift.

Mr. H. H. Collins remarked that he would have liked to have heard something about the cost of the different materials referred to that evening. As a practical man he found that the glass-lined pipes, such as Mr. Slater had mentioned, might be beautiful and useful, yet if he were to specify them, he was sure it would so enhance the cost of the building that it would frighten his client, and the quantity surveyor would, in reduction of estimate, omit the item from the contract. He remembered a tin-lined pipe, but he found the utmost difficulty in getting plumbers and engineers to use it, on account of its expense, and the labour involved in fixing it. This was also the case with many new inventions, which, though they appeared so admirable when brought to their notice, yet were really prohibitive on account of cost. He hoped, therefore, before the paper became part of the Transactions of the Institute, that Mr. Slater would give some idea of the cost of the several inventions referred to by him.

The Chairman (Professor Aitchison, A.R.A.) added that he had had considerable experience of such prices, and knew they were utterly fallacious.

The vote of thanks was then put, and was most cordially received.

Mr. Slater, in his reply, said he had thought of mentioning the cost of some of the things he had referred to. In the case of the glass-lined pipes, however, it was only within the last few days that they had become a practical thing, and, to the best of his knowledge, he believed that when the trouble of making the joint was taken into account, they could be put into a building at a little beyond the cost of lead piping. He had only intended to call attention to the several inventions, and if his hearers wished to know the prices, they must apply personally to the manufacturers. He knew as a fact that the glass-lined pipes had been in use for two years at a large vinegar factory, and that very great improvements in the jointing of them had since been made. From what he had seen of the American lift, he believed it was, humanly speaking, absolutely safe. It had often been found desirable to have square water-pipes on the fronts of buildings, and after experiments extending over some years, Mr. Hellier had at last devised a square-drawn lead soil-pipe. He had to thank Prof. Balcock for his remarks, because he had been able to tell them from practical experience a great many things they did not know.

The Conference then adjourned to the next day.

#### ARCHITECTURAL FEDERATION.

The fifth meeting of the Conference was held on Thursday afternoon in last week. The business before this meeting was to discuss the Report of the Special Federation

Committee of the Royal Institute of British Architects, prior to its consideration by the Council.\*

The Chairman (Mr. John Holden, of Manchester), said that the question before them was that of Architectural Federation. The Committee appointed on the 1st of March had gone into the matter very carefully, and he need hardly say that it was a subject requiring care to ensure the matter being dealt with both on a broad basis and also with a view of meeting the wishes of the metropolitan and provincial members of the Institute. They would see that in addition to the metropolis, the following towns were represented on the Committee itself, namely, Bristol, Darlington, Glasgow, Liverpool, Leeds, Leicester, Manchester, Nottingham, and Winchester, thus embracing a wide range of country. The question was one that was deeply interesting to the whole of the members of the profession, as the object was to form some sort of union between the members of the profession throughout the country, which did not at present exist. It was true that there were already architectural societies in different parts which were doing good work, but they were, for the most part, entirely local, and unconnected either with the Institute or with the corresponding societies in towns in their immediate vicinity. Of course he did not mean when saying "unconnected" to infer that there was no interchange of courtesies or ordinary civilities between them, such as the passage of papers, but so far as their work was concerned they were absolutely alone. That want of connexion between the societies appeared to him to be a great disadvantage, not only to local societies, but to the Institute; indeed, perhaps more to the former than to the latter, because the Institute, from its position, its age, and numerical strength, must of necessity exercise a very great control over the profession wherever the members were situated. The public were also interested in obtaining the best advice they could have, and when the public found that customs differed in different towns and places, they were sure to come to a conclusion somewhat disparaging to the profession at large. In the consideration of this question by the Committee the first thing was to find out really what "Federation" meant, and that was not at all an easy matter. Different people had different views, and they would see from the Report the view the Committee took of it, namely, that the object of federation was "to establish a closer union than now exists between architects generally throughout the British Empire, with a view to promoting the advancement of their art, harmony of practice, and intercommunication." Many people did not take this idea of federation, their view being that it was some sort of trade union. The Committee, however, did not take that view. In considering the question, a few matters seemed to force themselves upon the Committee almost as precedent conditions. The first was that the Institute, as the best known and oldest chartered body of architects, as well as being the largest numerically, and being located in the Metropolis, should be the centre of any scheme of federation. Secondly, that the provincial architects might be most readily reached through the existing societies, which already had gathered to themselves a considerable number of individual members from the surrounding districts. Thirdly, that as each local society would naturally feel itself of great importance in its own district, as little interferences possible should be suggested with it, and that in each case it should retain its identity and control the expenditure of its own funds. Fourthly, that no financial or other responsibility should be assumed by the Institute or by any of the other societies with respect to others. Those four conditions seemed, as it were, to force themselves upon the notice of the Committee first; but then, as all federated bodies must have a common basis to start from, it seemed to follow naturally that the scale of professional charges and practice should be that basis; therefore the one recommended by the Institute was proposed to be adopted in its entirety by the whole of the societies. He thought he might at once say that that scale or schedule was adopted by almost all the societies,—certainly in spirit, and by many even to the letter. If he was not mistaken, Leeds, Liverpool, and certainly

\* This was printed in extenso in the Builder for April 23.

Manchester had adopted it in its entirety. It was very probable that some little alteration or revision would be required in the schedule to meet little local customs, but when that was done, it was proposed there should be one scale or schedule ruling throughout the country. It should be borne in mind that that schedule or scale was not a compulsory one. It had never been put forth by the Institute as compulsory, and was not proposed to be so put forth now. It would leave each member to use his own discretion in dealing with his own clients, so long as he made no arrangements that were not absolutely antagonistic to it. And with the view now of carrying out that scheme of professional union, it was suggested that the Institute should organise visits to certain towns where there were not at present any societies, and that it should assist as much as possible in the formation of such. Conferences should be held, sometimes in provincial towns, and sometimes in London, and every encouragement should be given by the Institute to provincial societies in promoting the education of the younger members of the profession, and also in the formation of libraries and in dealing with Examinations. Those Examinations in Architecture should be established in different towns wherever the society which represented it could bring together a certain number of candidates. At present those Examinations had been held in Glasgow, Manchester, and Leeds, but what was proposed was rather a different affair altogether. Under the present arrangements the Examinations were held at the option of the Institute, and the provincial society had to come to the Institute and ask where they would hold an Examination. That was rather an awkward thing to do, because the local society could not begin to look up the students or candidates until they knew whether the Examination would be held. It was one of the difficulties they had in Manchester, but it was now proposed to leave that entirely in the hands of the local society. It would be a permanent institution, and as soon as the society could bring together a certain number of candidates, they would go to the Institute and ask that an Examination should be arranged. That Examination, of course, would qualify, as now, for the admission of Associates. Then, with the view of giving the provincial societies a direct interest in the Institute, it was proposed that the President of a provincial society, should be a Fellow of the Institute, should be *ex officio* a member of the Council of the Institute, and that would, of course, give the provincial members a full representation in all the discussions of that body. The provincial members would, in fact, be as well represented as the Fellows themselves. Now, with a view to strengthen both the Institute and the provincial societies, and to meet an objection which had been made, it was also proposed that any Fellow or Associate of the Institute who was also a member of a provincial society should be entitled to a drawback on his subscription to the amount of 25 per cent. That would practically clear him from his subscription to the local society, for he believed that the subscription to most of these societies was about a guinea per annum. That would certainly be a benefit both to the local society and to the Institute, because there would be no reason for any member of the Institute not belonging to a local society. It would cost him nothing, and any person would naturally wish to have the benefit of both societies (applause). It was also hoped that it would induce many provincial members to become members of the Institute itself. It was further suggested that the vexed question of quantities should be dealt with by an authoritative statement from the Institute. That, he believed, would be welcomed by all the members of the provincial societies, as it was most important that something should be done, and the Institute was the only body that could do it. A statement reported to have been made by Lord Coleridge, in a case recently before him, showed the necessity for positive action with regard to the question by the architects of the country, and that action could only be taken through the Institute. The statement made was this,—that, apart from actual contract, it was quite monstrous that the employer should pay for quantities,—that was, that he should pay for that which it was the duty of the architect to do. That judgment would show the necessity for dealing with the question. Some other suggestions had

been made which interested the members of the Institute perhaps more than the provincial members. One was in respect to the issue of certificates to those members of the Institute who were in a practice. The object of that was to give some distinguishing mark to the members of the Institute, and of course the same thing could be done by the provincial societies if they thought proper. He referred to some distinguishing mark by which the public would know that a gentleman holding the certificate belonged to some learned society; and it was hoped that, being put up and exhibited in the offices of the holders, in time they would be looked for by the public, and recognised as some guarantee, not only of the holder's efficiency, but also of his honourable conduct and position. Finally, he would remind the meeting that under the existing regulations all Associates were required to pass an Examination before admission, and, after a certain time, even the Fellows would not be elected, except under certain circumstances, without satisfying the Council as to their ability and proficiency. In that way the status of the coming generation of the profession would be kept up, and it was of course anticipated that provincial societies would show every care in respect of the parties whom they admitted to their bodies. That was a matter of great importance, because there always had and would be a large number of gentlemen practising as architects,—or at least doing work which architects thought ought to come to them,—who, neither by education nor by position, were entitled to admission either to the Institute or to the local societies. It was impossible to get rid of those gentlemen. They were satisfying the public, and it would be a long time before they could be prevented from accepting commissions from their clients. The aim of the Conference, therefore, should be to make the membership of the Institute and of the societies a guarantee, as much as possible, to the public of the efficiency of the members, so that in time the public would find out that if they travelled beyond the societies in their search for an architect they were on dangerous ground (applause).

Mr. J. A. Gotch remarked that he would like in the first place to refer to the question of the Probationers. Clause 2 of the second page of the Report said:—

"That as the Royal Institute is the recognised representative body of the profession throughout the Empire, the prestige and advantages of membership of the Royal Institute shall not be obtainable by any person in any way short of actual membership."

It had been decided "to establish," as it were, two other orders of the Institute, namely, "Probationers" and "Students," who were to have certain advantages through belonging to the Institute, without having to pay a subscription. In so far as that arrangement conflicted with clause No. 2 he had no doubt the Council would arrange matters so as to embrace members of those two orders which he had referred to, who, while not being actual members, at the same time would have a certain prestige attaching to them from their new position. In asking provincial architects to become members of the Institute he thought that body should be careful how far they treated those gentlemen in matters not strictly connected with architecture as an art. In large towns it very often happened that an architect was an architect pure and simple, and had little surveying work to do. Such a man was not called in as a surveyor only, his chief work being designing buildings and superintending their erection. On the other hand, in smaller towns it so happened that architects had to undertake additional duties. From the force of circumstances they were compelled to be surveyors to the various local authorities, and it seemed to him that the Institute should be careful how it approved of regulations likely to hamper such persons, because it was obvious that gentlemen practising in the country could not escape those engagements if they were to be efficient members of society. If, therefore, such appointments were to clash with the regulations to be laid down by the Institute, the latter would be in danger of losing a great many men who would be of advantage to it. He would like to point that out at an early stage so that the matter might have full consideration (hear, hear).

The Chairman remarked that he had not noticed anything likely to clash with the duties of the provincial architect, which must, of necessity, have a somewhat wide range. Nothing

should be done in the way of hampering the provincial members, though they would, of course, have to satisfy the Council of the Institute as to their eligibility to become Fellows or Associates.

Mr. Gotch said it was the rule that a Fellow of the Institute could not survey other people's work, except as a referee.

Professor Roger Smith said he did not think the question of the Fellowship of the Institute was before the Conference. What they had to deal with was the question of a federation of societies.

Mr. H. D. Appleton (Hon. Sec. of the Conference) then read the several numbered clauses of the Report.

In considering Clause 1 of the Committee's recommendations,—

"That this object may be best attained by connecting the various local societies which exist, or which may hereafter be formed, with the Royal Institute of British Architects,"

Professor T. Roger Smith said he thought it was not sufficiently definite. It was desirable that it should be distinctly understood that the societies were composed of architects, and were not merely archaeological or antiquarian societies.

Mr. Charles Fowler said he believed that most of the antiquarian societies were chiefly composed of architects.

Mr. J. W. Cannon (Leeds) said he thought it would be well to leave the clause as it stood. If a line were drawn too tightly, it might exclude some society which was a combination of architects and archaeologists. It was a positive necessity for the cause of Federation that this clause should be passed in its present form.

Professor Smith moved the insertion of the word "architectural" before the word "societies," but on being put to the meeting, it was lost, and the original wording was agreed to.

On Clause 2,—

"That as the Royal Institute is the recognised representative body of the profession throughout the Empire, the prestige and advantages of membership of the Royal Institute shall not be obtainable by any person in any way short of actual membership."

Mr. Gotch said he thought that Students and Probationers should not be excluded from the use of the Library.

Professor Kerr said he considered that the word "prestige" ought not to be used by professional architects. It was a term involving a certain idea which might be better expressed by the word "position." He would, therefore, move that "position" should be substituted for "prestige."

Mr. Ralph Nevill said he agreed with Professor Kerr, believing at the same time it was well to avoid using foreign words. He did not know that he had any objection to Probationers, but he did object to the multiplication of orders and degrees in an Institute of that sort, which had quite enough of them already.

Professor Kerr's suggestion was then agreed to, and the clause was passed as amended.

Clause 3 was next discussed,—

"That for the purpose of making known in country districts the advantages of professional union, and in order that societies may be formed where they do not now exist, with a view to federation, the Council of the Royal Institute shall organise visits to such localities as may be deemed expedient."

Professor Roger Smith inquired what was meant by a "visit." Did it mean a deputation?

Mr. E. T. Hall said he believed it would mean that a gentleman would go down to speak on the advantages of the Institute, and meet the members of the profession in the district.

The clause was agreed to.

The following clauses were agreed to without comment:—

"4. That, with the object of bringing provincial architects more in direct association with the Royal Institute, the Council be requested to arrange that, in future, Conferences be held sometimes in London and sometimes in the provinces."

"5. That, in the case of any candidate for membership of the Royal Institute not being personally acquainted with the number of Fellows required by the By-laws to propose him, power shall be given to the Council, if satisfied with his qualifications, to nominate him by special resolution."

"6. That the subscription for provincial or colonial members in each class of the Royal Institute shall be the same as that for metropolitan members, less the amount paid by the former to any local society federated with the Royal Institute, but in no event less than three-fourths of that paid by metropolitan members."

The next clause elicited some discussion. It stood as follows in the Report:—

"7. That, in any arrangement to be made, the federated Societies may retain their identity and name, and shall

still, as now form local centres; and that they may style themselves the "Royal Society, federated with the Royal Institute of British Architects."

Professor Roger Smith remarked that the Chairman in his opening address had stated that not only would the Institute issue certificates of membership, but that the local societies had also a perfect right to do so.

The Chairman.—May do so.

Professor Smith said that a gentleman who could not become a member of the Institute might yet, as a member of one of the federated societies, procure a certificate. That would be very much the same in the eyes of the general public as if he had a certificate of the Royal Institute of British Architects hanging up in his office. Therefore the addition of title seemed rather a dangerous thing and should be looked at with some degree of caution before being adopted.

Mr. J. Douglass Mathews said he thought that any addition to the certificate proposed to be given was very undesirable.

Mr. J. L. Robinson (Dublin) said he believed that the members of local societies would find it to their advantage to become members of the Institute. It would really be of advantage to them to give up their own societies (No. 10).

Mr. E. T. Hall explained that the result would be quite the other way, the object being that members should have the benefit of the two societies.

Mr. Edwin Seward (Cardiff) said that, as a country member, he had always regarded his membership of the Institute as extremely valuable, because of the position of that body in the capital of the Empire. Therefore as the status of membership must hang very much on the centre of the Institute in London, the ability of any local society to grant certificates of efficiency must of necessity endanger the position occupied by the members. Local societies might be well or imperfectly governed, and any imperfect government would reflect upon the value of the certificates.

Mr. Ralph Nevill said he did not see how it was possible to prevent a local society from giving a certificate, and if the society was federated with the Institute he could see no objection to the arrangement. What they wished was that the local societies should have some benefit out of their federation.

Mr. Hall remarked that the By-laws of every federated society would have to be submitted to the Institute, and care would be taken that only competent provincial men were admitted.

Clause 7 was then put and agreed to.

The following clauses were also agreed to *nem. con.* :—

"8. That the constitutional rules or By-laws of federated Societies shall be subject to the approval of the Royal Institute.

9. That the Royal Institute shall not interfere in the management of any federated society, and *vice versa*.

10. That the Royal Institute shall not be responsible for any acts, expenses, or other liabilities, which may be done or incurred by any federated Society, and *vice versa*."

Clause 11 was next taken into consideration. It was submitted as follows:—

"That each federated Society shall adopt the 'Schedule of Professional Practice and Charges of Architects' sanctioned by the Royal Institute as the custom of the profession, and may, so far as may not be inconsistent with the spirit of such Schedule, arrange specific terms for the guidance of its own members."

Professor Kerr asked what was meant by local societies arranging specific terms for the guidance of their own members.

Mr. F. N. Kemp suggested that that the word "sanctioned" should be altered to "authorised."

Mr. E. T. Hall remarked that in certain localities there were branches of architectural practice which did not obtain in London. It was therefore suggested that those words should be put in, and it seemed to the Council to be a reasonable thing to do.

Mr. Dawson said he thought they were fully protected by the words,—"so far as may not be inconsistent with the spirit of the Schedule."

Professor Kerr said he considered the clause a dangerous one. He was told by a gentleman present that he had a letter in his pocket in which the writer affirmed that the Schedule of the Institute had no effect in law. Now, the matter had been thoroughly threshed out two or three weeks back, and it would be well to publish the discussion which then took place for the information of gentlemen such as the writer of that letter. It was the custom of the

profession, and was recognised as such in all courts of law throughout the country. It was only when a dispute came on that the Schedule was in request, and then the dispute was settled by the universal custom of the profession. The Schedule, indeed, represented what they had ascertained twenty-five years ago in those rooms, after careful investigation, to be the recognised and universal custom.

Mr. Robinson (Dublin) remarked that the scale of the Institute had been adopted by the Irish Institute and by the Irish judges. The only difficulty he had found was that the architects had no legal right to the drawings.

Mr. Octavius Hansard moved that the words beginning with "and may," to the end of the clause, should be excluded.

Mr. L. C. Riddett seconded the proposition.

Mr. Dawson deprecated too much dictation to provincial societies, such as preventing an arrangement with clients. Perhaps the word "specific" was somewhat ambiguous, and that part of the clause would read better as follows: "arrange terms for special works for the guidance of its own members."

Professor Kerr suggested that the meeting should pass the first part of the clause down to the words "of the profession." In the year 1872 the word "Rules" was inadvertently introduced into the heading of the Schedule, and had done infinite mischief. In 1882 it was obliterated, and the document now stood as the "Schedule of Professional Charges sanctioned by the Institute." It had no force except as a declaration of ascertained custom, so that if the society in Liverpool wished to make any rule for its own guidance it would only be for ascertaining, and recording, and proving the custom in a court of law. The document had no force but as an affirmation of that which could be proved as the custom. Therefore provincial societies could make what rules they pleased so long as their clients would agree to them, but those rules could not be introduced into a court of law except as a declaration of custom they were prepared to prove. He suggested the use of the term "supplementary" instead of "specific."

The Chairman said that the Schedule published by the Institute, and adopted by the federated societies, was the only one that could go forth as the custom. But there was no reason why the Liverpool or any other society should not make additional rules for their own guidance, though only as a supplement.

Mr. David Thomson (Glasgow) said that the Institute of Architects in Glasgow had had a similar schedule to that of the Royal Institute of British Architects for a considerable period of time. It differed in some things from the R.I.B.A. schedule, but he had no doubt that the Glasgow Institute would be ready to co-operate in the arrangement for one schedule. But as there were a good many "agents" practising in Glasgow, he was afraid it might prevent that, as in many things the custom in Scotland was different from that prevailing in England.

After some further discussion, the clause was passed in the following form:—

"That each federated society shall adopt the 'Schedule of Professional Practice and Charges of Architects' sanctioned by the Royal Institute as the custom of the profession, and may, so far as may not be inconsistent with the spirit of such Schedule, arrange terms for the guidance of its own members in questions not covered by the Schedule."

Clause 12 was next considered. It ran as follows:—

"That the President of any federated society which numbers twenty-five members in independent practice (provided that such President be a Fellow of the Royal Institute) shall, during his term of office, be *ex officio* a Member of Council of the Royal Institute."

Professor Kerr said he thought this clause objectionable, because how could they have twenty or thirty *ex officio* members on the Council?

Mr. Worthington said he did not believe there were more than three societies that would number more than twenty-five members.

Mr. Hall explained that in this case the precedent of the Incorporated Law Society had been followed.

Mr. Aldridge (Liverpool) said he considered this the most important part of the whole thing, and he was sorry that the clause met with any opposition. It was the great connecting link desired to be established. In the case of Liverpool, they had only once had the privilege of being represented on the Council of the Institute, in the person of Sir James Picton.

Mr. Cole A. Adams said he agreed with Mr. Aldridge.

Mr. Connon (Leeds) added that if the clause were not agreed to in spirit he believed the country members would have nothing to do with "Federation." He would, however, move as an amendment:—

"That any federated society which numbers twenty-five members in actual practice may appoint one person as a Member of Council of the Royal Institute of British Architects, provided always that such person is a Fellow of the Institute."

Mr. Moncrieff (Bristol) seconded the amendment.

Mr. Robinson said he considered that the whole value of the Federation scheme centred in the clause being passed.

Professor Kerr then proposed that the words "*ex officio*" be omitted, which was seconded.

Mr. Silvanus Trevail (Truro) said he thought that if a gentleman became the president of a society of architects in a provincial city or town it should be sufficient guarantee of his being fitted for election on the governing council of the Federation.

Professor Smith said that after what he had heard he was prepared to vote for the clause.

After some further discussion and voting the clause was passed without change.

The following clauses were also agreed to:—

"13. That the Architectural Association of London shall be always represented on the Council of the Royal Institute.

14. That the federated societies be encouraged by the Royal Institute to afford every practicable assistance to students in their preparation for the Examination in Architecture, and with that view to form libraries of books of reference in accordance with the list issued by the Royal Institute.

15. That local Examinations in Architecture, to qualify for candidature as Associate of the Royal Institute, shall be held, under the control of the Royal Institute, at the instance of any federated society, or group of such societies, which shall bring together a minimum of applicants for such Examination.

16. That professional members of all federated societies, and although not members of the Royal Institute, and residing not less than twenty-five miles from London, shall, on showing their cards, have the privilege of attending meetings and using the Library of the Royal Institute during a stay in London for a period not exceeding one month.

17. That the federated societies shall transmit to the Royal Institute information affecting the profession generally, together with short reports of the proceedings of such Societies, which may, if considered desirable, be published in the *Journal of Proceedings*.

18. That, as a means of intercommunication, professional notes and remarks shall be published (referring to Papers read at the Royal Institute, or to other subjects of interest) in the *Journal of Proceedings*, which may be communicated by members and others."

The meeting next discussed the first part of Clause 13, viz.:—

"The Committee also recommend, as a means of furthering the interests of the Royal Institute in particular and of the profession generally, that the Royal Institute shall give its opinion publicly to the effect,—" (a) That the taking out of 'quantities' is no part of an architect's duty to his client as an architect."

On the motion of Mr. Riddett, seconded by Mr. Hall, the words "as a means of furthering the interests of the Royal Institute in particular and of the profession generally," were omitted from the clause.

On the second part of the clause, ("b) That there is no reason which should debar an architect from practising as a quantity-surveyor, should he think proper to do so, and from receiving payment for such services."

Mr. Cole A. Adams said he would require to hear some strong arguments before he voted for quantity surveyors being elected to the Fellowship of the Institute.

Mr. Thomson (Glasgow) remarked that in Scotland the taking out of quantities was not altogether a separate occupation, and was done by what were termed "house-measurers." In Scotland the architect was permitted to take out his own quantities, but on no account to take out quantities for another architect's plans. Scottish architects would consequently look on a clause of this sort with some considerable distrust.

Mr. Thomas M. Rickman contended that it would be a great advantage if quantities were prepared more generally by special practitioners, when they would be able to get rid of some of the very grave scandals which had arisen in London and the country. He hoped the object of this clause would be recognised,—not that they wished to alter the present position of affairs for the purpose of benefiting any particular branch of the profession, but that they desired to place the By-laws of the Institute in such a state that the members generally who were practising in the country could join the Institute.

After some further discussion the following amendment was carried with only two dissentients:—

"That there is no reason which should debar an architect from preparing the quantities for the works to be

executed under his own superintendence, and from receiving payment for such services."

The third section of Clause 19 was next considered,—

"(c) That when an architect acts both as architect and as quantity surveyor for the same building, he should act in his capacity only with the previously-expressed concurrence of his client, who should also be informed in what way the charges for the 'quantities' are to be paid."

Mr. Watkins proposed as an amendment:—

"That the following words be added to the clause,— 'That when an architect employs an independent surveyor to take on the quantities for any building work for which he is himself the architect, he should do so with the previously-expressed concurrence of his client, who should also be informed in what way the charges for the quantities are to be paid.'"

A further amendment was also proposed to the effect that all the words of this section of the clause after the word "client" should be omitted.

Both amendments were defeated, and this part of the clause was passed as originally submitted.

The meeting then passed the following clauses of the Committee's Report:—

"20. That the foregoing paragraphs (a), (b), and (c) shall be incorporated in the 'Schedule of Professional Practice and Charges of Architects,' sanctioned by the Royal Institute; and that the Royal Institute shall draft rules for the guidance of those of its members who practise as quantity surveyors."

They further invite the consideration of the following:—

A. That the Royal Institute shall issue certificates under its seal to all and every of its members who are in practice, which certificates the Royal Institute suggests shall be exhibited by the members in their offices as evidence to the public of the holder's efficiency and assumed responsibility, and that the certificates shall be the property of the Royal Institute, liable to be revoked, and to be re-called, if considered advisable, by the Council.

B. That the use in the Royal Institute, for certain purposes, of voting papers transmissible by post, and the extension of the Associates' privileges provided for in the Supplemental Charter, will tend largely to the expansion of the Royal Institute itself, and greatly aid the objects of Registration.

The large question of compulsory registration is not within the scope of the Reference to the Committee, but they desire to point out that, should the proposals they have made be adopted, there will have been established a better organisation than now exists for eliciting the opinions of the profession generally on that important subject."

Mr. Herbert D. Appleton then read the concluding clause:—

"The Committee also feel that the following suggestion, made by Mr. Rickman, does not come within the scope of the Reference to the Committee:— 'That the employment of an architect to prepare quantities for works under his own superintendence, or the concurrence of the client in the appointment by the architect of a quantity surveyor, will give the quantities so prepared the same position in the contract as that of the drawings and specification.'"

Mr. Rickman said he would be sorry if the Conference endorsed the opinion expressed by the Federation Committee. There had been strong arguments put forward in favour of making the quantities furnished by the architect, or any one he employed with the client's consent, a part of the contract. The moment those papers were recognised as having been put forward before the builder to prepare his estimate as any part of the basis of his calculations, they became as much a part of the contract as the drawings and specification. He should be sorry if the Conference lacked the strength of mind necessary to attack this subject.

Mr. Murgatroyd (Manchester) thought the Conference was not in a position to upset that part of the circular.

Mr. Riddett said that as the Committee had only one quantity-man upon it, its recommendations on that point did not carry much weight.

The sitting was closed by the passing of the following resolution:—

"That the Conference, having discussed the Federation Committee's Report, do recommend it to the Council as amended."

## THE REGISTRATION OF ARCHITECTS.

The final meeting of the Conference proper was opened at three p.m. on the afternoon of Friday in last week, Professor T. Roger Smith in the chair. There was but a thin attendance, only about thirty persons being present.

Professor Roger Smith, in opening the proceedings, said:—The subject which we are to consider this afternoon is the Registration of Architects. Four papers are to be read to you,—by Mr. Cannon, Mr. Hall, Mr. Thomson, and Mr. Aldridge,—and I propose to ask those gentlemen to read them in the order in which I have given them out. I do not think that the subject which we have before us is so ripe for discussion as the question of Federation, which we had before us at the last sitting, in the shape of a carefully-digested report which had been considered by a Committee, and which led to a very interesting discussion in many

respects. We, of course, have not got any document of that sort, nor have we even got the draft of a Bill before us, as another body, which has paid attention to the subject, has had. It appears to me it would be fallacious and discourteous to ignore the fact that another body of architects have been considering the subject. If registration is a good thing for architects, we ought to be very glad it should be as universally discussed as possible. At the same time, we cannot but regret that a course has been taken which at present seems to make it difficult for the two sets of architects, who are paying attention to the subject, to cordially co-operate. Whatever causes difference I hope will in time cease to exist, supposing the two bodies should continue, and their co-operation should really be desirable (applause). I am not going to inflict my opinions upon you now; I have simply to observe that I think there are two different things which must present themselves in the course of the discussion. First of all, there is the question of something being desiderated; we desire to remove evils, and we desire to gain some advantages. Now, I do urge upon you rather strongly not to exaggerate either of these. Pray do not exaggerate the evils that afflict the profession. Let us be well aware of what they are, but do not let us go saying that everything is as bad as it could possibly be, because it really is not so. Somehow or other a very large number of buildings get designed and erected, of which, while some are very bad, a great many are very good, and a credit rather than otherwise to the architecture of this country. Many enlightened critics consider that at the present moment the modern architecture of England is in advance of that of any country in Europe; and that being so, it is idle to say there are not a great many good points in our profession, in spite of the most salient defects. On the other hand, supposing we make alterations that are advantageous, do not let us exaggerate the good which may come to us. Probably we are quite as liable to that class of exaggeration as to the other, and let us, therefore, endeavour to be moderate in our view of both. But admitting that there are constitutional evils that we should be glad to see eliminated; admitting that we may in many respects improve the position of practising architects generally, the question remains,—and I think it is a most important one,—whether "Registration," whatever may be meant by it, is a measure calculated to remedy the evils, and introduce the benefits. These, I think, are the two divisions into which our view of the subject will naturally separate itself,—the question of what can be got, and of whether in Registration we have any adequate means for procuring this good. What is meant by Registration is not, I think, quite clearly defined in the minds of all persons who have paid attention to it. Some persons consider a voluntary, and others a compulsory, registration is desirable, and that and other difficulties will no doubt be to some extent threshed out. It appears to me if we agree that the matter ought to be considered by a smaller body in the same way as Federation has been, we shall very likely do as much as this Conference can usefully accomplish at the present day (applause). I will now call upon Mr. Cannon, of Leeds, to read his paper.

### Mr. Cannon's Paper.

WITHIN the twenty minutes to which my remarks have to be confined, it would be impossible to treat the subject before us at all comprehensively, and I must claim your consideration for the necessarily insufficient and disjointed manner in which they have to be presented to you. Whatever apologies may be required for the fashion of its presentation, none are needed for the subject itself. However various may be the views held regarding the question of registration, it will be conceded by all that it is a matter well worthy our serious attention.

The moment chosen for its consideration is an opportune one. The grant of a New Charter to the Royal Institute of British Architects has removed a barrier that for long has dammed back the tide of progress in our profession, and held in sullen check all efforts towards reform. For the first time in fifty years the tide of regeneration is again on the flow; and it will be to the dishonour of all lovers of the architectural section of society if it be permitted to ebb

before full advantage has been taken of its sweeping flood. Whether the legal registration of architects constitutes one of the blessings that should be snatched from the wave of reform, is for us to decide, with more or less certainty, by this afternoon's discussion; and I trust that the subject will meet with something like definite treatment during this Conference of 1887.

Surely, amongst all professions, there are none built up of such heterogeneous atoms as our own. (Hear, hear.) In it the contemptible Pecksniff finds an apotheosis in a Street or a Shaw, yet from charlatan to genius there is no line of demarcation, nothing to designate,—before laborious years have purchased reputation,—that the one is less worthy of the common title than the other; or that the difference between them is generic, and not merely specific.

For the removal of this disorder of the body corporate there is but one prescription,—the adoption of legal registration of architects, preceded by an examination test of fitness. (Hear, hear.) The remedy cannot, however, be applied without certain drawbacks. The nauseous physic precedes the restorative results, and perhaps some may be forgiven even a child-like revolt at the dose, especially in the case of those who doubt the efficacy of the specific.

In the first place, we may take it as conclusive that no Act could possibly be obtained which did not insist on registering the whole body of practising architects, whatever their qualifications, or however complete their absence. The tinkers and tailors and candlestick makers dubbing themselves architects will be included in the same roll with the illustrious and cultivated of the august Royal Institute of British Architects. The advertising gentleman, confident in the possession of universal gifts, which naturally included those of an architect, who on the front pages of a daily paper invited "persons intending to build to enquire as to his terms, and investigate his mode of doing business before going elsewhere," will rest in the list next to and on equal legal terms with, say our Honorary Secretary, whose horror at the proximity we shudder at, even whilst the actuality is, as yet, no more than that of a dream.

The prospect is not a pleasant one, and the realisation would not immediately benefit the profession, so that no one can be blamed for seriously asking if the ultimate result will be worth the first price to be paid for it.

I believe it will be; for the punishment of being held in a real bond of brotherhood with some of the charlatans who are self-styled architects, though almost more than we can bear, will be of comparatively short duration; and its effects will be speedily removed by the gradual elision of the original, and the gradual admission of the subsequent, entrants, who will have had to qualify in a way worthy of their profession.

The embarrassment will be wholly of a temporary character. Its full and entire burden will rest on the shoulders of the present race of architects. Their successors will inherit only the beneficial portion of the change. We may thus console ourselves with the knowledge that any inconveniences which registration may bring are but an unselfish contribution towards the welfare of our heirs.

A far more serious objection is the possibility that an Act of Registration might result in separating art from construction, or dividing architects into two camps.

We may rest assured that any type of examination which may ultimately be settled as the qualifying one prior to registration, will be a scientific and not an artistic one. The only claim that can be made entitling architects to a protective Act must necessarily be based on the need for guarding the interests of the public; certainly not on the ground that we desire an improved position for ourselves. (Hear, hear.)

The demand for an Act must be founded on the fact that the health and the purse of the building community are endangered by unlicensed architects, whose ignorance of sanitary and constructive laws makes their presence amongst us imperil the public health and the public safety. (Hear, hear.)

That art in architecture should be protected is a proposition which the Legislature would never concede. People prefer to buy their own ideas of design, and would rather have it bad, or pay for that which is not art at all,

than be restricted in their choice in matters of taste. Education and not Parliament is the mistress of the arts; and we must look to our own teaching powers, and not to law, for any improvement in the general appreciation of architectural design.

The restriction of the future qualifying examination to scientific acquirements will be forced upon us by the might of circumstances, and not by our own choice, which would naturally be more comprehensive than any Act is likely to be. We may not forget that, whilst we may draft such Act, the shape into which it will pass will not rest with architects.

This very curtailment of the qualifying test for registered architects brings us face to face with the possibility that the result might be to divide our body into two schools,—registered architects, who could be relied on to build in a manner satisfactory from a hygienic and constructive aspect; and unregistered architects, who would rely solely on their designing powers for acquiring a practice. It is undoubtedly the case that there are many men whose very excess of artistic insight brings with it a repugnance to the practical and business requirements of life, such as induces them to forego many advantages rather than undergo the drudgery of the preliminary study of un congenial subjects, requisite to enable a scientific examination to be creditably borne.

The art-loving section of the public will forgive much to the one who leads in the way of design. I am acquainted with many instances where architects of deserved repute have erected buildings showing extraordinary errors of construction, or singular ignorance of the laws of sanitation; yet their great skill in design has commended them so urgently to those who specially value this phase of an architect's work, above more solid attainments, that their practices are seemingly little affected by their constructive blunders.

The fact that this is so confirms the idea that one of the earliest results of registration may be to divorce the cleverest artistic practitioners from the best scientific ones, and may thus add one more horror to the first years of an Act that will, temporarily at least, lower the general level of architects.

The objection is one which, like that of the levelling up and levelling down which will follow registration, will not, I imagine, be of long duration. The public, however much value they may attach to art, will soon realise the advantages of selecting their architects from amongst those, skilled in design, whose diplomas assure them have also received a proper scientific training.

The existence of this separation would be gradually eliminated by the institution of the custom, which it may confidently be expected public authorities would adopt, of restricting appointments and competitions to registered men.

Government in this country, both Imperial and local, whilst it holds art in the most sovereign contempt, attains an equivoque by the exercise of the most abject veneration for science. It thus may happen that, if the mystic "F.R.I.B.A." comes to denote the possessor of a well-earned technical diploma, we may live to find these singular letters revered with a fulness which will somewhat surprise their ancient owners, who will have grown grey in the days when scorn was too often the only feeling that their appendix evoked.

For the existence of the contempt for architects which unquestionably animates some high quarters, we have ourselves mainly to blame. The feeling has been created by the undue value set by us on art over the science which is the fundamental basis of architecture. We show our preference for the first in our prize competitions, in our papers, in the preponderance of time spent in discussing art or archaeology, over that devoted to constructional or technical questions. The public can hardly be severely judged for drawing a natural conclusion, and alleging that we prefer pretty clothing to a sound body, or admiring that we follow fashion rather than truth.

A scientific examination test for all architects would remove this impression by proving that we do hold it to be essential for constructional knowledge to precede and inspire architectural design.

Registration, it may be expected, will increase the burden of legal responsibility already borne by architects. Protection brings its obliga-

tions along with its privileges, and a State-contemned profession will doubtless have its liability for carelessness in the execution of duties less leniently judged in the courts than when it worked in the enjoyment of unlicensed freedom and expected ignorance.

Such a result may not be one wholly to be deprecated. Possibly greater responsibility may have a tendency to check the formation of practices too unwieldy to be within the control of one mind; and may eventuate in those most highly gifted and most widely honoured practising largely as consulting architects. There can be no doubt that if registration, by increasing our legal obligations, had this effect it would not necessarily be one for regret; and would probably tend to raise the degree of respect in which architects would be held.

As a mere thought in passing it may be asked what effect protection would have on foreign architects practising in this country. Probably their position would be identical with that of unregistered native architects. Their employers would have to accept their services with the knowledge that they, in doing so, deprived themselves of the legal right to recover damages in case of mismanagement of their building operations, whilst the foreign architect would have to rely on the honour of his client for the settlement of his charges.

Minor questions of disadvantages attending registration I have no time to discuss, but there is one benefit it would confer on our profession which, to my mind, would outweigh all injuries a thousand-fold. The thoughtful amongst us, long before Wednesday afternoon, must have recognised how thoroughly inefficient are the existing means of education offered the architectural student. The discussion on that day brought to a culminating point the sense of our weakness in this respect, and must have impressed every one with a perception of the immediate need for an entire remodelling of present methods of instruction.

The desired improvement will come with registration. Until a systematic course of technical training is a necessity to an architect before he can enter on an independent career, the general body of students will pass into the ranks of practitioners half trained, and little fitted for their duties. I have little hesitation in saying that the greater number of architects learn the practical part of their work at the expense of their clients (hear, hear). It is well for most of them in early life that the public are seldom alive to all the errors of others for which they have to pay, or ever learn of the many blunders whose knowledge rests in after life a heavy burden upon the tender consciences of their architects.

So soon as through the gates of examination the rising architect must inevitably pass, so soon, and not before, will his training assume a character wholly different to what it has at present. No longer will the youthful student meander joyously through the pleasant paths of the Architectural Association, carelessly gathering only the flowers of his art which please his delicate fancy as he passes by. Before his eyes will then for ever stand the dread figure of Mr. Arthur Cates, even as an avenging angel, before whom he will have to answer for wasted opportunities, and misdirected efforts (laughter).

The value of an examination test rests not so much with its analytical purposes, as on the incentive it forms towards keeping the student's attention directed equally to the un congenial, as to the attractive sections of his education.

Whilst there is no compulsory examination, no dread tribunal before whose stern presence the young architect must eventually stand, he will inevitably more or less confine his studies to those portions of his education which possess for him the greatest charm. Human nature is the same everywhere, and can only be driven in directions un congenial to it.

With the compulsory education which registration will require, will come the desiccated colleges, and the longed for university chairs. What models of ordered method do the medical schemes of education present! Would these ever have been realised, in their present form, without the powerful incentive offered by the Medical Registration Act, and its accompanying obligations?

Necessity, the mother of invention, will find the means for thoroughly and systematically training our students when necessity has been created. The first step in the direction of a real architectural education will have been

taken when the absolute need for it is forced on the attention of everyone entering our profession. Given the compulsory diploma, and the problem of founding the means of methodical and wisely directed instruction will solve itself.

Until we arrive at the era of diploma-ed architects, the day of classified and directed architectural education will not be reached. Youthful caprice, without such incentive, will not fasten its attention on distasteful objects. Thrifty guardianship will not lavish money on the education of its wards unless the stern logic of facts proves it to be beyond eluding; and will prudently blind itself to its advisability. The undiscriminating public will encourage both by declining to display any preference for the wise Associate of the Royal Institute of British Architects, over his ignorant rival, who airily assumes a virtue if he has it not, and who makes an assumption of wisdom answer all the practical purposes of the other's years of laborious research and conscientious toil.

It may be urged that this class of impostors could not, by the passing of a Registration Act, be excluded from practice; and that, indeed, they could not, in common fairness, be shut out from employment, so long as they could find clients; and that they would consequently form a formidable body of competitors with those who had, by examination, entitled themselves to registration.

This danger would not be one of moment. Such men would be identical with the "quacks" outside the medical profession, and would occupy the same position in reference to the organised body. They would be employed by those foolishly credulous enough to believe the loud-sounding advertisements which would form their stock-in-trade; but would be held in contempt by all persons of solid worth or reputation. They would be shut out from public appointments or public honours, and would, as with their prototypes of another profession, serve as a foil to point the superiority of the duly-qualified architects.

A great gain to the profession by Registration would be the homogeneity which would result from it. It would then no longer be a question of attaining to a faceted sort of federation of different societies,—none of them powerful,—to a central Institute little more influential; but the realisation of a perfect combination on the part of every true architect (hear, hear), with a central head, powerful, far-reaching, and representative. The council of the body would no longer rule on mere suzerainty, with weak authority, and the timidity born of feebleness, but would speak with imperial conclusiveness, because supported by the loyal zeal of the whole body of architects.

With this firm cohesion of the profession would be created a revival of *esprit de corps* such as cannot animate an un cemented aggregate of individuals. All members of the body corporate having undergone the same training, passed the same examination, entered the one class, would to a far greater extent than is possible now, possess an identity of sympathies, and a consequent fidelity to each other and to the common ideals.

Along with this would come the corollary of proper observance of professional etiquette,—a virtue which, for want of congenial soil in which to cultivate it, is becoming a rare and precious thing in our profession. It cannot be otherwise; its very existence depends on a unity of interests, an equality of education, and a mutual self-respect, which is at present absent from our ranks.

Registration, if obtained, would doubtless mean that only those admitted to its privileges would be heard as witnesses in the courts of law on questions of building customs. Certainly this would come to be the habitual practice, even though it were not actually the law, and would assist in giving a position of supremacy to the registered architect over his unlicensed competitor.

Probably from time to time legislation would recognise in one way or another the standing of the class it had itself created, and would, in any fresh appointments necessitated by future Acts relating to building or sanitation, confine them to persons on the official roll of architects.

There can be no doubt that that years, as in the case of other protected professions, would tend to increase rather than diminish the value of the privileges conferred by registration,



and it may be expected that such advantages as would be gained by registration would be multiplied by the passage of time.

No doubt the registration of the profession of architecture would eventuate in the schedule of charges, authorised by the Central Council, becoming the basis upon which fees could be recovered, without its being needful, as it now is, for anyone suing a client to call many witnesses to prove that five per cent. is the customary commission charged by architects. No law could, of course, prevent any member of our profession agreeing to work for less than this if so disposed; but it would be a removal of much annoyance if certain fixed charges on the part of architects could be recognised in a court of law as customary ones without calling evidence.

Part from the least of the advantages resulting from registration would be the creation of an atmosphere of terrorism, which would then envelope the evil-doers amongst us. No Act would be acceptable or complete that did not contain a clause enabling the Central Council to strike off the roll those who had been convicted of acting in a manner conclusively derogatory to the interests and dignity of the profession. (Applause.)

The punishment of expulsion is not infrequently demanded for, and awarded to, sinners even within the temple of the Institute,—to those who have felt strong enough in their sense of rectitude to promise compliance with the honourable standard set up by the stringent Charter of that body; but, even when sentence has been pronounced, the loving kindness of the Council leads them to carry out the punishment with so much delicacy and secrecy that the result is like that of the terrible curse of the Bishop of Rheims:—

"But what gave rise  
To no little surprise  
Nobody seemed one penny the worse."

Yet even this slight check on doubtful practices can be applied only to those who, in the main, "have no need of salvation." The residuum of the profession are beyond any influence that the Institute can exert, and can be reached by no regulations, however skilfully framed. Registration would, at least, remedy this difficulty, as it has done in the professions of Law and Medicine.

It would enable us to cast out of our ranks the fraudulent recipient of illicit commissions (hear, hear), the betrayer of his client's trust, the false brother who had in any way disgraced irretrievably his profession, and thus to purify our body by the forcible ejection of the basest of its constituents. (Applause.)

To my mind it seems incontrovertible that the advantages of registration outweigh immeasurably the disadvantages with which it may be credited. At the worst, these latter are of a temporary rather than a permanent character, and might be endured for the sake of future gains. On the other hand, the advantages of registration are of a kind likely to increase in number, in force, and magnitude with time.

The problem of education cannot be solved until a sufficient incentive can be held before every student impelling him to confine his studies in such directions as wiser and more experienced minds than his own have shown to be the true ones. That incentive it is impossible to create, except by the institution of tests which all alike must submit themselves to; and which can only be made universal in their application through the medium of registration.

The problem of creating a real union amongst the members of our profession can alone be solved by an Act which will join all together by the bond of equal qualifications and mutual respect, and by the exclusion of those whose presence amongst us now makes confederacy, of a comprehensive character, a simple impossibility. Only by an Act of Registration can this be made practicable.

The task of obtaining this Act, if undertaken, will be no light one. It will require the exercise of every means of influence at our command, and for this reason, and because there is no essential point of difference between our body and theirs, I should advocate obtaining the assistance of engineers and surveyors in forwarding the work. (Hear, hear.)

The minimum qualifying examination might be identical for the three professions, leaving each free to adopt its own standard of investigation before granting the right to use the titles

attaching to membership of the central associations.

Just as in the medical profession few doctors are content to practise with the lowest degree actually necessary, but pursue their studies until they are entitled to affix to their names letters showing a higher education than that essential merely for business purposes, so few architects would be satisfied to commence life as such before they had, by an honour's examination, earned the right to annex "A.R.I.B.A." or "F.R.I.B.A." to their title of vocation.

This is, however, only a matter of detail; the principle involved in the proposal has not yet been accepted by the Royal Institute of British Architects, the only body that can possibly head the movement with any probability of success. (Applause.)

It is my earnest hope that the meeting to-day will take the initiatory step of approving the promotion of an Act of Registration, and thus inaugurate the official commencement of the most important movement that the history of architects has yet known.

I am not hold enough to urge that this would not mean some degree of self-sacrifice and an immense sum of labour, but surely the objects to be ultimately secured,—the efficient education of students, the purification of the profession, and the realisation of a union of architects of genuine value and manageable quality,—may stimulate us to forget fears of personal inconveniences, to sink private differences of opinion, and impel us to unite harmoniously and with single-mindedness of intention to secure a brighter and more honourable future for our illustrious and ancient profession.

#### Mr. Edwin T. Hall's Paper.

The advocates of the compulsory registration of architects claim that the time has come when the Legislature may be asked to close the profession of architecture to all who cannot hereafter pass a qualifying examination.

Among the evils which are pointed out as remediable by such a measure, the following are stated to be the chief.

First. Under the present system it is alleged that houses generally, i.e. for the masses, are ignorantly built without the assistance of an architect and without regard to any scientific laws of construction or sanitation,—that while the medical profession is aiming at the prolongation of life and the improvement of the species by developing the *mens sana in corpore sano*, its efforts are frustrated and rendered of no avail in consequence of the unsanitary construction of the habitations of man and beast,—the neglect of proper drainage, ventilation, lighting, and warming.

The second evil is that the public has no means of learning authoritatively if the professed architect has any claim to competence in undertaking the work required to be done. As any person may call himself an architect, and it is alleged many do so who have never studied architecture at all, the lay employer, who may be excused for being ignorant of design, construction, and sanitation, cannot discriminate between the quack and the expert. By the law of averages it is probable in such a state of things that the former gets as much work as the latter, and the result is that architecture is not shown at its best, and the average ability of architects is rated very low.

This creates a third evil,—a grievance under which the *bona-fide* architect labours. If his calling suffers in repute he participates in the disrepute, and he calls for the exclusion from the profession of those men who injure it.

Now, with regard to the first evil, it is at least questionable if the present unsanitary construction of houses can be admitted in argument as at all relevant to the question of closing the profession. It seems to me that the proper remedy for that evil would be in more stringent building regulations, and in strengthening the hands of the public officials administering those regulations.

It is apparently assumed that the remedy would be effected by enacting that no person shall erect a house of any sort or kind without a registered architect to design and superintend it. To say the least, I think it will be a very long time before the public can be brought to such an appreciation of an architect's services as to render such an enactment possible.

I believe, however, that when the practice of

architecture has taken the same hold of the public mind as that of Medicine has, then it is probable the Legislature will grant the same privileges to our profession as to those of Medicine and Law. (Hear, hear.)

Meantime, I think the second and third evils referred to are capable of remedy, and, being evils, that steps should be taken to remedy them.

To assist the public to distinguish between the competent architect and the quack, and to show the public that it is to its own interests to entrust all buildings to a qualified architect, are functions of this Institute in particular, and generally of the professional societies throughout the empire.

It is the interest and public duty of all *bona-fide* architects to strengthen the hands of their representatives in this work.

The Royal Institute has adopted the principle that the coming generation of architects shall be men who by passing a qualifying examination shall establish a right to recognition as competent architects. But as the Institute now is, and claims to be, the recognised representative body of the whole profession as at present constituted, it should, I suggest, register the whole profession. It is practically certain that when the Architectural Act is obtained, the Legislature will require some public body to make and keep such a register. This register will, following precedent, enrol the names not only of men who are members of the Institute, or who have passed or shall thereafter pass a qualifying examination, but of other *bona-fide* architects who can comply with some other test. The Legislature will further constitute that body the examining body for future admissions to the profession. The Chartered Institute will, I should think there can be little doubt, be that body, and its claim to that position will be all the greater if it has already of its own initiative fulfilled the duties which an Act of Parliament would prescribe. It has taken in hand examination, it should take in hand registration. If this be so, and if *bona-fide* architects now practising are willing to assist the Institute in its endeavours to raise the status of our profession, there should be no difficulty in securing the co-operation of all in perfecting the register.

In propounding a voluntary registration scheme, I shall carefully bear in mind the spirit of the affirmation of the Federation Committee that the position and advantages of membership of the Royal Institute shall not be obtainable by any person short of actual membership. We know, as a fact, that many architects are excluded from membership by the conditions attaching thereto. The Twenty-third By-law, rightly or wrongly, shuts out a certain number. If it be right, they must continue to be shut out; if its cessation from the Institute's laws, or its modification he considered compatible with the maintenance of the best interests of the profession as a whole, these gentlemen can and ought to join the Institute. The By-law will shortly have to be considered in General Meeting, and doubtless the combined wisdom of the members of the Institute will arrive at a decision just and honourable to the profession. But when architects eligible for the Fellowship in length of practice and in the quality of their work are dealt with, there remain a large number who having been engaged in practice for a shorter period than will qualify them for this rank are yet too busy and too preoccupied with the responsibilities of their position to prepare for the examination necessary to qualify them for the Associateship,—gentlemen who missed or did not appreciate the opportunity afforded them of joining the Institute before the examination was compulsory. I say did not appreciate the opportunity, for it must not be forgotten that the subject of general professional co-operation has only within the last year or two been brought within the domain of "practical politics." The federation scheme proposed by the Institute's Committee (containing representatives of every Society in Great Britain) is the outcome of this awakening to the importance of co-operation.

What can be done to meet the case of these gentlemen, for the present excluded from the Institute? I wish at once to say that I do not propose the creation of a new class. Much might be said, perhaps, in favour of this, but there are grave difficulties in its way, if not valid objections to it, so we will dismiss it. The admission to the Associateship is definitely

settled to be only by passing an examination. I should deprecate, even if it were possible, the reversal of a policy deliberately adopted, after mature consideration. The admission to the Fellowship is, at all events for the next five years, on a different footing. Within that period architects are eligible for election to this rank without passing an examination. There are, therefore, existing architects not now in the Institute who are admittedly fit persons to join its ranks in the future. They are *bona-fide* architects who now have been at least two years in practice, or they would not become eligible in five years for the Fellowship. I propose that all these should be permitted, now or at any time within the five years, to apply for nomination as candidates for the Fellowship. Within the four corners of the Charter, By-laws can provide for this,—can fix the qualifications, forms of application, nomination, &c., necessary for entry on the roll of candidates, and if the Council is satisfied that an applicant complies with the By-laws, I propose that his name shall be enrolled under the heading of "Probationers, or candidates whose nomination for election to the Fellowship when they have been in practice seven years, is approved by the Council."

Parentetically I would here remark that, in my opinion, By-laws should specify the actual machinery by which there shall be an investigation into the fitness of every candidate for nomination. At present this does not exist.

Prior to being put on the roll, the candidate shall pay a registration fee, and annually, until his election comes on, shall subscribe, say two guineas, to the Institute, for a copy of its "Journal of Proceedings and Transactions." I define the object of this subscription, in order that he may not acquire equitable rights in the property of the Institute by subscribing to its general funds. As a registered candidate he shall be permitted to attend the meetings of the Institute, and take part in its discussions, but he shall not, unless and until he is elected, be a member of the Institute, nor be entitled to any right or privileges other than those specified. He shall, in his application form, undertake, during his term of probation, to practise only in accordance with the terms of the Charter and By-laws of the Royal Institute. Assuming the Federation scheme to be adopted, if he be a member of any federated society he shall be entitled to such relate on his subscriptions as he would be were he an actual member of the Institute.

A careful study of this proposal will show that it would enable the Fellows and members of nearly all the principal architectural societies throughout the kingdom to secure for themselves at once a nomination to future candidature for the Fellowship of the Royal Institute.

I submit that the adoption of this scheme would be reasonable and logical to bridge over the transition period between the old *régime* and the new.

And now to the framing of our General Register of Architects. In our Calendar we have a register of the members of the Institute. I propose to name this "The Register of the Royal Institute of British Architects."

Under this heading would come the Fellows, the Associates, and the Probationers.

Following this in the Calendar would come, "The Register of Practitioners and Others not Members or Probationers of the Royal Institute."

First in order should be placed "Professional Members of Societies Federated with the Royal Institute," and as the By-laws of these societies have to be approved by the Institute, a standard will be agreed on with the societies which will give all the necessary professional safeguards.

Under another division the "Members of the Architectural Association not included in the Register of the Royal Institute" would be given.

Members of the Societies and Association should pay, either individually or collectively, a certain fee for registration, to defray the necessary expenses. The details of this I refrain from going into in this place.

As the Association is primarily a society of juniors,—assistants and pupils,—it will be seen that provision is made for including in the two registers the members of every branch of the profession.

A sub-heading to each division should set out clearly, by quotation from the Charter or By-Laws of the Institute, the qualifications or conditions (as the case may be) under which the names are inserted in the register. Every man's

status can then be ascertained at a glance. We should have not only the police of the Institute, but of every affiliated society, ranged on the side of safeguarding the register, so that it should include the names of worthy men, and worthy men alone. Such a register under such sanctions would become an authoritative guide to the public, and exclusion from its pages would and should carry with it a stigma to the prejudice of any only *soi-disant* architect.

It may be urged that certain gentlemen of undoubted ability and honour would hold aloof from any society. We cannot provide for these exceptions. If architects elect to stand outside from caprice they are lacking in *esprit de corps*, and deserve to pay a penalty.

I will add that if my scheme be adopted, the increased circulation of the Journal of Proceedings incidentally resulting from the working of the scheme would tend to a greater and more personal diffusion of knowledge on professional subjects, so that individual architects would be benefited and the reputation of the Royal Institute would be enhanced. Again, the provincial societies would be benefited, for the country practitioner who now stands aloof an independent atom, but who would seek to be admitted to the register, either as a member or as a probationer of the Royal Institute, would, by joining his local society, be entitled to a rebate on his Institute subscription or registration fee which would pay or nearly pay the subscription to the local society, and in joining this he would have more frequent opportunity of giving the profession the benefit of his experience and advice on current questions than he would if he joined the Institute alone, whose meetings, owing to distance, he could rarely attend.

It is, in my opinion, wise on the part of the Institute to encourage the expansion of provincial societies. A bundle of thick sticks is stronger than one of an equal number of thin sticks, and strong local centres of architectural life will strengthen the Royal Institute.

On the question of the Institute's relation to the registers I may refer to two precedents.

The Incorporated Law Society is bound by Act of Parliament to keep a register of all practising solicitors, whether members of the Society or not. It may be urged that in the profession of the law there is a great distinction, which vitiates the precedent, in that all solicitors have to pass an examination. I answer that, with the exception of students or assistants, all whose names would be on the Architectural Register must be shown to be architects complying with a standard fixed or approved by the Royal Institute. In the legal profession the standard is a qualifying examination, but this is only the test of the *bona-fide* solicitor, while, for the present, at all events, another test is applied to the *bona-fide* architect.

My second precedent is that of the Royal College of Veterinary Surgeons, the latest of the closed professions. By the Act of 1851 the Royal College was bound to keep, in addition to a register of its own members, a separate register, under the heading of "Existing Practitioners," of persons who for five consecutive years previous to the date of the Act were in the *bona-fide* practice of veterinary surgery, but who had not passed an examination. They are expressly declared in the Act not to be members of the Royal College. This is a precedent exactly on all fours with our case, and the "Register of Existing Practitioners" regularly appears in the Calendar of the College. (Hear, hear.)

In conclusion, I feel that this project requires more consideration than can be given to it at a short meeting, but I trust that it will commend itself to the members of the Institute and the profession generally. I submit that if registration he desirable in itself to exclude the unqualified practitioner, the voluntary scheme I suggest (subject, of course, to development and probably to amendment in detail) meets the reasonable requirements of the case, and it has this commendable feature about it, *viz.*, that it is in our own hands to do the work at once, while if we have to await the leisure of a congested Parliament we may have to wait until the Greek Kalends.

The Chairman said he wished to draw attention to a slight inaccuracy into which Mr. Hall had no doubt unintentionally fallen. Mr. Hall said,— "I would remark that, in my opinion, By-laws should specify some machinery by which there shall be an actual investigation into the fitness

of every candidate for nomination; at present this does not exist." Mr. Hall did not seem to quite apprehend what happened when a candidate was nominated for election as an Associate or Fellow of the Institute. A nomination paper had to be deposited, signed by three Fellows who could testify from personal knowledge as to the fitness of the applicant. If the signatories were conscientious men, they would not do that without actually having such personal knowledge. Then, again, some account had to be given by the candidate himself of the whole course of his professional education and life, as well as of the work he had done. His proposer also had to write a letter on that subject, and all those papers came before the Council, one of the things that occupied the constant attention of that body being the consideration of such proposals. This was not done in a perfunctory manner, but each case was carefully looked into.

Mr. Hall explained that he had all that information before writing his paper, but still he thought it did not meet what he suggested. What he had more especially in his mind was the machinery of the American Institute of Architects. Under that machinery, supposing a man was recommended from any State, the by-laws of the American Institute specified that the Council should send the papers to the President of the local society, and ask him to make the necessary inquiries. That would relieve the Council individually.

The Chairman added that he still thought they had machinery which might be considered worthy of confidence. However, without further delay, he would call upon

Mr. David Thomson, President of the Glasgow Institute of Architects, to read his paper.

#### Mr. Thomson's Paper.

GENTLEMEN.—When your secretary invited me to prepare a short paper for this Conference on the subject of the Registration of Architects, I had not considered the matter very seriously, and had read but little of the correspondence on this subject which has, for the past year or two, occupied so much space in the building journals.

I will not, therefore, attempt any review of the proposals which have been brought forward, but state to you as shortly and clearly as I can the method I would propose for combining all the architects of the kingdom into one corporate society.

I find that there are seventeen architectural societies in the United Kingdom, in correspondence with the Royal Institute of British Architects, and that of these only five, including the Institute, are societies of architects, the others being associations of architects and other persons who desire to promote a love for and knowledge of architecture. I find, also, that of the five societies of architects, only one restricts its actions to operations proper to a guild of architects, and has no meetings for discussing matters of antiquarian, literary, or artistic interest, while the remaining four have a dual character, that is to say, they have regular meetings for the consideration of matters connected with architecture as a science and as a fine art, and others for adjudicating on matters connected with professional practice.

The Glasgow Institute of Architects is the only one, so far as I know, which has no meetings for the reading of papers, and whose members, as such, occupy themselves only with the consideration of matters connected with professional practice, and with such public questions as affect their interests or come peculiarly within the province of architects to consider.

When I came to consider this difference which distinguishes the Glasgow Institute from all the other institutes and societies of architects, it occurred to me that, upon the lines of our Institute, it would be a simple matter for all the architects in practice in the kingdom to combine and form one society, whose sole aim would be to further the interests of the profession, and to speak with one voice on all public questions in which architects are interested, or on which an expression of their corporate opinion would be of advantage to the public (hear, hear).

I hope no one will refuse consideration of this proposal because it may, at first sight, appear to be opposed to the continued pre-eminence of the Royal Institute. I certainly

have no wish to see the Institute lessened in its influence and position, and will take no part in the raising up of a rival institution; but I think the dual character of the Institute prevents its expansion, and that by some modification of its regulations, provincial members might be incorporated with it in the discharge of its functions as the Metropolitan Guild on professional matters, while they took no part with it in its operations "for promoting and facilitating the acquirement of the knowledge of the various arts and sciences connected therewith."

I have found that, as a Fellow of the Institute, residing at a great distance from London, it was impossible for me to take part in its proceedings, and consequently, up till now, I have never attended one of its meetings, though for many years I enjoyed the honour of membership. I have no doubt that the reason why so few of the provincial architects are found upon the roll of the Institute is just this, that they cannot afford the time and expense requisite to attend its numerous meetings, and as they cannot take part in its proceedings and discussions they see no sufficient reason why they should contribute to its funds.

Had the Royal Institute been founded upon the same lines as the Glasgow Institute of Architects, there would have been no need for these handsome and commodious premises, for its costly library, nor for the great outlay in printing and circulating of its paper. I grant you that its meetings would have been much less interesting and instructive to those who attended, but the necessary expenses would have been reduced to a very small sum. I put the matter this way to draw attention specially to the large expenditure required to carry on the work of an Institute having for its object the furtherance of the study of architecture, as compared with an Institute which engages itself only with the interests of the profession, and my proposal is that all the architects in practice within the kingdom shall be incorporated into one Society, which shall have its headquarters in London, with branches in all parts of the kingdom. I propose that each branch-institute shall be formed exclusively of architects in practice, and that they shall each have corporate and independent existence, be governed by their own officials, and regulated by their own by-laws, with power to fix entrance and yearly subscriptions and qualification for admission,—each member, however, being bound to subscribe the same "form of declaration" as that required for admission of Fellows into the Royal Institute of Architects.

Further, I propose that each branch-institute shall annually elect from among its members representatives, who shall be formed into Provincial Chapters, which shall meet quarterly in the most convenient town within the province, and each branch-institute shall also annually elect from among its members representatives to a Grand Chapter, which shall meet annually, and alternately, in London, Edinburgh, and Dublin. The number of members which shall be elected to the Provincial and Grand Chapters shall be proportioned to the number of members in each branch-institute, and every member of the branch-institutes shall contribute an equal sum to defray the necessary expenses of these quarterly and yearly meetings; and as no payments shall be made to the representatives attending these meetings, the expenses will not be great, and a small annual payment from each member will suffice.

While permitting each branch-institute to regulate its own affairs, and to have its meetings for discussing all subjects relating to architectural and professional practice, I would advocate the restricting of the subjects to be brought forward at the meetings of the provincial and Grand Chapters, to those hearing upon professional practice, and such public questions as lie peculiarly within the province of architects to advise upon. This would reduce them to business meetings of short duration, and though they might be found sometimes wanting in interest, their chief purpose would nevertheless be served, viz., that of bringing the whole fraternity into touch with each other, and providing a medium through which every member would exercise his influence in determining all questions affecting his profession; it would at the same time provide an effectual bond of union, and be a means of promoting our common interests.

In order to prevent the new society ever becoming a rival to the Royal Institute of

British Architects, I propose that its President shall always be the President of the Grand Chapter.

I will not occupy your time in attempting to formulate in more detail this scheme for the amalgamation and registration of architects. Should the proposals be approved of by you, it will be the work of a committee to draw up the requisite rules and regulations, defining all the duties, powers, and privileges to be exercised by the provincial and Grand Chapters, and for devising the means whereby their decisions may be given effect to.

I will add but a word or two on the qualifications for membership.

By the Articles of Association of the Glasgow Institute of Architects it is declared that "in order to constitute eligibility to membership, every person applying for admission shall at the time of application be engaged in carrying on the business or profession of an architect on his own account, and shall besides belong to one or other of the following categories:—

"1. Persons who have served six years at least as apprentices or assistants with members of the Institute, or with persons eligible to become such.

"2. Members of other architectural institutes, associations, or societies.

"3. On the recommendation of at least two-thirds of the Council, and on a resolution to that effect being passed at two consecutive general meetings of the Institute, a member may be admitted who is otherwise qualified."

These rules for the admission of members are, I think, as restrictive as present circumstances require, and I would not advocate any change till after this scheme has been in operation for some years.

I do not think it would be advisable to incorporate the whole of the architects, civil and mechanical engineers, and surveyors, into our corporate body, under an Act of Parliament, making it compulsory for all of them to hold a Government diploma; but I am of opinion that were all the architects amalgamated in some such way as I have now proposed, the way would be paved and made easy for the adoption of some such scheme of statutory registration as is advocated by Mr. W. H. Seth-Smith.

In conclusion, and lest any one should suppose from what has been said that the architects of Glasgow neglect the cultivation of the knowledge of architecture, I beg to state that we have a separate Architectural Society for this purpose, which forms a branch of our Philosophical Society, and is composed of architects and other persons interested in the study of our art, and at its meetings all matters connected with the arts, the crafts, and the sciences are discussed. This separation of matters purely professional from others of a literary, artistic, and scientific nature is of great advantage, and I can recommend its adoption in all places where architects are numerous enough to form a purely professional society.

#### Mr. Aldridge's Paper.

Mr. Charles Aldridge (Liverpool) then read the following paper:—

I SHOULD like first of all, in introducing this subject of the Compulsory Registration of Architects to your notice, to say a few words with respect to the action of the Special Committee of the Institute on "Federation," complaints having been made "elsewhere" and in sundry letters addressed to the professional journals of the slowness and do-nothing policy of the Institute. These complaints arise chiefly, I believe, from the younger and less responsible members of the profession, who fail to appreciate the difficulties that have to be overcome, and become impatient because the Institute prefers to treat the important subjects of "Federation" and "Registration" in a business-like manner, and have them thoroughly discussed by representative architects in London and from various important centres in the provinces, who by reason of their experience and position are able to treat these subjects in a businesslike way, and hear all that has to be said. Such an opportunity has fortunately now occurred during this triennial Conference of the Institute, and I venture to hope that one of the outcomes of this meeting between London and provincial architects in London will be to give the questions of "Federation" and "Registration" some definite shape, and, if thought desirable, bring them within the range of practical politics.

These two subjects, which have been engaging our attention for some time, although in my opinion intimately connected, are really each

of such importance that the Conference Committee have, I think, wisely separated them and given each a separate afternoon for discussion. The Special Committee on Federation also very wisely declined to take up this latter subject in connexion with their report, but have referred to it in a separate clause as an addendum at the end in the following words:—

"The larger question of compulsory registration is not within the scope of reference to this Committee; but they desire to point out that, should the proposals they have made be adopted, if only in principle, there will have been established a better organisation than now exists for eliciting the opinions of the profession generally on that important subject."

**Necessity for "Registration."**—The movement for imposing some restriction upon the ever-increasing numbers who call themselves "architects" is a natural one. Those who, at considerable expense, much study, and perseverance, have duly qualified themselves to undertake the multifarious duties of an architect, are naturally indignant and disappointed to find that they are obliged, in the battle of life, to compete with men who have slipped into the profession by some back door, as it were, and have never gone through a proper period of probation and apprenticeship with an architect, belong to no architectural society, observe no rules either of etiquette or architectural practice, and are, in fact, free lances, who carry on their business in any way they think most profitable, and very often combine the profession of architecture with a little speculative building, auctioneering, or other kindred occupations. (Hear, hear.) With such the contest is, of course, an unequal one, as the duly-qualified architect cannot compete with these nondescript architects on equal terms. This state of things, which will probably get rather worse than better as the population increases, has at last found a vent in the cry for protection of some sort.

**Status.**—Another point intimately connected with this subject is the professional standing or status of an architect, which I am sure we should all like, if possible, to see more defined. The public, as a rule, understand what is meant by the Church, Law, and Medicine, but very few persons know what is an architect, or whether he is a professional man, an artist, or a tradesman. (Hear, hear.) If "registration" would once for all solve this question and place the architect in a definite and recognised position, so that the public could be taught to distinguish an architect from a civil engineer, land surveyor, auctioneer, house agent, builder, &c., I think we provincial architects will admit that it would do some good.

**Harmony of Practice.**—Assuming that "registration" would define the professional status of an architect, another important point would be to bring the whole profession into perfect harmony of practice, and settle what are the duties, responsibilities, and remuneration of an architect; for we must remember that, although tolerable uniformity exists amongst architects belonging to the Institute or other Architectural Societies, there are a much larger number of outsiders to whom I have just referred who only recognise the rules of the profession in these matters just so far as may be convenient to them.

**Qualification.**—It is manifest that before an architect can have his name registered as that of one duly qualified to practise, he must show, in some way, that he is really competent, and here we touch at once on the all-important question of education and examination. With regard to the former, although we must all admit that there is much room for improvement in the system of apprenticeship, still there is a great deal to be said in its favour, for, even if Institutes or Colleges were established in some of our large towns for the sole purpose of providing for the training and education of students in architecture, it is very doubtful whether these could supply the practical training and experience that the industrious pupil must gain during, say a five years' term of apprenticeship in a good office. Supposing, therefore, that the student makes the most of his time during his office hours, and supplements this by attending a school of art or classes and lectures, or, where he is unable to obtain these, a careful course of study in the theory, construction, and history of architecture, in well-selected books, it is difficult to understand why he should not be able to pass

an examination at the end of his term of apprenticeship.

**Stimulus to Students.**—Before leaving the subject of education, there is an important point bearing on this and compulsory examination, about which I should like to say a few words; and this is the want of application and enthusiasm so often displayed by the ordinary pupil or student, the lack of which makes it impossible for a young man to become really competent or successful architect. Now, the reason for this is not far to seek. In the first place, the student is aware from the outset that he need not necessarily pass any examination, or test how he has spent the term of his apprenticeship, and what advantages he has taken of the various opportunities of instruction he has received. He knows that there is no law to prevent him calling himself an architect and commencing practice at any time when he sees a chance of obtaining business, and that a friendly quantity surveyor, and a good assistant draughtsman, will supply the technical knowledge and power to design in which he may feel he is deficient. (Hear, hear, and laughter.) It is true that sooner or later the incompetent architect will become known and find his own level; but very likely not before he has had the opportunity of committing several blunders at the expense of his client, and perhaps the health of his fellow-citizens. Now, it is quite certain that, whatever objections may be raised against compulsory examination and registration, they must put a stop to this state of things. The pupil in an architect's office would be placed in a similar position to the student in Law, Medicine, or theology, and all through his term of apprenticeship or study would have the knowledge that he has to undergo two or three examinations before he can be qualified to commence practice and call himself an architect. The dreaded examinations which he is bound to pass would be ever present to his mind, and his failing to do so would be a proof that he has not taken full advantage of the opportunities for study which have been provided for him, either by reason of idleness or mental incapacity. It is manifest, therefore, that compulsory examination would, at least, provide the student with the necessary incentive or stimulus to study.

It will be said, however, that the Institute has now provided an examination which all students must pass before they are eligible to join its ranks. Granted; but this is not compulsory, and, speaking from experience as a provincial architect, I fear the percentage of young men in the provinces who will take the trouble to qualify themselves to pass this examination will always be a small one (hear, hear), although I hope that the scheme of federation may do much to improve this. It is not because there is any special lack of energy or spirit amongst young men in the provinces, but because it is almost impossible to persuade architects, in Liverpool for instance, that they will gain any commensurate advantage by joining the Royal Institute of British Architects.

**Objects of Registration.**—It certainly seems strange that, in this nineteenth century of progress and age of competition, when scarcely any post or situation can be obtained without some test or examination, a profession so important in its relation to the daily life of all as that of architecture should have been allowed to continue up to the present time without any compulsory examination or test as to the efficiency of its members (hear, hear), or a guarantee to the public that their interests will be protected by a duly-qualified professional man; in addition to this, it is said by those who strongly advocate compulsory examination and registration,—

"The examination test will do more to unite the scattered and divided factions of architects than has been supposed. It will unite the profession into a brotherhood. However divergent in practice or natural abilities, essential differences of thought will disappear, for the qualifications once settled will bring the profession more into one mind. In all that is essential in knowledge and technical skill, one architect will be equal to another, and a higher intellectual tone will pervade the order, yet without in one degree destroying that individuality and those artistic aptitudes which vary in different individuals. It will be manifestly fairer to the public. They, at least, will not fall into the error they do now, in supposing one man as good as his fellow-craftsman, when such is not the case. They, at least, will be guaranteed against that kind of incompetency and charlatanism from which they now often suffer. Every architect they employ will, at least, be a skilful constructor, will understand material and the nature and duties of structures; he will be expert in sanitary science, and be able to control the arrangements of drainage and ventilation; he will be able to protect his client against unnecessary legal obligations, to which he would be liable by ignorance of the law of easements, and other legal questions; and,

in a word, he would guarantee to his client such an amount of general knowledge, education, and skill befitting the employment of a professional adviser. That the architect will derive advantages from a measure calculated to improve his position and status in society cannot be doubted. His authority will be accepted in a manner it has never before, his opinion in matters relating to professional questions, which are constantly being broached in the public Press, will carry more weight than they do now, when every amateur has a word to say, and often with more purpose, being devoid of narrow professional bias and rivalry."

Concluding with this extract from the public press, which I think very ably sums up the advantages to be derived from registration, I will now say a few words as to the difficulties and objections, for it cannot be denied, even by those who are most strongly in favour of the scheme, that there are many and great difficulties in the way; and, however anxious they may be to promote this object, nothing should be done hastily or without most careful deliberation and discussion.

One of the first questions to arise is that of the proposed amalgamation of architects with civil engineers and surveyors. Many are of opinion that the differences between these professions are so slight, and all have so much in common, that it would be impossible to separate them in any scheme of registration and compulsory examination; but is it so certain that this harmony and brotherhood could be established? and is it desirable? Many architects, no doubt, would prefer to continue on the old lines; and it is by no means certain that civil engineers would care to be associated in the same profession with architects and surveyors. (Hear, hear.) It is true that there are many architects who are duly qualified as civil engineers, and vice versa; as there are many architects who are land surveyors, and some few quantity surveyors; but in my opinion, these amalgamations are to be deprecated rather than encouraged. Surely there is room for all; and it would be far better to let each keep to his own profession.

We have also to consider whether it is advisable that architects should be licensed to practice, and would it be possible to prevent outsiders from drawing plans, &c., and if they did, could they be punished?

It is a matter of common notoriety and complaint that architects are so little employed to design and superintend the erection of ordinary dwelling-houses. No doubt the builders of these houses find they can get on very well without employing a properly qualified architect; and it is doubtful whether compulsory registration would be likely to improve this. Then, again, there are many estate agents, auctioneers, and land surveyors, who regularly employ draughtsmen to draw plans of houses and schemes for alterations. Would "registration" prevent this? I think not; indeed, it is not probable that it might rather augment the evil than put a stop to it (hear, hear), and it is difficult to see how builders and others are to be prevented by law from drawing plans for their own houses.

The next point to which I would call your attention, as a possible objection to "registration," is a larger and more important one. The question often arises, Is it possible to establish any uniformity of opinion in a matter of taste, or to set up any uniform tests thereon? In other words, can an architect's ability as an architect be gauged? Architecture is an art as well as a profession. This, no doubt, is a great difficulty in the way of registration. It is no secret that there are many in the profession whose artistic powers are largely in excess of their knowledge of the practical portion of architecture, while on the other hand there are others who are totally deficient in artistic power, and yet, owing to practical knowledge and business-like habits, are able to carry on a very successful and lucrative practice.

Would it be possible to devise a test for each of these classes, and might not obligatory examination deprive the profession of many a clever artistic genius? (Hear, hear, and "No.")

Many will say, too, *Cui bono* this cry for registration and compulsory examination? Are not the professions of architecture, civil engineering, and surveying already sufficiently protected? ("No.") For what purpose do the Royal Institute of British Architects, the Institution of Civil Engineers, and the Surveyors' Institution exist? Are there not examining bodies with power to grant certificates of competency? (Hear, hear, and "Voluntary.") Let all architects, civil engineers, and surveyors

whose conscience will not allow them to practise without a certificate of competency go to their respective Institutes and be duly examined (hear, hear); they will then have all that any Act of Parliament could give to show to the public that they are not as other men. But is it advisable to compel all architects to do likewise, and is it certain that all the advantages to the public and the profession that the advocates for compulsory examination and registration expect would be realised? Let us look for a moment at the three professions of the Church, the Law, and Medicine, where compulsory examination exists. Do we find a dead level of efficiency? And is there not as much difference in the knowledge, experience, and capabilities in these professions as in Architecture? (Hear, hear.) And does compulsory examination prevent incompetent men from practising either Law or Medicine? Examination is not all that is required to prove efficiency. (Hear, hear.) There are many who will acquire the necessary amount of knowledge to get them through, who, when the examination is over, soon forget all they have learnt, think they have done all that is required of them, are too lazy to go on studying, and turn out in the end helpless and incompetent; while, on the other hand, there are many men who by reason of nervousness shirk examinations, who are really clever and studious (hear, hear), possessed also with great artistic power.

**Foreign Architects.**—Let us turn abroad and see what system is adopted in other countries. Do we find compulsory examination and registration on the Continent? Nowhere, except in Spain; and it is a remarkable fact that nowhere do we find modern architecture at such a low ebb as in that country (laughter), where no one can be an architect unless he passes a State examination. In Vienna the *builder* is required to pass the examination, the architect may do as he pleases (laughter). In Germany those architects employed by the State are required to pass certain examinations before they are duly qualified to act as Baumeister, and they become inspectors only or architects accordingly. During the last twenty-five years architects intending to practise on their own account have found it worth while to obtain the title of Baumeister by examination, but it is not obligatory; and some of the most artistic work in Berlin is done by architects who are not Baumeisters by examination. I received this morning a letter from Berlin which I will read:—

"Berlin, May 3, 1887.  
Dear Sir,—To my letter I add a translation, in bad English, which may, perhaps, be of some use to you.

Your letter of the 27th of April came into my hands only yesterday, in the evening. I answer therefore in a hurry, fearing notwithstanding to be too late, as you are to read your paper this very week.

Asking for the mode of education and training of German architects, you must make a difference between architects of the Government and private architects. As for the former ones, I send you herewith the regulations from the 6th of July, 1884, which will give you the best information about this matter. They concern not only architecture (*Hochbaufach*), but as well the constructors of hydro-technical works, roads, bridges, railways (*Angewandte Baufach*), and the constructors of engines (*Maschinenbau*). The most important points of the regulations, especially for architects, are, in short, the following:—

—Going through a German gymnasium or Prussian *Realschule* (schools) to be compared with yours at Eton and Harrow). Examination of maturity before leaving these schools.

Two years' study in a technical high-school (at Berlin, Aachen, Hanover, or similar ones). Preliminary examination.

Further two years' study in the same high schools. First chief examination.

Three years' practical training. Second chief examination.

After the first chief examination, the Minister gives them the title "*Kaiserlich-Regierungsbauführer*," after the second, the title "*Kaiserlich-Regierungs-Baumeister*." They are then held fit for any appointments as Government architects.

Many private architects go through the same education and training as the Government architects. But there is in Germany no compulsory examination for private architects. As we have liberty of trade, everybody may be a private architect, no matter where educated and trained.

In this field there is completely free competition. Lately there have given up aspirations for making examinations compulsory in private architects, but they have as yet had no success.

As to the scale of charges of German architects, which are rather the so-called "*Zwangsgebühren*," which are rather generally observed, though nobody is bound to adhere to them.

About the social position of architects I cannot say much in a hurry. State or Government architects are equal to all other officials of the Government. Of the private architects those will have the best social position who know best their profession. . . .

I am, Dear Sir, faithfully yours,

HOUSSLER

(Substitute of the President of the  
Architectenverein in Berlin.)

P.S.—I add the statute of our Society (Architectural Society), which is perhaps of some interest to you. I beg you not to be misled by the name. In spite of it, a great portion of our members are engineers. I, for instance, am a railway-engineer.

HOUSSÉLLE.

In France the Government places the winners of the Grand Prix on their return from Rome in charge of some State building, sometimes with residence and at a nominal salary, and they have to prove their capabilities.

In Italy I hear that some three years ago it was decided to establish institutes at Rome, Milan, and Florence, for definite instruction in architecture. These are sanctioned by the Government, and have the power of granting diplomas, and enable those upon whom they are conferred to direct the construction of civil and rural buildings, and to exercise the functions of a town or country surveyor; but whether this course of instruction, and obtaining a diploma of efficiency, is obligatory upon all Italian practising architects, I am not certain.

A few words now to those who are really desirous to see "registration" take some definite form, and become the law of the land. The first thing to be done is to make federation a reality. (Hear, hear.) Let all the architectural societies throughout the United Kingdom and colonies join with the Institute, and let all architects who do not belong to any society at once join the Association in their neighbourhood; or, failing this, the Institute. (Hear, hear.) By this means the power and position of the Institute as the central governing body may be enormously increased, and become really representative of the bulk of the profession. Annual conferences could be held in London and various centres, where questions of this kind could be thoroughly debated; and it is certain that if the Institute, as really representing the bulk of the profession, were to take this matter seriously in hand, and its members, or the great majority of them, were really desirous to have registration and compulsory examination, the State would eventually grant the Institute the necessary power of examining and giving certificates of competency. (Hear, hear, and "It has done that.")

Mr. Chairman and Gentlemen.—I have now endeavoured briefly to put before you the question of "registration" in an impartial manner, with some remarks for and against the scheme. In conclusion I should like to add that the question has been discussed at a special meeting of the Liverpool Architectural Society, who, while taking a warm interest in the movement, are not prepared at present to pronounce any definite opinion, preferring to await the outcome of this discussion. (Hear, hear.)

The Chairman, in inviting discussion, said that the Conference had before it four very carefully written and extremely suggestive papers. He had only to suggest that the gentlemen who spoke would be good enough to condense their observations as much as was consistent with stating what was in their minds.

Mr. H. R. Gough remarked that it had given him great pleasure to hear that subject discussed in the rooms of the Institute. The matter had been before the public for fully twelve months. It had been in the minds of himself and some of his colleagues for something like three or four years, and he naturally took a great interest in the matter. It was not to be wondered at, perhaps, that some of those who had taken up the subject, without giving much thought to it, should have fallen into some slight mistakes. As to Mr. Connon's paper, he must say that in the main he fully concurred in it. One observation had been made about unregistered architects. The very object of the Registration Bill would be to compel all architects to be registered and to leave none outside, because one of its natural provisions would be,—as in the medical and similar professions,—to prevent any unregistered practitioner recovering fees. If course there would be nothing to prevent a man having clients, but he would not be able to recover any fees for his work. The committee had the honour of representing had spent a vast amount of time on the matter, and had drafted a Bill, which, of course, was open to criticism and correction. A great deal of importance seemed to be attached by some to the Federation scheme. It was, no doubt, an important subject; but even when they had federated all the societies, they would not then have a strong body to appeal to. The Institute and all the provincial societies only numbered, he believed, about

1,650 practising architects. That had been proved by statistics furnished by the secretaries of the various societies about twelve months ago; 1,700 would be the utmost number at the present time if they were all federated, which he imagined would take some years to effect. Now, the total number of architects in the United Kingdom, in round numbers, was between 9,000 and 10,000. To get the feeling of the profession as to whether compulsory registration was desirable or not, was a very simple matter. There was no need to have conferences, necessitating men coming from Scotland and Ireland. A letter sent to every architect in the kingdom would be likely to bring an expression of opinion quite sufficient for the purpose. An Act was undoubtedly required by the profession. Out of a picked list of 1,500 architects, not belonging to any society, who had been written to on the subject, 1,100 took the trouble to reply to what was merely a circular letter. What they had before them was to consider the best Bill that could be drafted, to make it as perfect as possible, and to have the different societies well represented. It would be absurd for a few London architects to attempt legislation for the entire members of the profession. There would undoubtedly always be a strong difference of opinion on the question of including engineers with architects under a Registration Act. He for one had always maintained, and always should,—that an engineer was simply a member of their own profession. If the engineer was not a constructor, he would like to know who was one? Where was the engineer fifty years ago? The architect, of course, was then the engineer, and it was only by a mere accident that the two professions had been severed and had become specialists in construction, to the misfortune of architecture and also to the misfortune of the country. The engineer was, as a rule, a much better constructionist than the architect, but the latter should know as much of construction as the former. He did not think it would be possible so to define an architect as to legislate for him to the exclusion of the engineer, as the professions were so constantly overlapping. When speaking of engineers he could allude to many Fellows of the Institute who were quite as much engineers as architects; the man who built a large brewery, for instance, was certainly an engineer. Then again, the engineer who built railway stations was in reality doing the architect's work. He hoped that some great good would arise from a discussion of the matter, and that before long such a Bill as he had referred to would be carried through the House. He had written to a great number of people, and had communicated with many members of both Houses of Parliament, the one reply being "I wonder it was never thought of before. It ought to be done, and it shall have my warmest support." He had also been told that if the profession did not do this for themselves, the Government would force it upon them. He did not think that it would be carried, as a Government measure, in the present congested state of the House, but that it would have the warmest support of all sections in Parliament he was morally certain.

Mr. Lucy W. Ridge said he had been struck with the difficulty which the writers of all the papers seemed to have met with, and that was in defining exactly what was meant by "Compulsory Registration," and how it was to be brought about. Mr. Gough had gone a little further into the subject, and had realised more fully than the gentlemen who had read the papers where the real difficulties of the matter rested. There was no doubt that if any man were asked whether he would like to have his own profession protected from outsiders, his reply would be in the affirmative. Therefore he had heard without the slightest surprise that Mr. Gough had received answers to that effect from a large number of gentlemen to whom he had written. But that was not a subject to be looked at solely from the architect's point of view, or with the ideas of those who would like to be protected. The chief industry of the country at the present time was crying for protection without the slightest chance of its being protected. [A voice: "What industry?"] Agriculture, of course. And it was unlikely, if agriculture were not protected, that architects would be protected from their point of view. He had listened very carefully to find out what form this proposition was to take, and the only definite remark made on the

subject was that people might be prevented from recovering fees for making plans. Now he did not think that that was within the range of practical legislation. Did they believe that either House of Parliament would pass an Act to prevent people recovering fees for making drawings? ("Yes!") It seemed entirely outside the range of reasonable belief ("No, no!"). Well, on that point they differed; but it seemed to him to condemn the whole thing at the beginning. They had no right to ask that any man should be debarred from receiving money for making drawings. The days of that sort of thing were gone. Gentlemen laughed at the idea of protection being applied to agriculture, and yet they wished to go back to the Medieval times, and apply protection to architecture! Mr. Gough had realised the difficulties of the thing, and had found it absolutely necessary to include the engineers. It was a melancholy thing when the engineers went to the front as they did, because to that they owed some of the most hideous monstrosities that had covered the face of the earth (laughter). However, it would be a long time before the two professions could be worked together, as things were. Then, again, the builders presented very material difficulties. Was it proposed to take in all the sanitary engineers and inspectors of nuisances, and every one who had to do with anything scientific? It had been stated by Mr. Connon that an appeal would have to be made to the Legislature to confer those special powers entirely on the scientific side of the case. He agreed with Mr. Connon. But, even if that course were taken, they must emphasize tremendously the sanitary question, and they could not turn off the people who made sanitation their special study. It, therefore, seemed that they might have a registered body of sanitarians and scientific constructors, but that art and architecture were to go absolutely to the wall! ("No, no.")

Mr. Walter Emden said that the profession did not want protection at all. They simply wished to get the profession free from quacks and charlatans,—men who came into it without any experience and crept into the societies as well as into the profession (hear, hear). Lawyers made agreements, and doctors prescribed medicine, and they only could recover fees in each of their professions. Under the circumstances, it seemed to him perfectly natural that, with registration, an architect, being a qualified man, could recover his fees, and that the man who was not registered or qualified could not recover them. That seemed to him a perfectly equitable arrangement, though possibly at the present moment it might not be so, because if only qualified people were admitted into registration a large number at present would have to stand outside. Vested interests were very properly considered in connexion with any Act of Parliament. In the first instance, therefore, a certain number of unqualified men might be brought into the profession, but he would say this distinctly, that if there were ten thousand architects at the present moment, and two, four, or even eight thousand were unqualified, if the present state of things went on it would not be long before the total number would be increased to twenty thousand, with probably eighteen thousand of that number unqualified (laughter). It was necessary that the line should be drawn as quickly as due and proper consideration of the question would allow, and it was essential at the present moment to all architects who had the welfare of the public and of themselves at heart that they should give their best attention to the question of the compulsory registration of architects, so that as soon as possible unqualified men might be prevented from entering the profession. The last speaker had said that it would be many a long day, if ever, before engineers and architects were brought together. But both professions were originally one. He had himself for five or six years practised entirely as a civil engineer, and since then fourteen or fifteen years as an architect, and he had never found that there was any difference in the two professions, excepting that the one sometimes forgot the art portion, which it ought to know more of, and the other sometimes knew nothing of construction. If the two professions were brought together under one Registration Act, and the matter carefully considered by a properly-constituted Council, would it not be self-evident to everyone that those differences

would gradually, and even quickly, disappear? Doctors and surgeons, when they came to register, were entirely separate bodies, and were practically so still, yet they were registered and worked together. Why, therefore, should not architects and engineers do so under one Registration Act? Those who were opposing such an Act were standing in the way of helping the public to have proper dwellings, and were to a certain extent indirectly answerable for a good deal of the bad construction and bad sanitation which only such an Act as was now proposed could prevent. (Hear, hear.)

Mr. Robert Walker (Cork) remarked that he had been very much struck at a meeting held that week in another place, in which a Chinese visitor made a comparison between the professions of Medicine, Divinity, and Law. The Chinese gentleman said,—"I am not an architect or an engineer, but I am an amateur architect, engineer, and surveyor. A comparison has been made between Medicine, Law, and Religion. These refer to the external man, while architecture, engineering, and surveying apply to all that is external to man and his external wants." The author of one of the papers read had considered it best to keep the professions separate, but he did not see why that should be so. The architect practised engineering, while the engineer practised architecture, in the pursuit of their lawful callings. Parliament would never give power to prevent engineers doing that portion of their work properly described as architecture. Nor would Parliament debar architects from performing that part of their duties which could only be correctly described as engineering (hear, hear). Mr. Walker then went into the question of the young architect's education, and proceeded to discuss the draft Bill previously referred to.

Mr. H. H. Statham here rose to order. He submitted that they had met for the discussion of the papers just read, and not to consider a draft Bill which was put forward by a society unrecognised by the Institute.

Mr. Walker pointed out that the papers read that day had referred to an abstract Act.

The Chairman.—No, I do not think the papers can be taken to refer to an abstract Act. Of course, we all know such a thing exists, but we have not got it before us.

Mr. Walker then said he would move the following resolution:—

"That this meeting is of opinion that it is desirable that all architects, civil engineers, and surveyors practising in the United Kingdom should be registered, and to this end it is necessary that an Act of Parliament should be obtained. This meeting is also of opinion that the Council of the Royal Institute of British Architects, or such Committee as they may appoint, should communicate and co-operate with the Architects and Engineers' Registration Act Committee, who have already drafted a Bill on the subject."

Mr. Trevail (Truro) seconded the resolution, although, he said, he considered it might have been made shorter. His idea in supporting it was that it was most desirable to have a Registration Act such as had been referred to that day.

The Chairman asked the mover and seconder to limit themselves to the first part of the resolution, namely,

"That this meeting is of opinion that it is desirable that all architects, civil engineers, and surveyors practising in the United Kingdom should be registered, and to this end it is necessary that an Act of Parliament should be obtained."

Mr. Walker said that he would adopt that suggestion with the greatest pleasure.

Mr. Trevail said he was glad that the latter portion of the resolution had been eliminated. Any registration, to be effectual, should be compulsory. Most of the professions were registered, and now the last to seek registration was that of the accountants. If the question were put to members of the registered professions, whether they would do without registration, it would be looked upon as ridiculous from a professional point of view. Architects ought to be all agreed on this question without having to make out any case amongst themselves. The case that required to be made out was before the public, and he believed it might take some years to be carried through, but it would be done in the end. He had been much struck by the opinions he had heard on the subject from medical men, especially in the matter of sanitation. The most important thing to decide was, Who should take the matter up? Those from the country who were not members of the Royal Institute of British Architects yet looked upon that body with the greatest respect, and it was a pleasure to come up and see men like the chairman, whose name had been familiar to

him for many years, and like Mr. Ridge, whom he was delighted to see. He hoped, therefore, that the Institute would take the lead in the matter, but if it would not do so, then the outsiders would show that they were determined to carry through the question, and to take it up even in spite of what he wished to speak of without offence as the inner ring of the profession. No doubt the inner ring were the best men to deal with the subject, but if they did not do so, the outside members of the profession must take some action, and the result would be a Registration Act. As to "tinkers and tailors" being included in the first registration, a test should be devised which would be accepted by the Legislature. From a public as well as from a private point of view, there would be an immense gain to the profession and the public if they could get rid of the various quacks now so much complained of. Referring to the Examination prescribed by the Institute, he had the greatest admiration for it, but it was utterly impossible for the majority of practising architects to drop their business and come up for Examination. He was struck with the remarks that fell from Mr. Hall on that point, and in a spirit which he was glad to see displayed; and the more that spirit was displayed the better it would be for the Institute as well as for the country practitioners. In the matter of federation he was afraid that good men would be excluded who were practising in the smaller towns ("Question!"). In Plymouth and Exeter, for instance, neither town would have an architectural society sufficiently large to be federated, although in Exeter there were gentlemen who might be regarded as good practitioners.

Mr. Edwin T. Hall explained that the Institute scheme made provision for all this, and that new societies should be formed to meet the difficulty.

Mr. Trevail, continuing, said that with regard to artistic work, any gentleman who showed artistic ability would always command his position in the profession, and what they wanted to have was a certain standard of qualification.

Mr. Hall said he was prepared to move an amendment to the proposal before the meeting. Mr. Gough had mentioned that there were ten thousand architects in the United Kingdom. He had made a calculation, however, and had found out that, if that were so, there was one architect to every five hundred householders in England, Ireland, and Scotland, and he could not conceive such a state of things to be possible. If there were fifteen thousand architects, that would make one to every two hundred and seventy-five householders (laughter). He proposed as an amendment:—

"That this meeting recommends the careful consideration of the Council the question of the Registration, either compulsorily or voluntarily, of bona-fide architects and architectural students, and suggests the appointment of a committee to deal with the subject."

The proper course, to his mind, was to appoint a Committee which would, as a matter of procedure, communicate with the societies in their respective centres, and procure valuable statistical information on which the Council would possibly take some action.

Mr. Aldridge seconded the amendment. Mr. Edgar Farman supported Mr. Walker's resolution. He thought the subject had been treated more from the architects' point of view than from that of the general public, though it was far more important to the public than to the architectural profession that a Bill of this nature should be passed. The meeting was a small one, and the Committee of the Institute would be a still smaller body to consider such a Bill.

Mr. Hall rose to order, on the ground that though Mr. Farman's observations might be valuable to the Council, they could not be dealt with by the present Conference.

The Chairman interposed, saying that there had been a considerable divergence of opinion in the papers they had heard, while many of the points on which they differed had not been discussed at all. He could not help thinking that the wisest thing to do would be, that if they could go home and think over the matter, the question might be further sifted, and public and professional opinion matured upon it. He felt, after what he had heard, that he should have great hesitation in coming to a conclusion as to the desirability of registration, but he was unquestionably convinced that the subject was one that ought to have the most careful investigation. He was, therefore, personally

disposed to think that the Conference would be going a little too far in adopting the resolution, and if the mover could see his way to agree to some such course as Mr. Hall had suggested in his amendment, it would probably be as far as they could go under the present circumstances.

Mr. Walker said he was prepared to amend his resolution as follows:—

"That this Conference requests that the Council of the Institute, or some committee appointed by them, take into consideration the question of a Registration Act."

A Voice.—"They have done so."

Mr. Trevail said he was ready to second Mr. Walker's resolution as amended.

After some remarks by Mr. Cowper and Mr. G. H. Guillaume, Mr. Walker submitted an amended resolution in the following form:—

"That this Conference requests the Council of the Institute, or some Committee appointed by them, to take into consideration the question of a Registration Act; and that this Conference is of opinion that a Registration Act is desirable in the interests of the public."

This was seconded by Mr. Trevail. The Chairman then put Mr. Hall's amendment to the meeting, when fifteen voted in its favour and fifteen against. The Chairman gave his casting vote in favour of the amendment, which he declared carried.

Mr. William Woodward remarked that he thought that any body appointed to consider the matter should avail themselves of the co-operation of the gentlemen who had expended so much time and money already on the subject.

Votes of thanks to the readers of the papers and to the Chairman closed the proceedings.

The following letter, addressed to the Hon. Secretaries of the Conference, has been communicated to us:—

"10, Lancaster-place, W.C.  
7th May, 1887.

DEAR SIRS,  
I shall, as Chairman of the Meeting held yesterday on the subject of the Registration of Architects, feel obliged if, in reporting the resolution (arrived at by the casting-vote of the Chairman) to the Council, you will draw attention to the fact that, notwithstanding the even numbers, that resolution really represents the general sense of the meeting, and so has a higher value than appears at first sight.

Those who voted against the resolution did so with the wish to substitute a motion very similar in wording and sense, but combining with the desire that the Council would refer the matter to a Committee for further deliberation.

I think it would be quite permissible to draw the attention of the professional press to these circumstances, and to communicate copies of this letter.—I remain, dear Sirs, yours faithfully,

T. ROGER SMITH.

The Hon. Secretaries,  
The Conference Committee."

#### VISIT TO THE NATIONAL LIBERAL CLUB.

FOR want of space we are compelled to hold over our account of the new building for the National Liberal Club, which was visited by the members of the Conference on the 3rd inst. under the guidance of the architect, Mr. Warburton, R.A. We have a detailed description of the building in type, which, together with plans of several of the floors, we hope to be able to give next week.

#### VISIT TO WHITEHALL COURT.

A VISIT was next paid to the important block of residential mansions in flats known as Whitehall Court, and which immediately adjoins the new building of the National Liberal Club. Messrs. Archer & Green are the architects. We gave a view and description of these buildings in the *Builder* for January 2, 1886, but may now give some additional particulars. The area of the site is 157 ft. by 365 ft.—57.3 superficial feet, or 1½ acre. The area of the main building is 38,000 ft. (about). The height of the building, from the pavement level to the top of the general roof, is 112 ft.; while the height from the pavement level to the top of the towers will be 206 ft. The height of the walls from the bottom of the footings to the top of the general cornice is 112 ft. The concrete foundations go to a depth of 22 ft. below the pavement, the continuous walls of concrete being 10 ft. 6 in. high and 8 ft. wide at the top and 10 ft. at the bottom. The soil at this level was found to be composed of gravel and sand with water, the entire height above having been "made ground" and Thames mud. The pressure distributed on the soil is ½ ton to the foot. The thickness of the walls of the basement floors averages 4½ bricks, and they have been planned that the weight on them nowhere

ceeds 15 tons on the foot. All constructional walls are built in Ellistown brickwork up to the second-floor level, and in "shippers" above that level. All floors are of fire-proof construction. The roofs are of timber construction, rendered fire-resisting. The whole building is divided into thirteen blocks, twelve of them being 54 ft. by 45 ft. Four blocks are grouped together as one building, and are accessible by a central staircase, and served by two elevators. The construction of the staircases will be of iron and concrete, with marble steps; that of the passages of iron and glass; while the decoration will be of marble. The buildings have a lower-ground, a ground, and an upper-ground floor, and seven stories above, with an eighth in the towers, making, in all, eleven floors. There will be suites extending over one floor only, averaging eight rooms each; others extending over one floor and a half, averaging twelve rooms each; others occupying two floors, and averaging sixteen rooms each. The total number of suites will be ninety-eight, with a total number of 1,028 rooms. It may be added that the exteriors are of Portland stone throughout, and that the carving, which is very good and not too abundant, is being done by Mr. John Hale. Mr. John Richards is the clerk of works. The builders are Messrs. J. W. Hobbs & Co. (Limited).

#### VISIT TO THE HOTEL VICTORIA, NORTHUMBERLAND AVENUE.

The members of the Conference next visited this building, which is now practically completed, and forms the latest addition to the hotel accommodation of London. Lately known as the "Northumberland Avenue Hotel," the building occupies one of the best positions in the metropolis. The site covers an area of some 32,000 square feet, and has a frontage of 300 ft. to the Northumberland Avenue. A contract having been entered into with Messrs. Perry & Co., of Tredegar Works, Bow, building operations were commenced in 1884. In preparing the site to receive the superstructure great difficulties were encountered from the treacherous nature of the ground. To reach a solid foundation it was necessary to carry down the excavations for the principal walls to the unusual depth of 50 ft. While these works were in progress a large quantity of running water was met with, which was traced and found to come from an old rivulet which had its rise in Highgate and fell into the Thames below this point. To keep this in check a 10 h.p. engine and powerful pumps had to be kept at work night and day for six or seven months, while a bed of concrete, 6 ft. thick, was being laid over the whole site. Shortly after the building had risen above the ground-floor level the property was acquired by the Building Services Company, who arranged with Messrs. J. W. Hobbs & Co., of Croydon and Queen's-buildings, Southwark, to carry on the works. The new owners retained the services of the architects, Messrs. Isaacs & Florence, from whose design the building had already been commenced.

The building consists of nine floors and a lofty basement, and its roof rises to a height of 122 ft. above the level of the Avenue. It contains some 500 bed and sitting rooms in addition to rooms in the basement set apart for servants, stores, and other purposes connected with the working of the hotel. The front elevation is faced throughout with Portland stone from the quarries of Messrs. Steward & Co. and Messrs. Crickmay & Co. The stone carving of the upper floors has been executed by Messrs. Daymond & Sons, and the whole of the remainder by Mr. Boekbinder. Of the ironwork used in the construction of the building the cast-iron stanchions have been supplied by Messrs. Young & Co., and the wrought-iron girders and stanchions by Messrs. Dibley & Son. The floors have been constructed throughout of a concrete composed of coke breeze and Portland cement, and for interior lobbies solid slabs of the same fireproof material have been employed.

The elevation\* is designed in the style of the French Renaissance, the combined dignity and freedom of which renders it, in the opinion of the architects, peculiarly adapted to a

building of this description. The monotony of a long façade has been relieved by the projection from the general frontage line of a central and two terminal pavilions. The provision of so large a number of windows, each tier marking a successive floor, rendered a horizontal treatment almost a matter of necessity. In order, however, to prevent an appearance of mere superimposition of disconnected stories, a certain amount of vertical grouping has been attained by the employment of a range of hold pilasters marking the principal divisions of the façade. These rise through and link together the three central stories. The two lower floors, which have been treated simply, combine to form a solid substructure upon which these pilasters stand. They are surmounted by a massive cornice running the whole length of the building, the frieze of which is deepened to include a range of windows. A double-storied row of coupled dormers, linked together by a flying arch, rises above this cornice. A triplet of these dormers crowns each pavilion. The intermediate portions, consisting of six bays each, have been treated with simplicity on the same general lines as the pavilions, but they have as a distinguishing feature a series of bay windows on the first floor, with projecting cornice carrying a continuous balcony, on to which the second-floor windows open. The principal entrance to the building in the central pavilion has been emphasised by a lofty and handsomely-carved arch the height of two stories. On either side the keystone are two carved figures, illustrative of Day and Night, the work of Mr. Boekbinder. This, the centre of the whole façade, is still further enriched by the introduction above the arch of a three-storied oriel, with caryatids and other decorative features, crowned by an ornamental balustrade.

The internal planning has been devised to provide as compactly as possible, considering the extent of the frontage, all the accommodation required for a modern first-class hotel. Simplicity of arrangement has been specially aimed at, and this has been obtained by the repetition on every floor from basement to roof of one main internal corridor, 8 ft. wide, extending from end to end of the building parallel to its front. The staircases and lifts open on to this corridor, and from it access is obtained to all the public and private sitting-rooms, and to the principal bedrooms. The remainder of the rooms on the upper floors are reached by two corridors running at right-angles to the principal one. All these have tiled dados, and that on the ground-floor has also a filling of gilded tiles arranged in panels, the tilework being thus carried up to the cornice level. All these tiles have been supplied by Messrs. Balfour & Co., of Longton. The approach to the hotel will be sheltered by an elaborate covered way, the work of the Coalbrookdale Co. The lofty portico, under the arch which spans the entrance, has its semi-circular ceiling lined with coffered panels of Patience, the work of Messrs. Simpson & Sons, of St. Martin's-lane. Passing through the entrance doors and lobby, the spacious vestibule is reached, the walls of which are entirely lined with alabaster, relieved with bands of Bardiglio. The latter marble is also used for the architraves of the doorways, and for other mouldings throughout. Round the whole a dado is carried, having its capping and base of Verde de Prato with a die of Sanguino. A similar combination of marbles has been used for the columns. Out of this vestibule, paved with veined marble squares with ornamental borders, a grand marble staircase, 13 ft. in width, having return flights on either side, rises to the first floor. At the foot of this staircase, and again on the halfway landing, its solid balustrading is terminated by massive marble piers, which serve as pedestals for lofty standard electro-gasaliers. The columns and pilasters are in alabaster, the pedestals having a die of rich red Numidian marble. The marble work is carried up to the cornice level of the first floor with pilasters of breccia. The wall of the staircase is enclosed by a marble balustrading in alabaster and breccia. The caps to all the marble pilasters and columns are finished a rich gold or bronze. All the marble work in the entrance hall and staircase has been supplied by Messrs. Farmer & Brindley, of the Westminster Bridge-road. The staircase is well lighted by a large lantern with decorated cove, which rises immediately over the main cornice. The public rooms on the ground-floor are

broadly grouped into three divisions. Those for the use of ladies and general visitors are placed at the southern end of the main corridor, and the gentlemen's at the northern end, while the rooms set apart for meals are to be found round and behind the grand staircase. A corridor, which passes beneath the halfway landing of the staircase, and is entered immediately from the entrance-hall, serves to connect and form a means of access to the Salle-à-manger, coffee-room, and haquetting-room. Fronting the general reception-room a domically vaulted vestibule, in close connexion with which the ladies' retiring-rooms are placed, forms the principal entrance to the Salle-à-manger. This apartment is 100 ft. long by 42 ft. wide, exclusive of the apse at the further end and the wings on each side. It rises through two floors, and thus has a height of over 30 ft. Although this room is chiefly designed for evening use, a lofty range of windows along the southern side renders it light and cheerful by day, this being still further secured by the admission of the morning sun through the glazed roof of the apse. A walnut dado, some 8 ft. in height, is carried round the room, and above it the various bays into which the walls are subdivided by the pilastered and arcaded treatment which has been adopted are filled with bevelled mirrors or with tapestries. These latter illustrate a series of subjects in connexion with her Majesty's Jubilee, and represent her as Queen and Empress receiving gifts and homage from her colonies and dependencies. All the tapestries employed here and in other rooms have been executed by Mr. Boekbinder, who has also, under the immediate superintendence of the architects, carried out in a very creditable manner the whole of the carton-pierre work and the general decoration. The ceiling is divided into domed panels, which are freely treated with gold, thus harmonising with the prevailing treatment of the room, in gold and cream. From the centre of these domes are suspended electroliers of special design. Double doors lead from the Salle into the coffee-room, which is an apartment 56 ft. long by 30 ft. wide. This room, like the Salle, has a high walnut dado; above this a dark leather paper is hung; the walnut work gives the key to the general decoration of the room and to that of the panelled ceiling. Between this room and the haquetting-room, which latter can also be approached from the northern end of the main corridor, are located the general lavatories and the room for hats and coats. In the former the fittings have been supplied by Messrs. Finch & Co., who have also provided a group of specially-designed oval wash-hand basins with flushing-rims.

The banquetting-room, the various approaches to which have been noticed above, is more Jacobean in treatment. It has a high dado of fumigated oak; above this a series of paintings are continued round the room, illustrating the sports and occupations connected with the daily supply of food and drink. On the right of the main corridor is the general reading-room. In the decoration of this a departure from the styles employed in the other public rooms has been effected by the use of the Flemish Renaissance. At the end of the corridor is the large smoking-room, 53 ft. by 37 ft. It is provided with large windows at either end, by means of which efficient through ventilation has been secured. The suite of public rooms at the southern end of the main corridor, which form more especially the ladies' quarter, consist of a reception-room, ante-room, and drawing-room. In these a light and cheerful scheme of French Renaissance decoration has been adopted, the drawing-room being finished an ivory white. The walls are panelled and hung with damasks, and the ceilings are delicately moulded. All these rooms are light and cheerful, as they are lighted directly from the Avenue. In addition to these public rooms the accommodation provided on the ground-floor includes two large private dining-rooms, a number of private sitting-rooms, and a range of bedrooms, together with the various offices required for the manager's department.

The upper floors are reached by a wide staircase at either end of the building, or by the four lifts, which are situated in pairs on each side of the centre. They have been provided and fitted up by the American Elevator Company, and the tanks which supply the water to work them are filled by a Worthington pump in the basement. All the newest and most

\* We gave a large view of it, together with the ground-floor plan, in the Builder for May 1, 1885; and a few months later, viz. on Nov. 6 last, we gave some of the carved details of the main entrance arch.

effectual precautions for insuring a safe and easy working are combined in the arrangements connected with these lifts. The hydraulic power to work them is provided from large tanks situated in the roof and the basement, the water of which is re-used continually.

The staircases have a wrought-iron balustrading supplied by Messrs. Starkie, Gardner, & Co., who have also furnished all the wrought-iron work in the exterior. Every floor throughout the building is provided with an ample supply of appliances for use in case of fire, the whole of this department having been carried out by Messrs. Sband & Mason.

The whole of the papering, with the exception of that in the public rooms on the ground-floor, has been supplied by Mr. W. Phillips, of Upper Thames-street. The papers in the reception-rooms were supplied to Mr. Boskinder by M. L'hoeste, of Liège.

The kitchen and offices are located on the fourth floor; the series of rooms over the *Salle* being entirely devoted to these purposes. The whole of the cooking apparatus, adapted almost entirely for the use of gas, has been supplied and fitted up by Messrs. James Slater & Co., of the Holborn Engineering Works.

The kitchen proper is surmounted by a large skylight, and has windows on three sides. Throughout this department, every precaution has been taken to secure a cool temperature and thorough ventilation. In addition to the several large and airy larders provided, an ice-room has been fitted up by Mr. Stockwell on his patent system. Opening out of the kitchen there are a pair of lifts, also the work of the American Elevator Company, communicating directly with the service-rooms for *Salle-à-manger* and coffee-room. The general service lift is close at hand, and as it opens on every floor into a service-room, any meals required in either the bed or sitting rooms can easily be supplied. An auxiliary kitchen is provided in the basement for the supply of private banquets, dinners, and other minor requirements.

The electric light, in the form of incandescent lamps, is supplied all over the building, but to guard against the possibility of mishap, it is generally duplicated with gas. The Wigham gas-lamp has been introduced into several of the public and private rooms. The whole of the work in connexion with the electric light installation has been carried out by Messrs. Thompson & Ritchie, who have also provided the electric bells, with signal semaphores and speaking-tubes. The fittings for the electric light are supplied by the Walsall Electrical Company, and those for the gas by Messrs. Hughes & Co., of the Atlas Works, Hatton-garden.

A large billiard-room for the use of visitors staying in the hotel is provided in the basement under the *Salle*. Here is ample room for five tables. A bar for refreshments, and all necessary lavatory accommodation, is in close connexion. A special staircase leads directly from the coffee-room corridor down to this room.

The basement, over 14 ft. high, contains further a good suite of bedrooms, hair-cutting and bath-rooms, a range of offices, and various servants' apartments, the auxiliary kitchen mentioned above, numerous cellars and store-rooms, and last, but not least, the boiler-house, engine-room, and engineer's quarters. In the former are two large Lancashire boilers, each 30 ft. long and 7 ft. 6 in. in diameter. These supply the steam power for electric lighting and for heating and cooking purposes. They are fed by a small Worthington pump. Another of these pumps supplies the motive power to the lifts, while a third is used for lifting water required for all purposes from the receiving tank in the basement to the various supply-tanks throughout the building as well as to the 10,000 gallon fire-tank in the highest point of the roof.

The hot-water supply is obtained by means of a Berryman's heater, and is carried to every part. The general heating of the building is effected by coils of hot-water pipes, which are liberally dispersed throughout the public rooms and corridors.

The engines for the electric light have been made by Messrs. Browett & Lindsay, and to these and to the dynamos separate rooms have been devoted.

The building is furnished throughout by Messrs. Maple & Co., who have received directions to complete everything in a style suitable to a building of this importance. So

far as the furnishing was completed when the building was visited they had been very successful in complying with this instruction. The wooden chimney-pieces and over-mantels are by Messrs. Wm. Walker & Sons, of Bunhill-row. All the floors of the principal rooms, viz., those of the *Salle-à-manger*, coffee-room, smoking-room, banquetting-room, and ante-room of the *Salle-à-manger*, covering altogether an area of 150 squares, are laid with Mr. J. F. Ebor's solid parquet floors, of simple but effective design.

The whole of the works in connexion with the erection and completion of this building have been carried out under the immediate superintendence of the architects, Messrs. Isaacs & Florence, of Verulam-buildings, Gray's Inn. Mr. Charles Till has acted throughout as clerk of the works.

#### VISIT TO THE ROYAL HOLLOWAY COLLEGE, EGHAM.

On the afternoon of Tuesday, the 3rd inst., a party of gentlemen attending the Conference proceeded by rail to Egham, to visit the Royal Holloway College, as mentioned in our last. We have so recently \* illustrated and described this remarkable building that we need say nothing more about it now.

#### VISIT TO COLLINGHAM GARDENS.

On the morning of Wednesday, the 4th inst., the members of the Conference visited several houses in Collingham Gardens, erected from the designs of Messrs. Ernest George and Peto. One of the houses visited adjoins that of Mr. W. S. Gilbert, and has been erected for Messrs. Cassell and Co., the well-known publishers, for the residential accommodation, as we understand, of some of the members of their editorial staff. This house is already furnished.

#### VISIT TO KENSINGTON COURT.

The visit of the members of the Conference on the same morning to the houses occupying the site of Baron Grant's mansion, and collectively known as Kensington Court, was largely attended, and marked interest was shown by the visitors in this estate, which is one of the most complete among recent undertakings at the West End, possessing several advantages in its self-contained area. The attention of the party was first drawn to the subway which runs under the centre of the roads all round the estate, and which is of sufficient size for a man to walk in, and containing under the bottom the main drainage pipes, with access to connexions of each house, and in the subway itself the gas and water mains and electric cables. The advantage of this ready access to drains, pipes, &c., is obvious, and has frequently been pointed out in our pages. The pumping station next received attention. It has been erected under the direction of Messrs. Ellington and Woodall, for the Hydraulic Power Company, from which the water supply to work the passenger-lifts is distributed at high pressure through mains in the subway. The machinery, &c., for this purpose appears to have been thoroughly and carefully carried out. The visitors made a careful inspection of the electric lighting works, also situated on the estate. These have been erected by Messrs. Crompton & Co., of Cbelemsford, and fitted on the system of storage by means of accumulators of sufficient capacity to contain electricity for one night's consumption of all the houses, in addition to the current from the dynamos, thereby ensuring immunity from interruption of the light by the temporary cessation of the machinery. The machinery and plant, already of ample power, are capable of being extended up to 10,000 lights without derangement of the present working.

The exteriors and arrangement of the houses (the work of Mr. J. J. Stevenson) received considerable attention, and favourable comments were made on the elevations, which are of red brick and grey terra-cotta, carefully chosen.

The interiors vary in size, the larger houses containing three reception-rooms on the ground floor, and boudoir on upper floor; and the smaller with dining-room and library on ground, and drawing-room and boudoir on first floor. A

special feature is the entrance-hall,—often conspicuous by its mean dimensions, or even by its total absence, in a London house of similar size,—which is roomy and carried up with open well in the larger houses. The steps at the entrance leading to the ground-floor level are either in the vestibule or under cover, which is a great advantage in wet weather. The basements are well lighted, and the rooms throughout well proportioned, with good window space and special provisions for ventilation. The continuous balcony at the first-floor level made in this case a pleasing architectural feature, and is well suited for pot plants and creepers.

The finishing and decorations of the interiors of the houses is being carried out under the direction of Mr. William Rolfe, who acts as resident architect to the estate. Somewhat attention has been paid to the fireplaces, with a view of ensuring comfort combined with economy of fuel. The mantelpieces are specially made, and painted with the other woodwork and dados, which are panelled out in some cases on the plaster. The ceilings, either enriched with mouldings or plain, are light in treatment, and where possible wall-papers of good but not heavy colouring have been chosen, with a view of obtaining a fresh and cheerful appearance, which end is further attained by the use of ivory white paint.

The electric lighting, now for some time in use, is by incandescent lamps, adapted, where desired, to existing candelabra, &c., and the occupiers fully realise the advantages of the light over coal gas, not only in the improved temperature of the rooms, but also in the saving of the decorations. The difference in cost between this and gas is found to be but small.

The passenger-lifts, an important part in the convenience of the houses, are capable of carrying four persons, and supply the place of back stairs for the servants' use between the basement and upper floors, as well as for carrying the tray for meals. The action of these lifts is well worthy of notice, and is by means of continuous rods inside and outside the cage for setting the lift in motion, the doors to the well-holes being self-closing and fixed until the cage comes to the floor level, when the bolt is released and the door can be opened. This arrangement, which has been successfully carried out, reduces the risk of accident to a minimum.

One or two other houses which have been specially built for private persons, were visited, notably the one at the corner at the entrance to the estate, from designs of Mr. T. G. Jackson, where the interior has been worked out with the same care as the elevations, making the most of the very fine position overlooking Kensington Gardens.

Attention also was given to the compact stables, arranged with carriage-houses on the ground floor and horses on the upper floor, and rooms accommodated over these; in sets for four or more horses. A private set, specially built to meet tenants' wishes, and attached to one of the houses, provides standings for nine horses on the ground-floor, with carriage-houses over, the vehicles being taken up by a carriage-lift. The interior finish of the stables, the electric lighting, and the way in which the most had been made of a small space, are among the points which were deservedly commended by the visitors.

[Accounts of a few other visits will be found in another part of this week's *Builder*.]

#### THE CONVERSAZIONE.

The *conversazione* given by the President and Mrs. P'Anson at the South Kensington Museum on the evening of Thursday, the 5th inst., was a great success. There were nearly 1,200 guests, including Mr. and Mrs. Cavendish Bentinck; Mr. and Mrs. A. Stuart Wortley; the Hon. Mrs. J. Stuart Wortley; Mr. W. Holman Hunt; Dr. Dohme (Emperor's Librarian at Berlin); Mr. H. Schutz Wilson; Mr. Edwin Freshfield, LL.D., and Mrs. Freshfield; Mr. Edward A. Freeman, D.C.L.; Sir J. Whitaker Ellis; Mr. Owen Roberts; Mr. T. G. Jackson; Sir Fred. Goldsmid and two Misses Goldsmid; Mr. W. Calder Marshall, R.A.; Mr. F. W. Cattermole; Sir Edward and Miss Sieveking; the President of the Institution of Civil Engineers; Sir John Code, V.P. Inst. C.E.; Mr. H. W. B. Davis, R.A.; Mr. Lumb Stocks, R.A.; Mr. H. Treaceman Wood; Mr. George Corson, of Leeds; and an unusually large number of non-metropolitan members of the Institute, and several well-known contractors.



# The Builder.

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SATURDAY, MAY 21, 1887.

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### Recent Excavations in the Presbytery of Lincoln Minster.



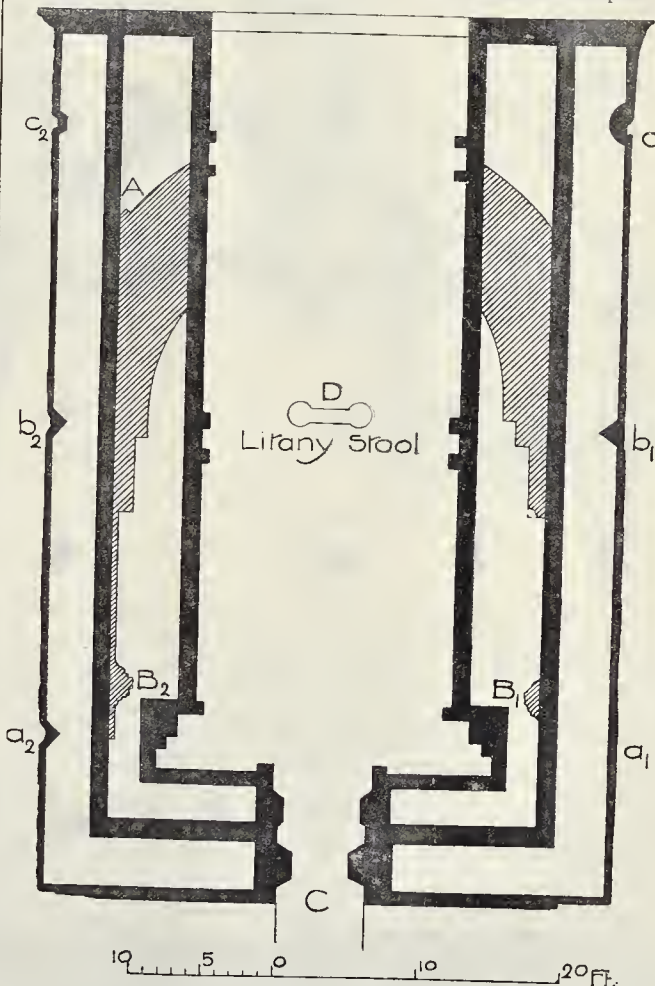
THE Cathedral of Lincoln, in common with the majority of our English cathedrals and minsters, has successively received more than one eastward prolongation. As originally

built by Remigius, the first Norman bishop of the great Mercian diocese, by whom the see was removed from Dorchester-on-Thames to Lincoln and the first cathedral church erected (1092), the eastern limb of the cathedral was short, and apparently not provided with aisles. After standing for a century the Norman choir was removed to make way for that of Bishop Hugh of Avalon, the "St. Hugh" of Lincoln tradition and Carthusian hagiology (d. 1200). The Burgundian prelate's building was in every way larger and more lately than the stern and simple fabric of his Norman predecessor, and was considerably more than twice its length. This new extension terminated in an apse, which, after an existence of not more than forty or fifty years, was demolished for the further prolongation of the church by the erection of the presbytery or angel choir, for the reception of the shrine of the then recently canonised bishop and his wonder-working remains. This last addition to the fabric was made between 1255 (when permission was given by Henry III. for the removal of the eastern city wall to allow of the extension of the cathedral) and 1280, when the relics of St. Hugh were solemnly translated, with circumstances of the latest pomp, to their new home.

With the last of these extensions, the so-called "angel choir," we are not now concerned. Happily no restoring or devastating work (the words are too often synonymous) has been laid upon it, and it stands the same as all its main architectural features as it was by its builders, confessedly the most perfect example of the best period of Gothic architecture, and, in Mr. Freeman's eulogistic words, "one of the loveliest of human works." In the eastern terminations of the churches of Remigius and St. Hugh the case is different. Both have been entirely demolished down to the foundations, which afford the means of determining their form and arrangement. For this purpose, however, materials, some long since known and some only recently brought to light, though they are sufficient, and enable us to lay out with accuracy the ground plan of the

buildings, and, by comparison with other parts of the same dates, to give a reasonable guess at their architectural composition and general contour.

essential for the erection of the new. So when Geoffrey of Noyers, Bishop Hugh's architect, was engaged on the erection of the present choir, he did not trouble himself to pull down



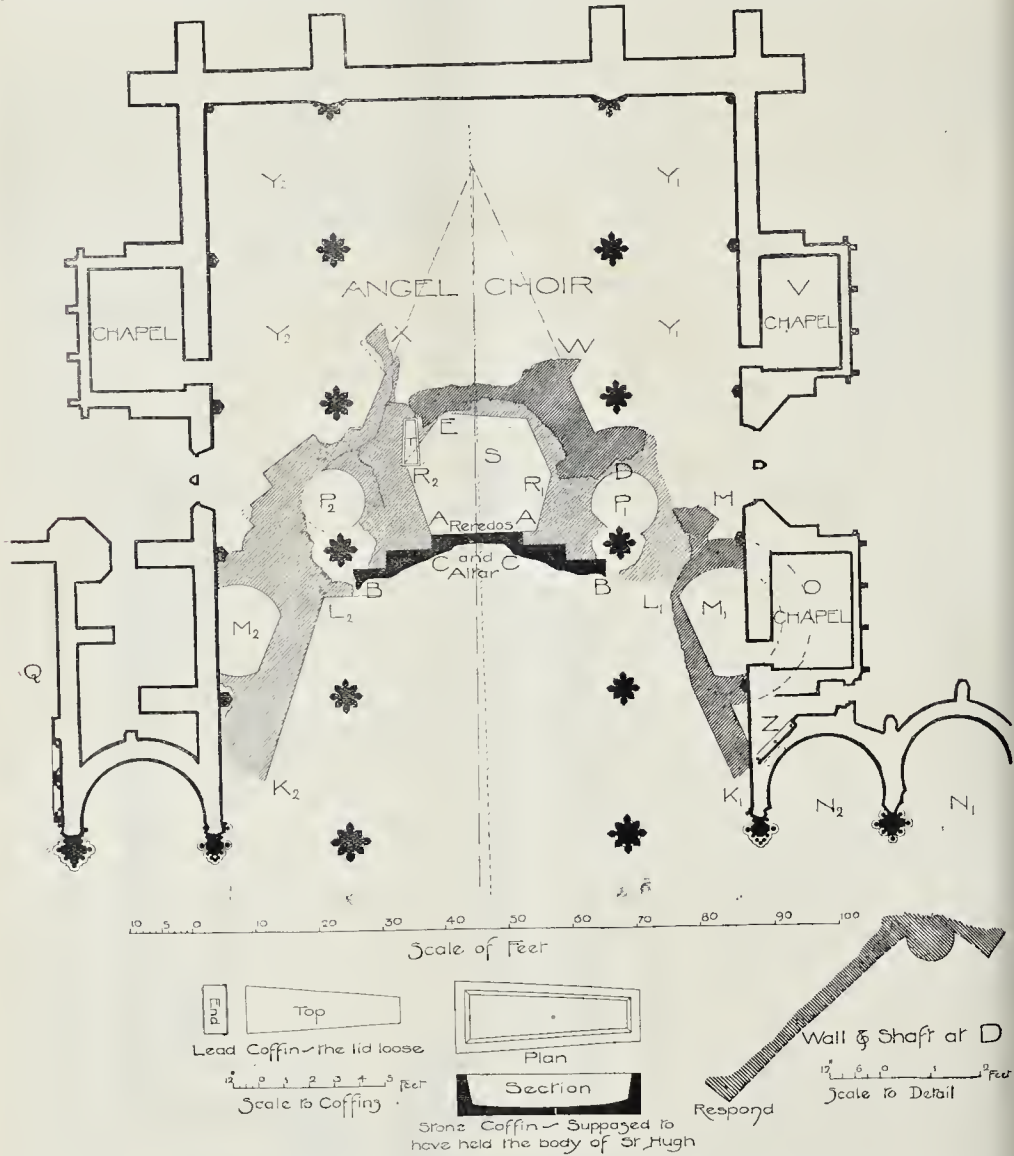
Plan I.—The Foundations of the Norman Choir of Lincoln Cathedral.

To begin with the eastern limb of the Church of Remigius (plan I). Mediaeval builders were, as a rule, very sparing of their labour, and, when rebuilding or enlarging a church, never removed a foot more of old work than was absolutely the whole of Remigius's work, but left the lower courses of the walls standing, knowing that the side portions would be concealed by the raised platform of the choir stalls, and the central part hurried in the new and higher

floor. Whether the existence of these precious traces of the old work was previously known is uncertain. Probably the cathedral workmen, in the course of their operations, became acquainted with them. But for all practical purposes they were discovered in 1853 by Mr. T. J. Willson, the son of one whose name deserves honourable mention, the late Mr. E. J. Willson, the contemporary and fellow labourer of Britton and Pugin in those great architectural publications which did so much in the early part of

measurement by the present clerk of the works under Mr. Pearson, Mr. J. J. Smith, will explain the nature of the remains better than any description. The lighter shade represents the Norman foundations, the darker tint indicates the framework of the choir stalls. It will be seen that the Norman choir was very short, not reaching beyond the second bay of the existing choir, and was 10 ft. narrower. A fragment of an external pilaster buttress to the north-east of the apse (A) proves that, as at St.

The first extension of the choir or eastern limb was made, as has been already said, when the reconstruction of the cathedral was commenced by St. Hugh in the erection of a new and much enlarged eastern limb. The foundation of this work was laid in 1192, and St. Hugh died in 1200. Between these two dates, therefore, St. Hugh's work must be placed. St. Hugh's addition comprised a ritual choir of four bays, succeeded by a second transept, as at Canterbury, Salisbury, Beverley, Worcester,



Plan II.—The Foundations of St. Hugh's Apse, Lincoln Cathedral.

the century to familiarise the world with the forms and details of our cathedrals and ancient churches. This gentleman, by doing what it would seem his father had never done,—close as were his investigations of every part of the cathedral, of which he at one time proposed to write the history, viz., by descending with a lantern beneath the floor of the stalls, discovered the foundation of the whole eastern limb of the Norman church, with the springings of its semicircular apse. The accompanying ground-plan (plan L), taken from actual

Stephen's at Caen, and originally at Peterborough, the apse had no surrounding aisle or procession path. Two rough blocks of masonry projecting from the wall at the west end (B<sub>1</sub>, B<sub>2</sub>) mark the position of the great transverse arch of the choir. The length of the chord of the apse was 25 ft., and the walls were 8 ft. thick.\*

\* The letters a<sub>1</sub>, a<sub>2</sub>, b<sub>1</sub>, b<sub>2</sub>, c<sub>1</sub>, c<sub>2</sub>, in the plan indicate the lower parts of the vaulting or wall shafts of St. Hugh's choir, the middle portions of which were removed to make room for the backing of the new stalls erected by Treasurer Welbourne (d. 1399), the stumps being fitted with corbels

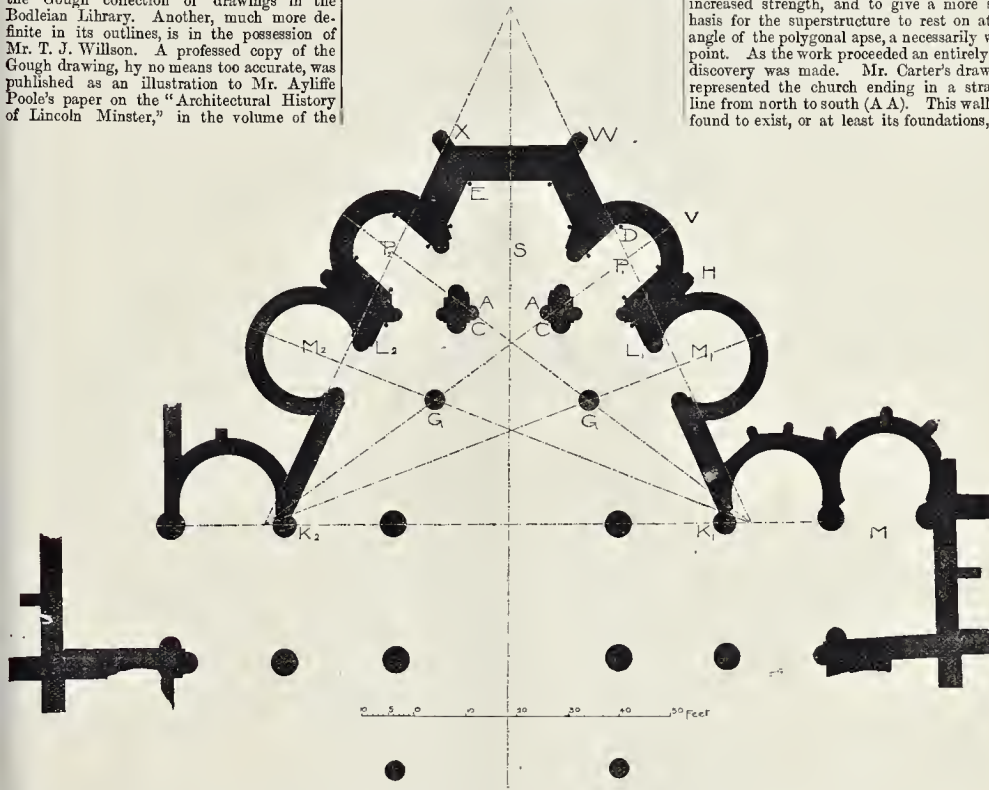
and Rochester, and, though with smaller projection and now absorbed in the widened aisle at York. Each arm of the transept had two semicircular or segmental chapels attached to the eastern wall. How far St. Hugh's building extended beyond the transept, and what form was, there was no visible evidence to determine, the whole having been taken down

of the same date. The economy of labour characteristic of the Medieval workmen is shown by their allowing shafts to remain as soon as they got below the floor of stalls, and were therefore out of sight.

on the erection of the thirteenth-century extension, the presbytery or Angel Choir. On these points, however, sufficient evidence has always existed, and still exists, beneath the pavement of the church, as the foundations which, originally discovered on the paving of the cathedral in 1791, and imperfectly measured and planned at that time, have been again laid here in the last few months, and accurately measured and drawn by Mr. Smith. The earlier plans were made by the Rev. John Carter, then the head-master of the Lincoln Grammar School, who had a very intelligent love for Gothic architecture, and was an adequate draughtsman. One of his plans, made "from memory," in 1792, is preserved among the Gough collection of drawings in the Bodleian Library. Another, much more definite in its outlines, is in the possession of Mr. T. J. Willson. A professed copy of the Gough drawing, by no means too accurate, was published as an illustration to Mr. Ayliffe Poole's paper on the "Architectural History of Lincoln Minster," in the volume of the

follows. At the end of November last year (1886) a portion of the pavement at the south-west angle of the south aisle of the presbytery ( $K_1$  plans II. III.) requiring repair, the slabs were taken up. Those who directed the work knew that the foundations drawn by Mr. Carter probably existed on this very spot, and desired the workmen to be on the look out for them. They very speedily came upon the south wall of the semi-hexagonal apse ( $K_1, L_1$ ) and the walls of a segmental chapel ( $M_1$ ), corresponding in form to the southernmost chapel of the south-eastern transept ( $N_1$ ) attached to it. These were traced as far as Bishop Longland's chantry ( $O$ ), which had been

churches, as at Chartres and St. Ouen at Rouen, wedged in, as it were, between chapels of larger dimensions and greater projection. Mr. Pearson's development of the ground-plan from the existing remains is given in plan III. It will be seen that he considers that the foundations are those of two small chapels with an external curved wall ( $V$ ), hut quadrangular within, vaulted from four wall shafts, and approached from the aisle or procession path by a triangular vaulted severy, such as we see at Ely behind the diagonal arches of the octagon. The circular form of the interior Mr. Pearson considers to be due to the builders having carried the foundations through uniformly from the outer wall for the sake of increased strength, and to give a more solid basis for the superstructure to rest on at the angle of the polygonal apse, a necessarily weak point. As the work proceeded an entirely new discovery was made. Mr. Carter's drawings represented the church ending in a straight line from north to south ( $A$ ). This wall was found to exist, or at least its foundations, hut



Plan III.—Development of the Ground Plan of St. Hugh's Apse, by Mr. J. I. Pearson, R.A.

Transactions of the Associated Architectural Societies for 1857. This was the first time this ground plan had been given to the world. A notice of the original form of the east end of St. Hugh's church, as derived from these explorations, was to be found in a note to Wild's "Lincoln Cathedral," p. 8,\* hut to Mr. Poole belongs the merit of having made it generally known, and of interpreting the indications afforded by the foundations, if not with perfect accuracy, yet as nearly so as the drawings allowed. The suggestion made by Mr. Poole that St. Hugh's church "terminated in a semi-hexagon with a chapel attached to each side," has been fully confirmed by the recent excavations, hut the theory that the "circular appendages" at the eastern angles of the apse were "stair-turrets," like those which flank the apse at Peterborough, which has been generally accepted, has been as completely disproved by them.

Of these explorations the history is as

partially built on its site, allowed. When at a later period the investigation was extended to the northern side, the results exactly corresponded with those on the south. There was the same sloping wall ( $K_1, L_1$ ) and the same annexed segmental chapel ( $M_1$ ). The investigation now became so interesting that it was determined to carry it out thoroughly, irrespective of any supposed repairs required by the pavement. The next part examined was what Mr. Poole calls the "circular appendages" at the northern and southern angles of the end wall of the apse ( $P_1, P_2$ ). The idea previously entertained that these had been stair-turrets was negatived by the discovery of a fragment of two dressed walls, one partially curved, the other straight, meeting at an angle ( $D$ ) with the footing of a small wall shaft still *in situ* at the junction,\* while careful digging in the centre of the circular void failed to discover any trace of the foundation of a newel. Mr. Pearson, after devoting much time and thought to the subject, has come to the conclusion that these appendages represent actual chapels of small dimensions, such as are found in some of the French

\* This wall and the annexed shaft will be seen drawn on a larger scale in the margin of plan II.

not as a terminal wall, hut either as a honing wall below the ground to tie the angles of the hexagon together for greater strength (as was the case with the segmental chapels), or as the base of a screen or reredos. But beyond this wall the foundations of a hexagonal chapel of 23 ft. internal diameter were discovered ( $S$ ), occupying a corresponding position to the chapel popularly known as "Becket's Crown" at the east end of Canterbury Cathedral. As will be seen on plan II, the plan of this chapel was laid out inaccurately, its transverse axis  $R_1, R_2$ , not being at right angles with the longitudinal axis of the church. The external angles of this and the other chapels were strengthened by buttresses ( $WX$ ), of which the best preserved was that between the segmental and the smaller chapel on the south side ( $H$ ).

Such a group of apsidal chapels surrounding the chief apse was more a Continental than an English arrangement. We find examples at Norwich and at Tewkesbury, and in Westminster Abbey, where the Continental influence is very evident throughout the eastern part of the building; and recent excavations prove that they existed at the great Cluniac Priory at Lewes. But it was a foreign feature which

\* "When this part of the church was new paved in 1791 some foundations were discovered, by which it appeared that St. Hugh's Church terminated in a half hexagon, of which two sides extended from the angles of the east transept to a line somewhat within the present altar-screen."—Wild's Lincoln, p.

did not take root in our island. The ground plans of French churches given by M. Viollet-le-Duc in the first volume of his "Dictionnaire" offer several curious parallels to the Lincoln arrangement in the alternation of larger and smaller apsidal chapels surrounding the great apse,\* and similar examples are presented by some of the German churches. One point of remarkable interest has become apparent in Mr. Pearson's investigations, and is shown on his ground plan (plan III). This is that a triangle, the base of which is given by a line drawn through the centre of the columns on a line with the east wall of the eastern transept, gives the lines on which much of the work is set out. The centres of the little chapels (P<sub>1</sub>, P<sub>2</sub>) fall almost in the centres of the sides of this triangle. Mr. Pearson remarks that there are parallels in Germany, especially in Bohemia, where churches and annexed chapels are found with triangular endings, and with some chapels of a hexagonal form added on at the extreme end.†

It should be mentioned that through the larger extent of the explorations, rude concrete foundations, marked by a lighter tint in plan II., alone remained, the upper surface being 1 ft. 4 in. or 1 ft. 5 in. below the surface. The portions of actual walling above the original floor-line which were discovered are shaded in a darker tint. The wall here reaches to within about 8 in. of the present floor. The most considerable fragments were those of the south diagonal wall of the semihexagon, K<sub>1</sub>, L, and the springing of the curved wall of the annexed chapel (M<sub>1</sub>), together with a considerable portion of the eastern and southern walls of the eastern hexagonal chapel W X, and of the walls of the smaller southern chapel at (D). A very important piece of wall at the north-eastern angle of the hexagonal chapel at E determines its form and dimensions. To preserve a permanent record of the discoveries all the chief lines of the building have been marked by lines deeply incised in the pavement.

It should be remarked that the recent discoveries give a clue to one of the many architectural puzzles suggested by this cathedral, as shown on plan II. The northern wall of the northernmost chapel of the south-eastern transept (N<sub>1</sub>), originally dedicated to St. Paul, is straight instead of curved, and has on its outer face a portion of a shafted arcade (Z). This has every appearance of having been originally internal, and it seems to indicate the existence of a little chapel squeezed in in the space between the two larger segmental chapels, N<sub>2</sub>, M<sub>1</sub>.

The supposed sepulchre of St. Hugh, which occupied the north-east angle of the eastern hexagonal chapel (T), over which a Renaissance table tomb had been erected by Bishop Fuller after the Restoration, proved, on investigation, to be quite empty of human remains. A stone coffin was discovered containing one rudely formed of sheets of lead unsoldered. This inner coffin was shown by the stains on its sides to have once contained a human body, but this had been abstracted, leaving only portions of decaying vestments. Microscopical and chemical investigation showed remains of flaxen and silken tissues, intermingled with fine gold threads, but any traces of human remains were entirely absent. The whole, coffin and contents, were carefully replaced.

#### NOTES.



We have received from the "Société Centrale d'Architecture" of Belgium a pamphlet on public architectural competitions.‡ The pamphlet includes two Reports, addressed by the Société to the Government and to communal and provincial administrations, the committees of hospitals, and other persons in positions of public trust : the first considering

\* We may refer to Vicoquery-sur-Marna, p. 169; Fontevraud, p. 171; St. Etienne de Nevers, p. 173; Ronce, p. 237; Chartres, p. 235; St. Omer, p. 230.

† Grueber's "Kunst der Mittelalter in Böhmen" may be consulted. See Hohensretz, p. 62, fig. 139; Strakonice, p. 67, fig. 169; Humpolec, p. 43, fig. 75; Braunau, p. 44, fig. 77.

‡ Concours Publics; leur Utilité, leur Organisation. Bruxelles: Alliance Typographique. 1887.

the advantages and disadvantages of competitions; the second treating of the best method of organising them. The first Report sums up in favour of competitions, which it appears have been little countenanced in Belgium, with the consequence, says the Report, that Belgian architects are obliged to go into foreign competitions in search of fame and reputation, being "cartés dans leur pays." Another consequence is, according to the Report, that many buildings are not given to the best men, and that certain public buildings, of which a list is given, would have fallen into very different hands and shown a very different type of architectural design if they had been opened to public competition. The Report on the Organisation of Competitions mentions some instances of the victimisation of architects, which it is interesting to compare with our experiences in this country. In the case of the Hospice de l'Harmonie at Verviers, the successful architect was expected, for a premium amounting to one per cent. on the estimated outlay, to furnish the working drawings and every instruction necessary for the execution of the building, without further remuneration. In regard to the double system of competition (sketches first and finished designs afterwards), the Report sums up some of the reasons for and against it, the most important reason in its favour being that put forward at the Paris Congress of Architects, that an architect whose main idea in the design is a bad one "ne s'en rend pas compte toujours" (which we should think very probable); he finishes his design laboriously in faith and hope, only to lose his labour; whereas the badness of his idea would have been at once apparent on the sketch competition, and he would have been put out of his pain with no further waste of tissue over it. On the other hand, M. Hermant's opinion is quoted, "Le concours a deux degrés me gêne un peu," and the drawback is noted, either that one competitor may appropriate another's ideas when the sketches are exhibited, or that the sketches must not be publicly exhibited; which latter the Report regards (justly, we think), as the greater evil of the two. After all, it ought to be easy to get over this objection by simply giving competitors to understand that their finished designs were expected to be on the main lines of their sketches. If we rightly understand, the principle of the double competition has been formally approved by the Belgian Society, but only in the case of buildings the cost of which would exceed 100,000 fr.; much too low a limit, in our opinion. Nothing under 10,000 l. value should be put up to double competition, if to public competition at all. To the Report is attached a proposed schedule of rules for public architectural competitions in Belgium. The 5th article provides that architects should send in two sealed envelopes, one containing, as usual, the name and address, with the motto outside, the other containing the names of two architects whom the competitor desires to see on the jury. The two architects having the greatest number of votes are to be elected on the jury. But the rules do not seem to provide for the very probable case of one or both of these being among the competitors. What is to be done then?

THE recent decision of Mr. Justice Kay in the case of MacManus v. Cooke should be taken note of by house-owners. The plaintiff and the defendant made a verbal agreement by which each party agreed to make certain alterations in their premises so as to give to the premises of each a sufficient quantity of light. The plaintiff had partially performed his portion of the agreement when the defendant refused to make the alterations which he had undertaken to do. The Statute of Frauds is an Act well known to successive generations of lawyers, and the question arose whether a part performance by the plaintiff was sufficient to enable him to compel the defendant to fulfil the agreement on his side, so that the absence of a written agreement should not cause the Statute of Frauds to prevent him from succeeding in his action. Mr. Justice Kay decided that the doctrine of part

performance applied, and gave judgment for the plaintiff. This decision is satisfactory; but, at the same time, owners of property should be careful to put such agreements as these into writing, because it is laid down by the fourth section of the Statute of Frauds that no action shall be brought upon "any contract or sale of lands, tenements, or hereditaments, or any interest in or concerning them, or upon any agreement that is not to be performed within the space of one year from the making thereof, unless the agreement upon which such action shall be brought, or some memorandum or note thereof shall be in writing or signed by the party to be charged therewith."

THE Society of Italian Engineers and Architects of Rome have recently published their annual report, which is preceded by a note on the progress and scope of the Society. On the 1st of January, 1871, at a time that numerous associations of a variety of form and object were founded, a society called the Technical Club was formed, which, although the definite purpose was of a scientific character, did not exclude festivities and similar objects common to other urban clubs. A desire to bring the association more in conformity with its true proper mission suggested the first change of name in 1876 to the College of Engineers, Architects, and Land Surveyors of Rome, the establishment of monthly meetings for the reading and discussion of papers, and the substitution of the publication of regular proceedings for a journal called *Young Rome*, which was the organ of the Club. In 1877, the surveyors having constituted a separate association for themselves, the institution took the name of the College of Engineers and Architects of Rome, retaining as members such of the surveyors as desired to remain. From that time until 1884, when the fourth Congress of Italian Engineers and Architects took place in Rome, there have been few noteworthy changes. In 1885 four volumes of "Transactions" were published, and the number of members, which had previously decreased to 140, rose in that year to 225. In the following year the society was reconstituted as the Society of Italian Engineers and Architects, chiefly through the exertions of the engineer Giovanni Cadolini, a member of Parliament. The society is more a college of engineers than of architects, as may be seen by the titles of some of the papers read before it, such as, "On Wood Pavements for Streets in Towns," "On the Construction of Railways over Boggy Lands," "On a Formula of Poncelet," "The Transmission of Electric Power at the Monaco Exhibition," &c.

THE Church of Santa Maria dei Miracoli at Venice, was re-opened on the 8th inst. after having been closed to the public for more than twenty years. The *Venice News*, in commenting on the re-opening, remarks that the work of restoration has been carried out with much greater respect for work than has been exhibited in Venice here and elsewhere (alluding, we presume, to St. Mark's), and that the sculptured parts, which are by far the most important, have been respected and preserved. Most of the marble facing, both inside and out, has, however, been removed or scraped, and, unfortunately, it appears has been left without that polishing which is necessary to display the real colour of the marble, and to preserve it from the weather. We gave a plan of the church, with a translation of some antiquarian notes relating to the fabric by Signor Giacomo Boni from a monograph in the "Archivio Veneto" (2nd series, vol. xxxiii, part I.), in our last week's number (pp. 711-13).

IT has been long supposed that the story of Perseus and the Grey Sisters with their one eye, though familiar in Greek literature, was unknown to Greek art. In the last issue of the German *Mittheilungen* (xi. 4), Dr. Boeblau puts an end to this supposition. He republishes a beautiful little Athenian pyxis, on which the scene of the stealing of the eye is represented with singular directness and simplicity. "Republishes," we advisedly say, for the pyxis had

long been known to archaeologists, but unfortunately only through a careless inaccurate drawing published in 1879 by Dr. Gaedeche. In this drawing the one eye, the main point of the story, was omitted, and the three sisters were drawn with seeing instead of blind eyes. The pyxis was found close to the ὄρφαντροφεῖον at the Peireos; it belonged to the Philemon collection, and passed with that collection into the possession of the Athenian Archaeological Society. The three sisters are represented as young maidens with dark hair, a characteristic euphemism of the vase-painter; he chooses to forget that they were "hoary from their birth" (ὅτι γυναικὲς πολλάς), though he remembers that they were fair of face (καλλισταρμούς); they are all three seated and hold sceptres in their hands, for they are princesses, daughters of the old sea-king Phorkys. The sister to the right holds the eye in her hand, and reaches it out to the second sister, but Perseus, who has just flown up, throws himself in between them. The eyes of all three sisters are drawn blind, according to the conventional Greek manner, i.e., without pupil. On the other side of the pyxis is a gathering of the gods interested in Perseus.—Athene, Poseidon (the lover of Medusa), Hermes, and old Phorkys himself. Dr. Boehlau traces in an interesting paper the various literary forms of the myth.

IN the *'Acro* (No. 77) a rough reproduction is given of a monument recently discovered on the Acropolis, and, so far, unique of its kind. This remarkable piece of work is a bronze relief, made up of two thin plates, each of which represents one side of a figure. The two plates are fastened together by small nails. Their joint thickness is 3-4 mm. The relief is worked *à jour*. It is almost flat, but on one (the right) side, there is slight modelling, to which the opposite side does not correspond. The whole working of the right side is superior; traces of gold on the hair and garment are visible only on this side. The relief represents the goddess Athene. She wears chiton and peplos, and a large ægis, but no helmet. It is possible that she may have carried this in her left hand, which has suffered much from oxidation. Her right probably held a phial. The style is much more natural than that of the numerous archaic female figures in company with which it was found; but from traces of fire in the gold work, it is supposed to be previous to the Persian invasion. The monument is so remarkable that we deferred our note of it till reliable particulars appeared in the German *Mittheilungen*.

IT appears that the leading of the Fairfield windows is now so insecure that new work is absolutely required. We are glad to find that no attempt is to be made to "restore" these remarkable windows, but that the glass is to be replaced in its new setting exactly as it is at this moment. This judicious decision will give confidence to those who subscribe to the repairs fund, now being collected by the vicar, that under the guise of reparation, new work will not be introduced. There are few places which better repay a visit than Fairfield, not only on account of these quaint windows, but because this Gloucestershire village is a singularly pleasing example of picturesque English scenery.

A RECENT fire and a sale of salvage will have completed the devastation of Sir Christopher Wren's Church of St. Mary Magdalen (Old Fish-street) in Knightrider-street, by Doctors' Commons. Tenders have been invited for the purchase of the remaining materials and fittings, including the bell, some lead, timber, ironwork, and woodwork, as recovered from the conflagration of last year. Steps are already taken by the Bishop of London for uniting the two parishes of St. Mary Magdalen and St. Gregory-by-St. Paul with that of St. Martin, Ludgate, under provisions of the late Bishop's Union of Benefices Act as applicable to the City of London.

A WELL-KNOWN firm of auctioneers have received instructions for the sale of the freehold manorial estate of Horton, in Northamptonshire. The property extends over some 4,000 acres in all, and includes numerous farms, with their houses, buildings, &c., together with several homesteads and holdings in Hackleton, Quinton, and Piddington parishes. Horton House, seat of the Gunning family, was originally erected by the celebrated Lord Halifax. Situated on the county's border, it lies about seven miles south-east of Northampton, on the road to Newport Pagnell, in the midst of a good shooting and fishing country, and in the neighbourhood of the Pytchley and Grafton hunts.

SIR FREDERICK LEIGHTON'S suggestion at the dinner of the Institute that the toast of "Art" would be more appropriately honoured by "a well-filled and pregnant pause of silence" than by speech was anticipated by Artemus Ward on an occasion when he was called upon to respond to the toast of "The Press" at a Ben. Franklin festival held in Cleveland. He rose to his feet, hung his head for a few minutes in silence, and then sat down, having said nothing. In his account of the festival in the next day's issue of his paper, the *Plaindealer*, his speech was reported by a blank space of about half a column of eloquent silence.

LORD GRIMTHORPE addresses to one of the Hertfordshire papers an *In memoriam* letter in praise of the late Mr. Longmire, the contractor, who, we very well believe, deserved all Lord Grimthorpe could say of him. On the celebrated occasion of pushing up the wall of the nave at St. Alhans, Mr. Longmire and his men were certainly the only persons concerned who understood their business. It appears, however, that Mr. Longmire had a good deal also to say in regard to the decorative details of the restoration, and that Lord Grimthorpe was surprised, considering how little Mr. Longmire had been concerned in ecclesiastical work, at the extent of his knowledge and taste in these matters. It would be easy to have taste enough to astonish Lord Grimthorpe, no doubt; but it is rather hard upon poor Mr. Longmire, who is dead, and cannot defend himself, that Lord Grimthorpe should attempt to fix upon him part of the responsibility of the architectural bungling at St. Alhans, though it is interesting to know how the restoration of one of our most valuable ancient buildings was carried on by a kind of happy-family committee of taste between a lawyer, the clerk of works, and the contractor. Lord Grimthorpe observes in the same letter that it was not true, "as a foolish person had said in the *Builder*," that he never deferred to any one except Mr. Chapple, the late clerk of works. A "foolish person" in Lord Grimthorpe's vocabulary means "a person who does not believe in my omniscience," and in that sense we are foolish enough; but the statement in regard to what was said in our columns is, of course, no more true than any other of Lord Grimthorpe's imaginary quotations from us; indeed, the idea of Lord Grimthorpe "deferring" to any one would have seemed rather too grotesque for publication. We should recommend some of the local journals, however, who are Lord Grimthorpe's most obedient servants, to be a little careful how they publish statements about this journal on no better authority than his assertion.

A Memorial of the late Lord Iddesleigh.—A reredos with super altar is to be erected in Upton Pyne Church, near Exeter, the gift of the Countess of Iddesleigh, in memory of her husband, the late Earl of Iddesleigh. The central panel will contain a valuable oil painting of the "Last Supper," purchased by the Earl of Iddesleigh (then Sir Stafford Northcote), during his travels some years since in Italy. The reredos has been designed by Mr. Medley Fulford, architect, and it is to be made and carved in oak and stone, by Messrs. Laseombe & Son, of Exeter.

#### ARCHITECTURE AT THE ROYAL ACADEMY.—IV.

1616, "Small drawing-room, 1, Grosvenor crescent," Mr. G. Aitchison, A.R.A. A coloured elevation of a portion of the wall, showing a dark dado, doors, and pilasters, relieved with white arabesque ornament in the panels, and on the architrave of one of the doors, whether painted or inlaid does not appear. Similar decoration is applied to the blocks which form a kind of rustication on the dark fluted pilasters. The architrave of the door seems to require a rather more filled up and continuous ornament than the alternating sprigs shown here. The folding-doors in the next compartment, and the fan-light over them, are filled with stained glass, and here the woodwork is left undecorated so as to give the glazed decoration its full effect. The wall decoration is in two shades of green, relieved with gold. Above is a frieze of birds and arabesque scrolls on a delicate buff ground. This frieze is very pretty in itself, but does not seem quite to belong to the rest of the scheme. This is Mr. Aitchison's only contribution to the exhibition this year, which is to be regretted.

1617, "Oakfield, near Chester," Messrs. Grayson and Onid. A well-treated drawing of a very plain Late Gothic house, with mullions, labels, and battlements; heavy-looking. The picturesque element seems to be relegated to the gate-house in the distance.

1618, "Decoration for a Boudoir," Mr. G. Crichton Hannal. A well-executed small coloured perspective interior of a room, covered on walls and ceilings with the usual elements and emblems which go to make up Louis Seize decoration. The cove of the ceiling is painted with a dark blue ground, with figures and gilt arabesques in relief. The whole is well carried out, but it is a mere repetition of the details of a bad style.

1619, "Design for Upper Panels of Stained-glass Window, Bolton Infirmary," Mr. P. H. Newman. A small coloured drawing showing three panels filled with gracefully drawn figures of Faith, Hope, and Charity, the margins filled up with ornamental devices of a Renaissance type, not over-refined in idea, but well drawn and coloured, and the colour effect is harmonious; the attic, with rusticated blocks in perspective, on each side of the "Charity" subject, is a mistake for stained-glass design.

1622, "St. Nicholas Church, Newcastle-on-Tyne; now the Cathedral: Reredos, Bishop's Throne, and Choir Fittings," Mr. R. J. Johnson. A large but rather coarse pen interior, showing a lofty reredos, with a rich effect of canopies over rather absurd-looking figures, the heads of which are too large for the bodies. The bishop's throne runs up into a very lofty crocketed spire springing out of an octagonal pinnacled base in several stages; the choir stalls show late Gothic detail, with large "poppy-heads." The best point is the connexion of the reredos with the main walls by a lower panelled wing wall on each side of it.

1623, "3, Hertford-street, Mayfair," Mr. W. Flockhart. A coloured drawing of a brick front of Jacobean character of detail, with modern variations: the main centre window of the principal floor is picturesquely treated, but the composition seems very scrappy, and the hanging on of pilasters to the upper part of the walls, where they perform no constructive function, is an absurdity which fashion cannot reconcile us to. The author has done much better things than this. A plan of the ground-floor of the house is appended.

1624, "Design for a Country Bank," Mr. Arnold B. Mitchell. A very good drawing, and a building with a very picturesque arrangement of windows; somewhat spoiled by the bottle-stopper ornaments and other bits of rococo in the upper portion. There is nothing specially to give it the character of a bank. The drawing was published in the *Builder* for October 31, 1885.

1626, "Abbeystead, Wyresdale, Lancashire," Messrs. Douglas & Fordham. A very good tinted drawing of a large and solid-looking Gothic house, another view of which appeared in last year's Academy. A plan might have shown the meaning of the somewhat castellated treatment and more solid and massive style of the block on the left, as compared with the remainder of the house, which can only be connected. This drawing and No. 1617, we may observe, though with different architects' names, are obviously by the same hand; both exhibitors being apparently indebted to one

draughtsman for their position on the walls: in which case the draughtsman might at least be allowed to share credit in the catalogue.

1627, "Business Promises, 86, Strand," Mr. A. Drewe. A somewhat picturesque street front in the upper portion, or, meant to be so; but the author's enthusiasm seems to have failed in the ground or shop story, which does not seem in any way to belong to the building above it.

1628, "Three Blocks of Insurance Buildings, Castle-street, Liverpool," Messrs. Grayson & Ould. The nearest of the three is a very well treated street front, and here the shop ground-floor has been properly treated; it is made into a plain basement with massive piers and large elliptic arches over the windows of the shops; a strong cornice cuts this off from the upper portion, which partakes of a Francis I. character, with flat panelled pilasters and millioned windows; the upper-story windows are arched. The two other buildings of the group appear to become more Classic as they recede from the eye. The whole forms a good and carefully-worked-out group of street fronts to business buildings, and might have claimed to have been hung where it could be better seen.

1629, "Interior View of the proposed Cathedral at Liverpool, looking East," Mr. T. Garner. A fine and effective water-colour drawing, with plenty of polished marble floor, and those reflections which are so effective in a drawing, but which we seldom see developed to this extent in reality. The general character of the design our readers are aware of from former illustrations in our pages; it is a very fine, massive, and dignified resuscitation of the finest type of Mediaeval cathedral architecture. The scale of the interior is, however, somewhat dwarfed by the proportion and great projection of the base mouldings and plinth of the nave piers, which gives the impression of their being only about half the height which they must be.

1632, "Church of the Holy Trinity, Long Melford, Suffolk," Mr. E. L. Conder. A careful and minutely-executed measured drawing of the side elevation (south) of this celebrated church, showing also, with cruel fidelity, the beauties of the "compo" tower which disfigures it.

1634, "In Normandy," Mr. E. Jeaffreson Jackson. A good freely-touched pen drawing of a bit of late Gothic building, but hardly of sufficient interest for its position in the hanging.

1636, "Buildings in Progress in Arlington-street and Piccadilly," Mr. W. O. Milne. A very well-executed drawing, but rather deficient in force, which may also be said of the building; it is very flat in effect, and though generally pleasing and in good taste, does not make the most of its splendid situation.

1637, "New Church of the Epiphany, Port Said: Exterior," Mr. W. Bucknall. The interior and a plan and section are shown in 1648. They are both small pen drawings, and the latter hung too high to be seen at all. As an English church in Byzantine style in that part of the world, this is a little architectural event of some interest. The architect might have sent better and larger drawings, but the two he has sent might at any rate have been hung together and so that the drawings could have been seen. It is a very plain building domed over the middle of the nave (there are no aisles), and with semi-domes over transepts and apse. Judging from the drawings the materials would appear to be brick with concrete domes, or the domes cemented.

1640, "Interior of the Church of the Redeemer, Clerkenwell," Mr. J. D. Sedding. One of the finest drawings and one of the most interesting and original designs in the room, upon which, however, we made some comment when we published a reproduction of the drawing (*Builder*, May 7 last). We could have wished, however, we that the connexion between the columns and the springing of the main transverse vaulting ribs had been achieved in some rather less commonplace and well-worn manner than by that of breaking out little slices of the architrave over each capital, a device rather unworthy of the rest of the design.

1641, "105, 107, and 109, Oxford-street," Messrs. Christopher and White. The three numbers appear to be one property and are combined into one design, with a centre and symmetrical sides. The upper portion is solid and well designed, but the whole would have been far more satisfactory if the authors had taken a bolder step and treated the shop base-

ment architecturally, instead of leaving a mere void, only broken by two insufficient-looking columns. In such a case, the more solid the superstructure, the more it seems to call for a solidly-treated basement story. Owners of shop property very likely imagine this is prejudicial to light and the transaction of business, but some of them are beginning to see that the superior architectural effect of an architecturally-treated front has a value, even from the point of view of mere attractiveness to customers; and architects, above all others, should endeavour to impress this on their clients, if they wish to see shop architecture improved.

1642, "Timber and Plaster Ceiling for Bickling Hall," Mr. John H. Pollen. A most extraordinary-looking drawing; a coloured plan of ceiling, treated on more or less Celtic motives; the under sides of the beams and joists are strongly coloured with decorative designs in irregular oblique bands of colour or of small geometric or interlacing pattern, which run over the edges of the joists, and are, therefore, only seen piecemeal, being presumably concluded or further made out on the sides. The soffit of the main beam is decorated by what appears to be an elongated dragon, but we confess its position and anatomy are not very easy to make out on the drawing,—possibly a view of the sides of the beam would assist in the development of this portion also of the design. The space between the rafters in part of the ceiling is occupied apparently by low-relief decoration in plaster; the other portion shows a bold coloured design in large scrolls (intercepted by the joists, and as if continued behind them) intermixed with birds and with knots of interlacing ornament, &c. The treatment of constructional timbers with ornament which entirely ignores their edges or their shape and function generally, and runs riot over the angles, though common enough in Japanese work, is, to our thinking, a decorative mistake; but the author may be congratulated on having done something which is, at all events, quite original, and which compels one to look at it; and, moreover, *outré* as the design is, the colour harmony of the whole is very fine. It would be impossible to say how far one could regard it as a satisfactory decorative treatment of the ceiling, unless we knew the decorative scheme of the room under it.

1643, "Metropolitan Police New Central Offices," Mr. R. Norman Shaw, R.A. This does not, we believe, represent the final form of the design, which is undergoing some alteration. It is an exceedingly solid-looking building, the lower two stories of stone, the upper of brick, the latter portion containing the principal window tiers, which are Classical in treatment, with architraves and pediments to the lower ones, and heavy keystones to the upper ones. A strongly-marked cornice crowns the whole, and at the angles and in the centre of one side are projecting bays, segmental on plan and rising as low turrets above the cornice line, the cornice stopping against them. The brickwork in the upper stories is relieved by horizontal bands of stone. The building as shown here does not display much of its architect's play of fancy, perhaps considered out of place in a building of this class; but it is a capital piece of solid, unpretentious architecture, and it is gratifying to find the authorities going to an architect like Mr. Shaw for such a building, instead of inflicting official architecture upon us. The drawing, a perspective in pen and ink, is an admirable piece of architectural drawing; clear, clean, and precise, without being too formal or hard in touch.

1644, "Entrance to a Provincial Public Building," Mr. Maurice H. Pocock. A coloured piece of detailed elevation. Is this an executed work? It is a good drawing of its kind, and we should suggest that detail elevations like this are a class of drawing of which we might very well have more in the Architecture Room at the Academy. There is some variety and novelty in the detail, but the repetition of three couples of pilasters in three stages, each on its separate subbase, is rather too much of a good thing; and if the cornice over the first-floor order is intended for the main cornice of the building, then the story over it is much too heavy, and out of proportion for an "attic." The stone pilasters stand against a brick wall, and, judging from the shadowing (which would have better more decisive and darker) they must be rather flat, and deficient in projection.

1645, "The Steeple of St. Michael's, Coventry, as restored," Mr. J. Oldrid Scott. A most

delicate and beautifully-executed pen drawing of this remarkable rich tower and slender spire, a *tour de force* of building which has revenged itself upon its too adventurous constructors by threatening ruin, and having to be taken down and built up again from the base.

#### THE PARIS SALON OF 1887.

The Palais d'Industrie contains 2,521 pictures and 1,042 drawings or cartoons. These numbers explain eloquently the difficulty of such a selection as would enable one to give, in a limited space, a general outline of the *Salon*. Many remarkable paintings, too, claim special attention as indications of the strong current setting in the direction of realism and the endeavour to get at the facts of Nature, which is a characteristic of recent art, and the Classic school seem to fervent disciples of the Classic school seem to strive in vain. Others, like M. Puyis de Chavannes, applaud this realistic tendency in others, while choosing themselves to remain on the heights of Helicon, where no envious competitions or jealousies can trouble their poetic serenity. M. de Chavannes carries to its height this principle of abstraction from reality, and his immense cartoon for the decoration of the Sorbonne is the most complete practical demonstration of his aesthetic theory which has appeared.

This composition is divided into three parts, symbolising Literature, Science, and History and Philosophy. In the centre, on a block of marble, is seated the ancient Sorbonne personified by a tall and fine female figure. At her side are two giant carrying palms and crowns, in homage to illustrious names, dead and living. Eloquence, standing before her, celebrates with a slightly mannered gesture the victories of the "esprit humain." To right and left are grouped figures representing various schools of poetry. From the rock between the two groups gushes a stream, from which young and old eagerly drink. The left compartment is devoted to Philosophy and History. The first group shows the contest between materialism and spiritualism, the latter depicted by a woman in a sombre raiment, who touches with one hand a skull held by a seated figure, and raises the other as pointing to the sky. History, or perhaps, we should say, archaeology, is shown as a female figure reading the annals of the past on inscribed stones which are dug up for her study, and further on, by a seated figure of an old man engaged in the study of manuscripts. The figures representing Philosophy and Archaeology form a noble and most expressive group, beautifully composed and contrasted. The compartment on the right, dedicated to Science, is not equal to the last named; it shows a group of young men around a statue of Science, vowing themselves to her service with a fervour of expression which shows that M. de Chavannes understands the ardour which inspires the scientific student of to-day; other figures are shown absorbed in the study of botany, zoology, and geometry. This is certainly allegory in its purest and most immaterial form, and the artist has had the opportunity of realising on a great scale his own special aspirations in art. Unfortunately, the drawing of the figures leaves something to be desired, and the cartoon does not give a full idea of what the work will be when finished with that delicate harmony of colour which distinguishes the paintings of M. Puyis de Chavannes, and makes one pass over those deficiencies of execution which his friends wish to reckon among his special merits.

Opposite this huge triptych is another very large work by M. Besnard, who has not troubled mythology in order to find a poetic allegory for the decoration of the Mairie of the First Arrondissement. On the threshold of a house, lighted internally by fire-light, a very old couple are placed, the wife sleeping, leaning on the shoulder of the companion of her life. The latter leans in his turn on a staff, and looks up towards the stars; a young mother and child behind him represent the earlier stages of human life. The contrast between age and death, youth and life, is finely brought out; the figures are expressive and well modelled, the colour fine and satisfactory as to decorative effect. It is altogether a composition which stamps M. Besnard as one of the masters of the new school. This is an allegory simple and obvious in meaning and which is eternally true, and addresses itself to the feelings and experience of all; after which one cares very little for

such allegorical prettinesses as M. Bongreard's "L'Amour Vainqueur," which is among the popular things of this Salon.

It is also for a Paris Mairie that M. Lévy has painted his "La Gloire décernant des Palmes," a pendant to his work in last year's exhibition, but not equal to it in colour. The ceiling by M. Maillard, symbolising "Instruction donnée par la Ville de Paris à ses Enfants," is intended for the Mairie of the Third Arrondissement; an array of stout personages of a remarkably vulgar type. It is odd that the pictures executed for the municipality have never been so classic in character as since the establishment of the public competitions, which were supposed to lead a re-action against the classicity of the Institut.

M. Clairin, who up till now has followed piously in the steps of his former friend, Henri Regnault, and painted Oriental scenes with a richness of colour which made one forgive their theatrical character and composition, has also taken up an unfortunate whim for allegory. His "Apothéose de Victor Hugo" takes us back to the night of the obsequies: Chiraociers sitting motionless on their horses hold torches which light up a catafalque covered with flowers; while a diaphanous figure, apparently representing Poetry lamenting over the bier, hovers above the line of troops. The colour is false, the effect is false, and the figure which should be the principal becomes only an accessory, the soldiers with their long cloaks forming the most prominent portion of the picture: the whole thing is an absurd mingling of realism and fantasy.

The rest of the allegories are not much happier. The "Armide abandonnée" of M. Jacquinet surprises one by a complete absence of anatomical structure or modelling, and the "Andromède" of M. Caroux Duran, in spite of its unquestionably fine qualities of colour and technique, cannot be counted among the best productions of that accomplished painter. If we pass to historical painting, we find in the "Cleopatra" of M. Cahanel the same precision of drawing, the same finish, the same hardness which have usually characterised the works of this correct painter, who has had such an unfortunate influence on many of the rising generation of painters. The subject, too, is a cruel and revolting one; it represents Cleopatra reclining languidly on a lion skin, watching the effect of various poisons on the unfortunate wretches who have been selected *à corpora vita* for experiment.\* The scene wants atmosphere. The marble-looking figure does not seem to detach itself from the draperies, and seems rather as if a part of the decoration of the Egyptian palace which M. Cahanel has painted with great minuteness of detail.

M. Cormon's "Vainqueur de Salamine" is surrounded by an enthusiastic crowd, in which the feminine element predominates. This large picture, commissioned by the State, would do exceedingly well to decorate the "Foyer de la Danse" at the Opera House, or (better still) for the Cirque Olympique, and the figurants in the short skirt recall the well-known type of the grisettes of Batignolles and Montmartre. One cannot deny to this work, however, the praise of spirit and good decorative effect, as well as a great deal of ability in composition. M. Roghegros, of course, gives us one of his usual scenes of slaughter. This time it is the Roman conspirators setting on the body of Caesar, and all desirous, as Pintarich tells us, "to have a hand in shedding his blood, as if it were the libation at a sacrifice." The picture, painted, one may say, with a kind of fury, shows great deficiencies of technical training, but certainly reveals the true temperament of an artist.

M. François Flameng, more fortunate than M. Paris de Chavannes, has been able to completely finish, before the Salon, the decorative painting commissioned from him for the Sorbonne. The picture, intended for the staircase of the "Faculté des Lettres," is divided into three parts: First, St. Louis giving to Robert le Sorbon the charter of foundation of the Sorbonne; next, Abelard instructing his disciples on the hill of St. Geneviève; and, lastly, the Prior Jean Heynin installing, in the cellars of the Sorbonne, the first printing-press established in France. M. Flameng has been unfortunate in not being content to remain himself and depend on his own style; he has gone

into imitation of early masters; his triptych includes great merits and vexatious defects; his Abelard in particular seems almost like a caricature. The scene is full, however, of curious details, and presents much of interest in an archaeological point of view.

M. Paul Laurens, that conscientious and unpretending but really learned artist, takes from the war against the Albigenses the subject for a small painting, of great interest. His "Agitateur du Languedoc" is a work of great power. The monk with the ascetic profile, threatening figure, and coarse garment, forms a striking contrast with the bishop in rich chaubles, immovable in their stalls.

Owing to the official direction given to the subjects of painting during the last few years, religious pictures are becoming more and more rare, since neither the State nor the municipality ever commission a work of this kind, and the church revenue are not sufficient for the ecclesiastical authorities to play the part of Mecenas. Accordingly, most paintings dealing with subjects from the Bible are treated rather as scenes of *genre*, as in the "Salomé" of M. Roghegros, or as studies, like the "Herodias" of M. Henner. The "Last Supper" of M. Uhde stands out, however, as an exception. Two years ago this artist exhibited a Biblical composition treated with very modern feeling, and with much originality. His present work has the same characteristics, and his Christ and Apostles are completely free from the trammels of the traditional church painter. Unfortunately, the colouring is dull and grey, and the work is not equal to his former painting. M. Dietz's "Adoration des Bergères" goes to an exaggerated extent in the direction of modern realism, and his "Virgin" is a Parisian grisette, whose type is certainly not in any sense Biblical.

M. Girardot goes to the Old Testament for the subject of his large painting with two figures, "Ruth and Boaz." This composition, painted in a very broad style, is one of real power; the pale and indistinct moonlight effect is finely rendered.

We referred to M. Henner just now. His "Herodias" has, in fact, not the least claim to any Biblical name; but there is a great charm in this young girl, whose blonde and pretty hair is familiar enough by this time. Last year it appeared on M. Henner's canvas as "Orpheline," and emerged from a black hood. To-day it emerges, with bare neck, from a red drapery, which gives full value to the whiteness of the arms and bosom; but, in spite of the painter's great ability, this repetition of the same model becomes wearisome.

Military subjects are exceptionally numerous this year; perhaps these are a kind of artistic reflection of the ideas which have been hovering on the political horizon lately. It must be observed that the Government have commissioned a certain number of works for the *salles d'honneur* of various regiments, and the artists who have received these commissions are here in great force. We notice no less than a dozen pictures of this class, worse than mediocre; but one may except from this emmury M. Delahaye, M. Morot, and M. J. Lewis Brown.

The first-named has painted with great vigour the charge of the 12th Hussars at Marengo, a picture full of movement and of good detail. Unfortunately the painter, who apparently was not sufficiently up in the anatomy of the horse, has thought well to supplement his studies by instantaneous photographs, the odd results from which are puzzling enough to the public, and which give to the animals the appearance of wooden horses. This result is most of all perceptible in a picture by M. Arus "the Eleventh Artillery at Solferino," which, nevertheless, is not without a certain amount of what is called "go." In M. Aimé Morot's "Bataille de Reischaffen" we find the same powerful qualities which distinguished his "Rezonville" of last year. In the foreground the cuirassiers are in headlong charge; behind them other squadrons remain motionless, waiting for the order to charge. The helmets flash in the sun, and the line of French *trouvailles* stretches far over the green country, the bright aspect of which contrasts forcibly with the painful incidents of war.

Mr. John Lewis Brown's "Hohenlinden," presented by the State to the eleventh regiment of Chasseurs, is a cleverly composed scene, full of aerial effect, where the wind blows freely over a landscape covered with deep snow. In the foreground the French cavalry are charging the

Austrian squares. There is extraordinary life and vigour in this painting, a thorough knowledge of horse painting, and an ability in the treatment of colour which stamps this as one of the best battle pictures in the Salon. The Government has unhappily not always been so fortunate in its commissions of this kind. With the exception of one work by M. Sargent, we find among the remainder only such paintings as we prefer to pass over in silence.

By the side of these pictures, in glorification of special events of modern warfare, appears the "Guerre" of M. Roll in all its sad and sanguinary realism. He does not paint the heroic deeds of hand-to-hand fighting. We are here opposed to an invincible enemy, who strikes from a distance. Personal heroism is replaced by the perfection of science. The scene is what may be called brutally real and painted in a masterly manner. The "Aérostation Militaire" of M. Loustannan makes a pleasant contrast to this. It is a curious scene, carefully observed and depicted. We may equally compliment M. Chaperon on his amusing scene of harrack life, "La Douche au Régiment."

We come here, however, into the field of *genre* painting, which this year, as usual, has numerous votaries, among whom M. Gervex is certainly in the first rank. His "Opération Chirurgicale" is a splendid bit of painting, telling its story admirably. A woman under anaesthetics and half undressed is stretched on a camp bed, surrounded by surgeons, pupils, "religieuses," and nurses. Near her is a table covered with instruments. A clear light illumines the scene and falls on the young patient. The heads of the spectators are expertly modelled, and the whole scene exhibits remarkable executive power. M. Brouillet has also gone to the hospital in search of artistic inspirations, and enables us to assist at a clinical lecture by Dr. Charcot, at a scene of hysteria, which impresses one like a night-mare. In these days, when hypnotism is so much disused, this picture naturally obtains a success, but its great artistic merit consists in the perfect resemblance in the portraits of Parisian celebrities among the spectators of the scene.

Another scene of modern life is illustrated by M. Béraud, who takes us to the Hall of the Palais de Justice, crowded with black-robed advocates and plaintiffs and defendants of various types. The "Salle des États" at the Louvre, by M. Béraud, where the idlers crowd round the easels of the amateur painters, is another well-studied scene of every-day life.

M. Alhot Fourie is making great progress. His "Noce d'Ouvrier" is a picture of amusing naturalism and wonderfully true. The scene passes on the green before a rural tavern at Yport; all the good people are in their "Sunday things," and rejoicing in this diversion from their usual labours; the bride, charming under her white garland, drinks gaily with an old peasant. Shafts of sunlight stream through the trees and sparkle on the bottles and glasses full of foaming cider.

The paintings of M. Jules Breton recall us to the more tranquil side of country life. Here, robust villagers gather in their crops; there, the peasants return homeward at the end of the day, across fields purpled with the evening light. These pictures give one the impression of the colour of nature at the close of a summer day. This impression is still more vividly given in M. Skredsvig's Norwegian scene, entitled "Le Soir de Saint-Jean," which has the charm and simplicity of Millet. "La Fenaïson" of M. Lhermitte recalls the vigorously-painted scenes and true feeling of the lamented Bastien-Lepage; it is a beautiful picture full of nature, though a little uniform in its tonality. The "Pain" of M. Démost Breton should also be mentioned. Before an open oven, the fire from which throws a red gleam over him, a peasant is looking to the baking of the bread; a young wife is looking on with interest, holding two stout children, who jostle each other while the elder looks with a curious eye at the labour of his father. A striking contrast between these healthy children and the *gamins* of M. Pelez "Nid de Misère," where two poor children, blue with cold, sleep with arms interlaced, scarcely covered with mean rags. M. Pelez like this class of subject, and parades before us every year these dramas of misery. This may be overdone, but there is more of human interest in them than in the fashionable prettinesses of M.M. Heilth and Stewart, whose favourite

\* "She hath pursued conclusions infinite Of easy ways to die."

Anthony and Cleopatra.

scene is Bougival, the Paradise of Parisian boating people.

The "Theodora" of M. Benjamin Constant, impassible amid Byzantine luxury, is a worthy pendant to his "Justinien" of last year; and M. Worms re-edits once more his inevitable Spaniards with wearisome persistence. We may notice also the singular picture which M. Raffaelli entitles "La Belle Matinée," and which deserves a better place.

In still life, the admirable fruit paintings of M. Vollon are perfect in their illusive realism, which, in this class of painting at all events, is the object to be aimed at. Those of M. Bergeret are of more precise but also more hard execution. M. Claude exhibits some fish which rival, in realism, the rabbits of M. Philippe Rousseau; and M. Gilbert combines poultry and game successfully on a big canvas, which certainly might with advantage have been reduced to more modest proportions. As for M. Bizet Desgoffes, who has always something of interest for those who admire his perfect execution (devout, however, of all sentiment), there are some peaches and grapes of his which seem to be carved out of the same onyx as the marvellous vase which accompanies them.

The school of landscape-painters still includes some artists whose works bear the indelible stamp of their former successes. In this category of forgotten talents are the names of MM. Bellot, Benouville, de Curzon, and Ciceri, whose pictures, most conscientiously painted, appear to-day singularly old-fashioned. For them the study of nature was subordinate to certain conventions which they could not escape from. The sky, the trees, the distances, are painted, not as they really appear, but after a traditional and almost mathematical formula. M. François himself, in spite of his great talent, has barely escaped these dogmatic exigencies, and his decorative panel, "Winter," although a very clever work, presents a hard metallic aspect, which contrasts disagreeably with the clear green of M. Bernier, the deep-toned landscape of M. Binet, the misty light in M. Péraire's scenes, or, still more, the fresh verdure of M. Pelouze, whose "Source Bergerette" is particularly remarkable. M. Normann, who for some time has given us landscapes painted in a bizarre tone, has this year made a great success with a midnight sun, the strange purple colour of which takes by surprise a public who are little acquainted with Norwegian atmospheric phenomena. We must humbly confess that we much prefer to these *tours de force*, the simple and true landscapes of MM. Hareux, Rapin, and Harpignies.

After having, up to the present time, confined himself exclusively to *genre* painting, M. Duez has resolutely attacked landscapes, and with this first attempt has at once established himself as a master. The cows resting in the grass, on the top of a cliff in Normandy, seem to be gazing placidly at the moon, which is reflected in the sea. There is a real artistic sentiment in this simple composition, a great deal of poetry, a remarkable power of execution. As powerful in effect, and as simple in the means employed, is the "Bœufs au Labourage" of M. Vayson; the strong animals stand out in relief against a blue sky. This picture gives a sense of reality; a faithful interpretation of nature. We must also mention a picture representing a shepherdess watching in the twilight, by the same painter.

There are always plenty of sea-pieces. The picturesque shores of the Mediterranean have tempted many painters, amongst whom M. Olive, after M. Vollon, is the only one who has thought of painting the Port of Marseilles with its true colouring. The same faithful interpretation characterises the two views of Havre by M. Maurice Courant. Very curious also are the two sea-pieces of M. Meudag, especially the view of Scheveningen, and the view of the Thames by M. Lionel Walden, where the steamboats are silhouetted against a rosy mist.

We will conclude by a glance at the portraits. Naturally enough there are plenty of repetitions of General Bonlangier. M. Debat-Ponsan represents him on horseback, in full uniform, saluting the public with a pretentious gesture; and M. Armand Dumaresq gives us a bust portrait of him, with a grave and pre-occupied air. Resemblance apart, the merits of these official portraits is small enough. They entirely want sincerity and simplicity. The portrait of M. Alexandre Dumas is remarkable for an intensity of life, a vivacity of expression, which

places it among the best productions of M. Donnât. It is a pity that he has exaggerated, by a wilful coarseness of handling, the accentuation of the features, which thus lose the *finesse* of expression so characteristic of the author of the "Dame aux Camélias." We do not care for M. Bonneron's expressionless portrait of a little girl. M. Léon Comerre exhibits two good portraits, especially that of a young blonde lady in a ball dress. All the best qualities of M. Morot are to be recognised in a portrait of a young lady in white satin, a work of very distinctive character. M. Pille exhibits an excellent portrait of M. Vayson, the painter, in his studio, full of various æsthetic necessities carefully painted. M. Jacomb-Hood, who has studied under M. Laurens, sends a very interesting portrait of a young girl, whose delicate beauty is finely contrasted with the deep mourning dress she wears. We may note also a very good portrait of M. Mounet-Sully in the part of Hamlet, by M. Chartran.

Naturally, in this rapid survey we have had to pass over entirely many more or less able works, the enumeration of which would have occupied too much space, but which go to swell a total of good work which renders this Salon superior to that of last year. The sculpture exhibits also include some remarkable works, to be noticed hereafter.

#### OBITUARY.

Mr. William Longmire.—On the 11th inst., in his seventy-fifth year, died Mr. William Longmire, senior partner in the firm of Longmire & Burge. One who knew him well writes:—"As a builder, few men ever enjoyed a higher reputation for sound and good work, or retained in the same degree the unbroken confidence of his customers. He was eminently a man of thought, and there were not wanting some professional men who would gladly avail themselves of his sound judgment, the result of a life-long and varied experience. By those acquainted with him in business life, he will long be remembered for the genial courtesy of his manner and the almost inexhaustible fund of anecdote and humour which ever lent an air of pleasantness to all personal transactions." His funeral was attended by almost all the employes, amidst ample evidence of sincere and deep regard.

#### THE ARTISTS' GENERAL BENEVOLENT INSTITUTION.

THE seventy-second anniversary dinner of this institution was held on Saturday last at the Freemasons' Tavern, under the presidency of the Right Hon. E. Stanhope, M.P. Among those present were Sir J. Millais, R.A.; Mr. W. P. Frith, R.A.; Sir J. Gilbert, R.A.; Sir J. Fowler, Sir C. Mills, Mr. J. Pettie, R.A.; Mr. B. W. Leader, R.A.; Mr. J. Barlow, R.A.; Lord Crew, Baron de Stern, Mr. Henry T. Wells, R.A.; Mr. J. Oldham Barlow, R.A.; Mr. E. Crowe, R.A.; Mr. H. Moore, R.A.; Mr. Oscar Wilde, and Mr. Comyns Carr. The Chairman, proposing the "Artists' General Benevolent Institution," dwelt upon the difficulties attending the pursuit of any of the arts and professions in this country. No matter what branch they entered upon, great obstacles had to be overcome, but the difficulties in the way of the artist's calling appeared to him particularly great. He could imagine the struggles for public recognition, and the bitter disappointments they had often to experience. In many cases the hand of sympathy held out at the proper moment would save from utter ruin a clever but struggling artist, and it was for an institution which gave such assistance in a most unostentatious and economical manner that he appealed for support that night. The toast of the "Royal Academy" also proposed by Mr. Stanhope, was responded to by Mr. Wells, R.A., in the unavoidable absence of Sir Frederic Leighton. The Treasurer, Mr. P. Hardwicke, announced the receipt of subscriptions amounting to 2,220*l.* He also stated that the late Mr. Cousins, R.A., had bequeathed 5,000*l.* for the benefit of the Institution. One hundred and sixty-one applicants had been relieved during 1886 with the sum of 3,011*l.* Since the establishment of the Institution in the year 1814, 4,644 donations have been granted amounting in the aggregate to 78,386*l.*

#### SANITARY LEGISLATION CONFERENCE.

OUR readers will remember that this Conference was convened by the Sanitary Assurance Association to consider and report upon the Sanitary Registration of Buildings Bill, and that the following institutions appointed representatives as members of the Conference, namely, the Royal Institute of British Architects, the Surveyors' Institution, the Public Health Medical Society, the London Sanitary Protection Association, the Association of Municipal and Sanitary Engineers and Surveyors, and the Royal Institute of Architects of Ireland. At its first two meetings the principle of the Bill was unanimously approved, and six out of the seventeen sections of which the Bill consists were, with amendments, agreed to.

The third meeting of the Conference was held at the rooms of the Sanitary Assurance Association, 5, Argyle-place, Regent-street, W., on Monday afternoon, when the President, Sir Joseph Fayer, K.C.S.I., M.D., F.R.S., again presided. After the confirmation of the minutes of the second meeting, and the reading of correspondence, the Conference resumed its consideration of the details of the Bill, Section 7 of which was in part agreed to at the last meeting. Mr. Mark H. Judge, A.R.I.B.A., proposed, and Mr. H. D. Appleton, F.R.I.B.A., seconded, that the Institution of Surveyors be added to those mentioned in Clause 1 of the section. This was agreed to, as were also two other amendments, one substituting five years for three years in Clause 2, and the other adding to Clause 3 a provision that the certifying officers of the Sanitary Associations should be qualified under the Act. The discussion of this section was a protracted one, in which the Chairman, Mr. C. C. Lacey, M.P., Mr. David Finlay, Mr. Joseph Smith, M.R.C.S., Mr. H. Leonard, C.E., Mr. Charles Jones, A. Inst. C.E., and Mr. Judge took part. Ultimately the section was agreed to as follows *mem. com.*—

"7. The Local Government Board, or corresponding authority, shall issue Licenses in Sanitary Practice to the following persons and Corporations, that is to say (1) Members of the Royal Institute of British Architects, Members of the Institution of Civil Engineers, Members of the Royal Institute of Architects of Ireland, Members of the Association of Municipal and Sanitary Engineers and Surveyors, and Members of the Surveyors' Institution, who are registered in accordance with this Act as qualified in Sanitary Practice. (2) Architects and Civil Engineers who have been in practice three years at the passing of this Act and who shall before January 1, 1890, prove to the satisfaction of the Local Government Board that their practice as Architects or Civil Engineers has been a *bona fide* one, and has included the designing and carrying out of constructive sanitary works. (3) Sanitary Associations incorporated by license of the Board of Trade provided their certifying officers are registered as qualified in Sanitary Practice in accordance with this Act. (4) Medical practitioners registered as qualified in sanitary science. (5) Persons who are Medical Officers of Health at the passing of this Act. (6) Persons who at the passing of this Act hold appointments as Engineers or Surveyors under the Public Health Act, provided they are members of one of the institutions mentioned in subsection 1 of this section. (7) Such other persons as the Local Government Board or corresponding authority may consider qualified after examination."

Considerable discussion also took place on the 8th and 9th sections, but they were agreed to with verbal amendments.

The Conference then adjourned till Monday next at two o'clock.

**The Disinfection of the London Sewage.**—At the meeting of the Metropolitan Board of Works announced for Friday, the 20th inst., the Works and General Purposes Committee will present a report recommending the Board to advertise for a quantity of manganate of soda, not exceeding 6,000 tons and not less than 2,000 tons, to be delivered in such quantities and at such places and times as the Board may from time to time require. Mr. E. Rider Cook has given notice that he will move, as an amendment:—

"That no further purchases of manganate of soda be made until Sir Henry Hoare shall have reported upon the advisability of using it in the sewers, and that it be referred to the Works and General Purposes Committee to consider if some less costly disinfecting agent cannot be obtained for use at the outfalls in the event of the condition of the river Thames becoming such as to render the use of disinfectants desirable in connexion with the discharge of sewage."

**Proposed Cathedral for Brisbane.**—The Bishop of Brisbane suggests, in a letter written to the *Brisbane Courier*, that a cathedral shall be erected for the diocese of that city, to serve as a memorial to the Queen's Jubilee. The letter has been received with general approval, and a meeting is about to be held in favour of the movement.



**Illustrations.**

**BRANCH BANK OF ENGLAND,  
FLEET-STREET.**

**T**HIS building is being erected by the Bank of England at the corner of Bell-yard and Fleet-street (partly on the site of the famous "Cock" Tavern) to take the business now carried on in certain rooms allotted for the purpose in the Law Courts.

It will contain the usual arrangements of a bank on the ground-floor and basement, and a residence for the Agent on the upper floors.

The entrance to the bank will be in Fleet-street; that to the Agent's house in Bell-yard, which will be widened considerably.

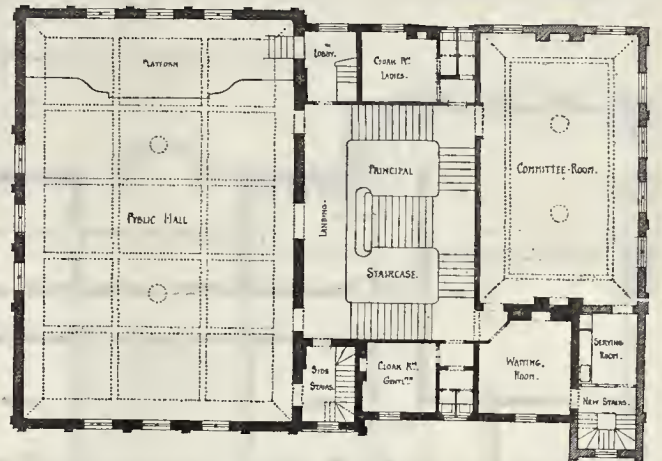
The rusticated base shown on the drawing is of Aberdeen granite. At the nearest angle the height of this base is 11 ft. from the pavement, which it is necessary to state, as the figures, having been unfortunately drawn much too large, give a false idea of the scale of the building.

The superstructure will be of Portland stone, polished granite being used for the columns and for the panels of pilasters and spandrels of arches.

The building will be fireproof throughout, Messrs. Lindsay's system being used for floors and roof.

The contractors are Messrs. Dove Bros., who are carrying out the building from the designs and under the superintendence of the architect, Mr. A. W. Blomfield, M.A.

The drawing from which the illustration is taken is at present hung in the Architectural Room at the Royal Academy.



**FIRST-FLOOR-PLAN.**

*Plan of Hampstead Vestry Hall, showing recent Additions.—Mr. Frederick Mew, Architect.*

**SUNDERLAND MUNICIPAL BUILDINGS.**

The illustration which we give of this building is from a drawing now in the exhibition of the Royal Academy. Mr. Brightwen Binyon, F.S.A., of Ipswich, is the architect, his design having been selected in a competition held in the spring of 1886.

The contract has been let to Messrs. E. H. & S. Allison of Sunderland, for 25,120l. The architect's estimate sent in with the competitive design was 25,500l. Mr. John Robinson has been appointed clerk of works. Mr. Frank Ashwell, of Leicester, will supply the heating and ventilation. The heating will be effected by means of low-pressure steam, each room being supplied with coils and fresh air inlet, and ventilated by means of extraction flues carried into an upright shaft in the tower.

The floors generally will be constructed of Homan & Rodgers's patent fireproof flooring, and the walls of the court-yards and areas for light will be faced with the Farnley Iron Company's glazed bricks.

The walls externally will be faced with Prudham stone, and the entrance hall and main staircase will be worked in Dennick stone with columns of polished red granite.

The building is now in course of erection, and the foundation-stone will, it is anticipated, be laid on "Jubilee Day." The work is to be completed in the course of two years.

**ADDITIONS TO ST. SEPULCHRE'S  
SCHOOLS, NORTHAMPTON.**

These additions consist of an infants' room, 45 ft. by 19 ft., and a babies' room, 25 ft. by 17 ft. 6 in. (giving together gallery accommodation for 169 children), with a hat and cloak lobby, 8 ft. wide, between the two rooms, which also communicates with the existing schools. A passageway, 5 ft. wide, is preserved on the north side to give a separate entrance for the infants, and as an approach to the playground and offices at the back. The old school being placed almost in the centre of a rather limited site, necessitated the addition being brought up to the boundary. Funds did not permit of the front fence being included in the contract. The front walls are built of yellow Daston stone lined with brick, the dressings of hard brown. All the floors are of wood block. Both rooms have fresh-air ventilating stoves, and gratings in the ceiling communicate by zinc tubes with a Ferguson's extract ventilator.

The works were carried out last summer by Messrs. Reynolds & Son, builders, Northampton, for a total cost (including some slight additional works to the old building) of 476l. 15s., under the superintendence of Mr. Thos. Garratt, architect, London.

**BUSINESS PREMISES AND RESIDENCE,  
WIMBLEDON.**

THESE buildings were erected at the corner of Hill-road and Woodside for Messrs. D. Thomson & Sons, florists. The large conservatory showing at the front is the general entrance for customers, and leads to the flower-room and offices, whilst another entrance is provided in Woodside for the seed-shop and general sale-room. In the rear, and communicating with the business portion, is the house, consisting, on the ground-floor, of dining and drawing rooms, kitchen, scullery, &c.; and upstairs are six bedrooms, bath and water-closet, with a large lumber-attic in the roof. The materials are red brick and tile, with rough-cast to upper story, and, with the picturesque surroundings, make a pleasant group. They were carried out by Mr. W. Harmer, of Wimbledon, at a cost of about 2,200l., from the plans and under the superintendence of Messrs. Potts, Sulman, and Hennings, architects.

**VESTRY-HALL, HAMPSTEAD, SHOWING  
THE RECENT ADDITIONS.**

THE alterations and additions to the Vestry-hall, Hampstead, which, together with the finishing and decoration of the entire building, were completed last year, consist mainly of the erection of a new committee-room in the rear of the existing structure on the upper floor, with a staircase and serving lobby adjoining. A retiring-room for musicians and others has been provided over the ladies' cloak-room and closets, approached from the lobby next the public hall, and also extended lavatory accommodation in connexion with the Board-room on the ground-floor.

Messrs. Gould & Brand, of High-street, Camden Town, were the contractors for the whole of the works, which, including the decoration of the principal apartments, have been executed from the designs and under the superintendence of Mr. Frederick Mew, architect.

**CHURCH OF ST. JOHN THE BAPTIST  
(R.C.), BRIGHTON.**

THE church was erected in 1835 on the model of St. Mary's, Moorfields, with a portico in *antis* as the feature of the exterior, the interior having a bold cornice, but an otherwise flat and unrelieved ceiling, 35 ft. 6 in. in width; there were, however, a handsome marble altar and font; a fine altar-piece in statuary marble with the Baptism of Our Lord, by Carew; and other sculpture, notably the monument to Mrs. Fitzherbert, who is buried near to the monument. A sanctuary, Italian in character, with side chapels, was added a few years since, designed by the late Gilbert Blount;

and the side windows have been filled with good stained glass by Messrs. Lavers & Westlake.

The constructional roof of the nave, hitherto concealed by the flat ceiling, has very substantial queen-post trusses, and it is now proposed to remove the ceiling, to case up and otherwise decorate the timbers, and by a few other carefully-designed modifications, to which the present construction lends itself, to gain a regular and interesting architectural effect for the interior, all the old constructional and monumental work being preserved intact.

The columns of the portico are constructed of brickwork cemented, and are dilapidated, besides being much in the way, as only the central intercolumniation is wide enough for ingress; it is therefore proposed to remove them, and to substitute an enriched arch, with a sculptured tympanum over the double doorway; and, as the interior is dull in effect, to brighten it by raising the windows in the façade, and piercing the pediment by a large circular window. The projected work also includes the bell-tower shown in the drawing, the lower part of which is planned as the baptistery, in which the present marble font and the marble group of the Baptism, now very badly lighted, will be placed.

The design for the whole of the work has been prepared by Mr. S. J. Nicholl, architect, London. The illustration is from the drawing exhibited at the Royal Academy this year.

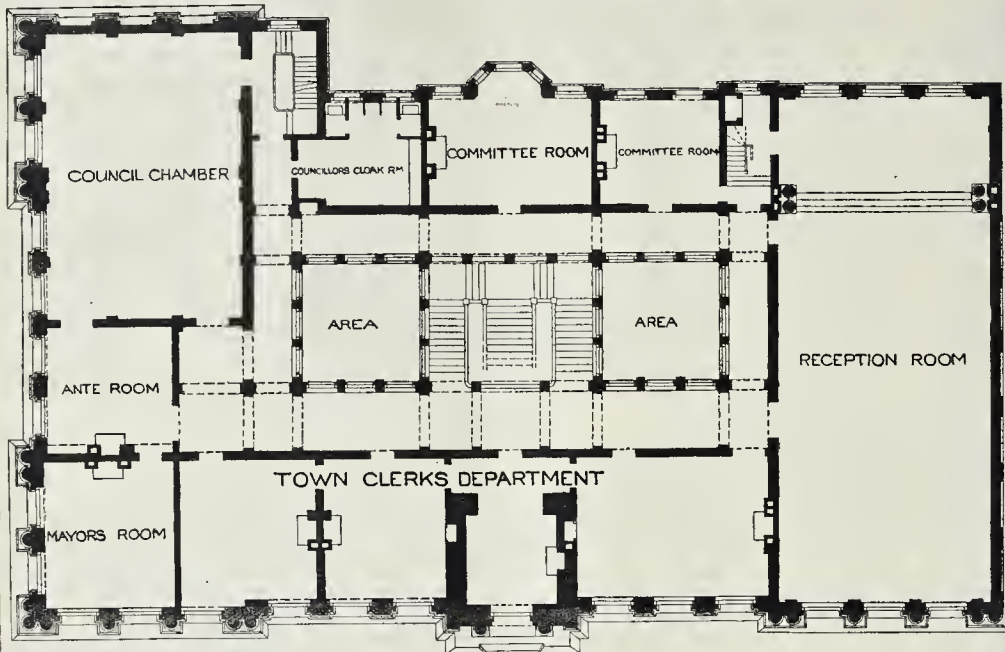
**Proposed New Square at Sydney.—**The

Government of New South Wales is considering a scheme which has been submitted to it proposing to transform a block of land in Sydney into a fine square. The site is on the west side of George-street, between the Town-hall and Market-street, on which now stand the Central Police-court and Markets. It is understood that the Minister of Justice is quite prepared to hand over the site of the police-court on condition that the corporation at the same time gives up that of the markets, and in view of the fact that the City Council is to be granted 8,000l. annually for ten consecutive years, provided they will give their support to the proposal, there ought to be no difficulty in carrying out the project. In the event of the land being obtained the square will be called the Centennial-square, in commemoration of the hundredth anniversary of the foundation of Sydney.

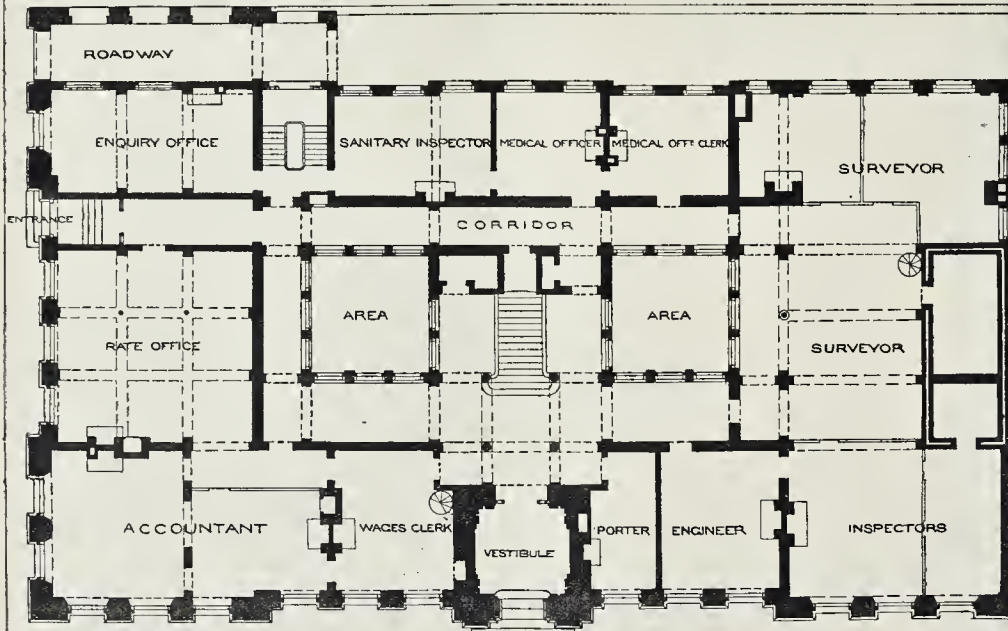
**Edinburgh Architectural Association.**

It has been decided by the President (Mr. Hippolyte J. Blanc) to change the subject of the competition in which he has offered prizes, "Designs for Workmen's Dwellings," to "Suggestions for the Restoration of Falside Castle" (near Musselburgh). The competition is open to all members of the Association who are not more than twenty-five years of age.

Scale of 1" = 10 feet

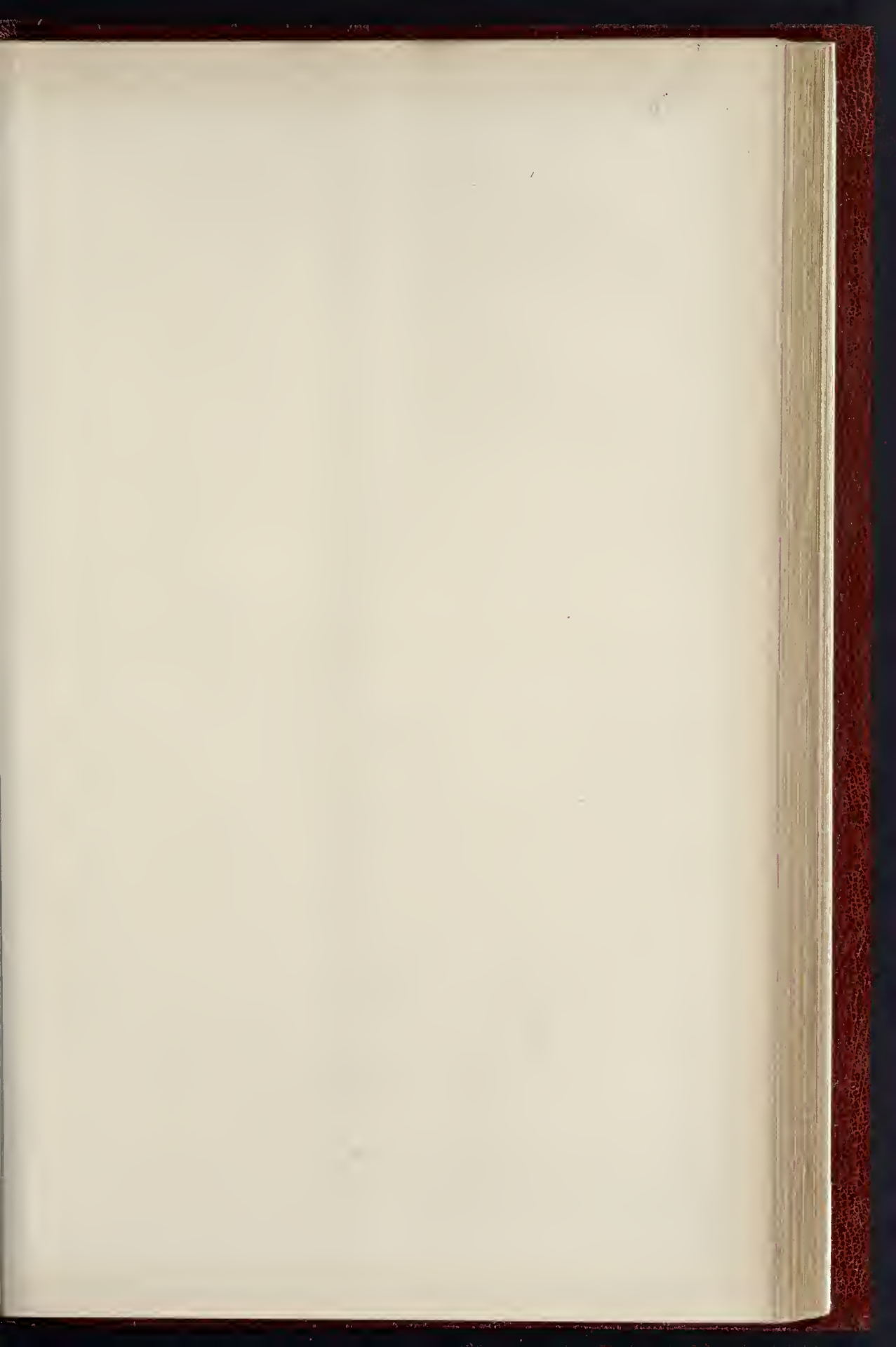


FIRST FLOOR PLAN.



GROUND PLAN.

Sunderland Municipal Buildings.—Mr Brightwen Binyon, Architect.



New Municipal Buildings  
 Fawcett St SUNDERLAND  
 Brightwen Binyon FSA Arch<sup>t</sup>



1871. DRAWN BY W. B. BINYON. 200. 1871.

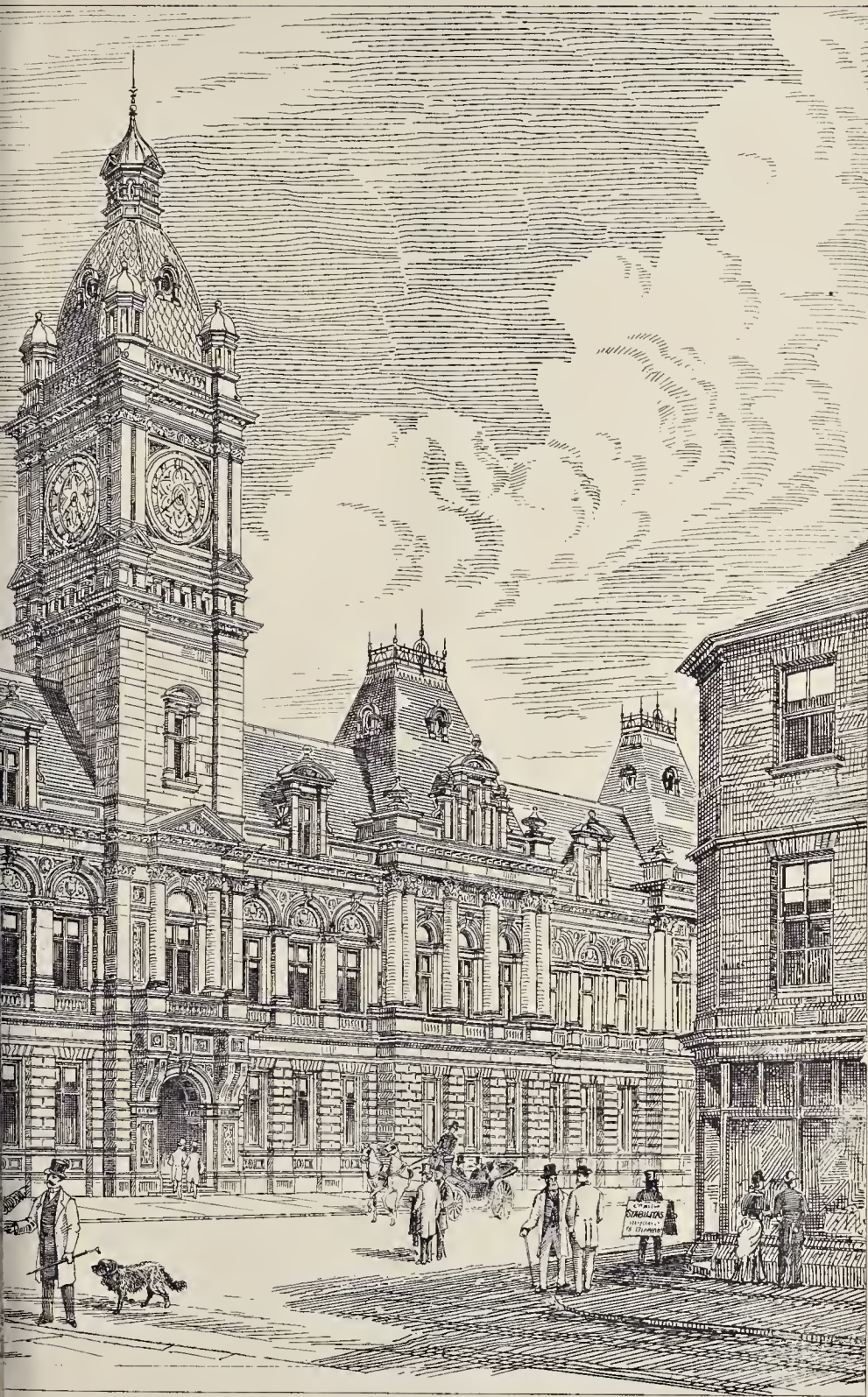
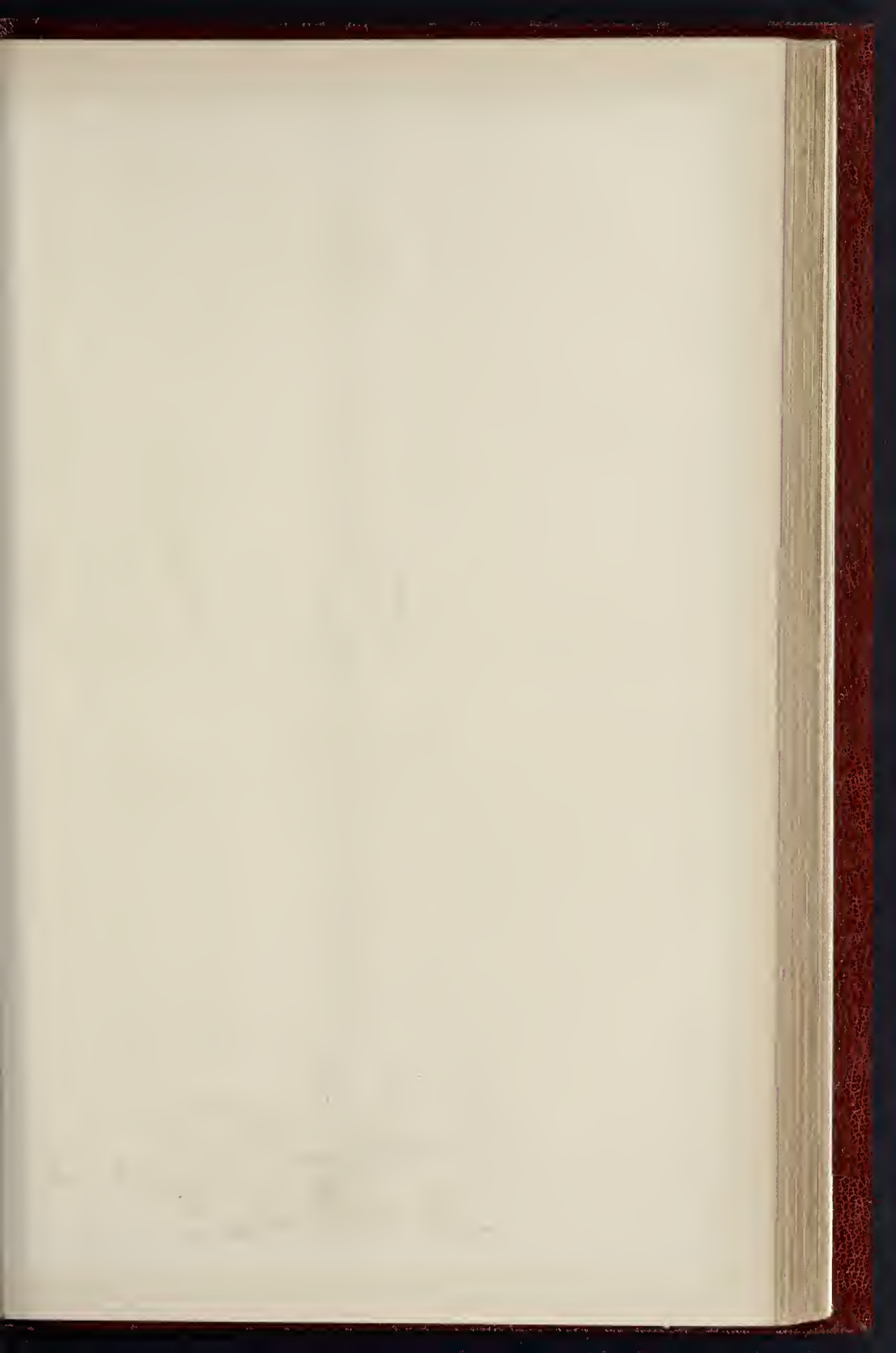


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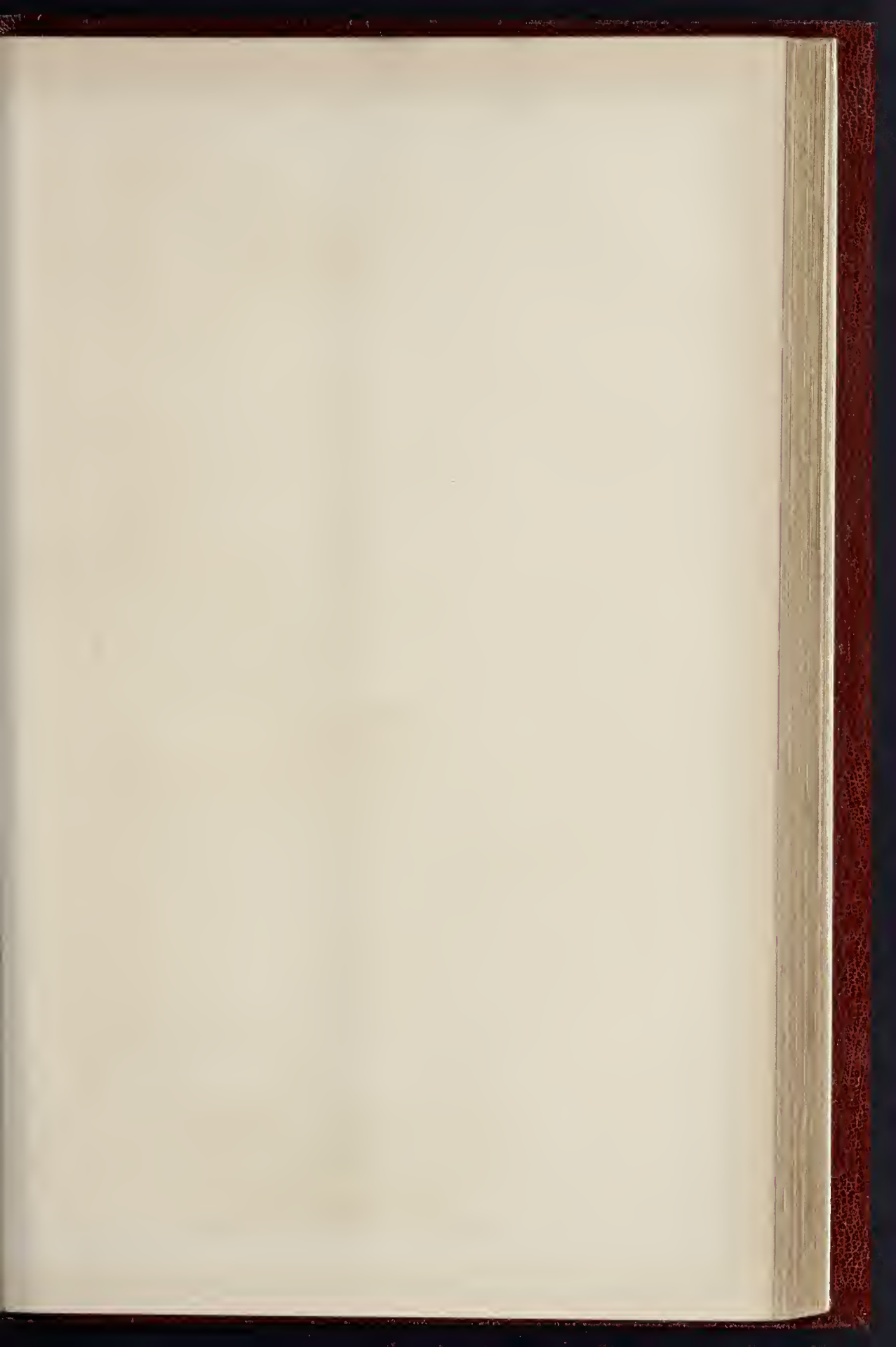




THE BUILDER. MAY 21, 1887.







THE BUILDER, MAY 21, 1887.



Architects, St. Stephen's, Danish Schools, NORTHAMPTON.

THE BUILDER, MAY 21, 1887.

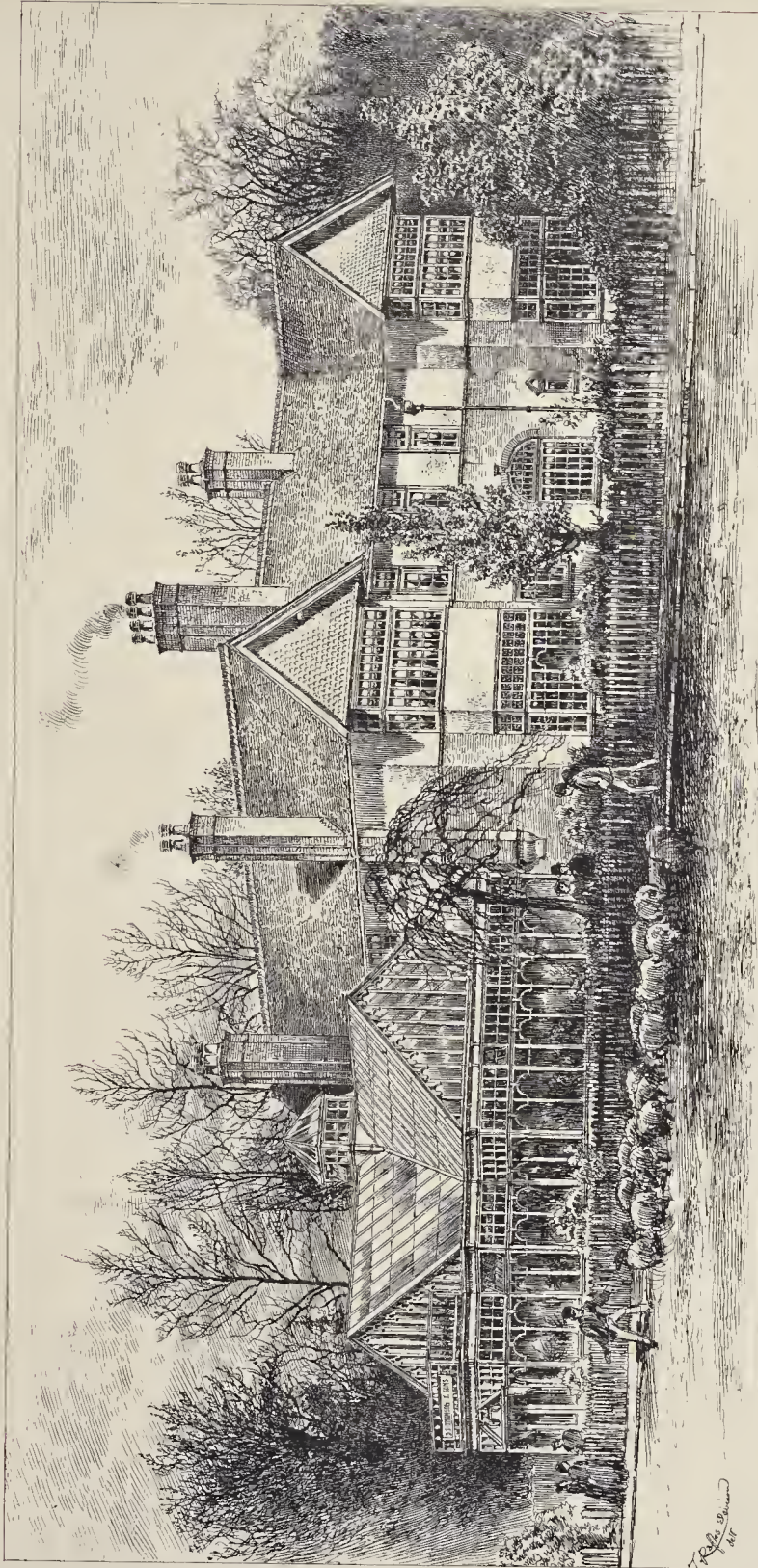
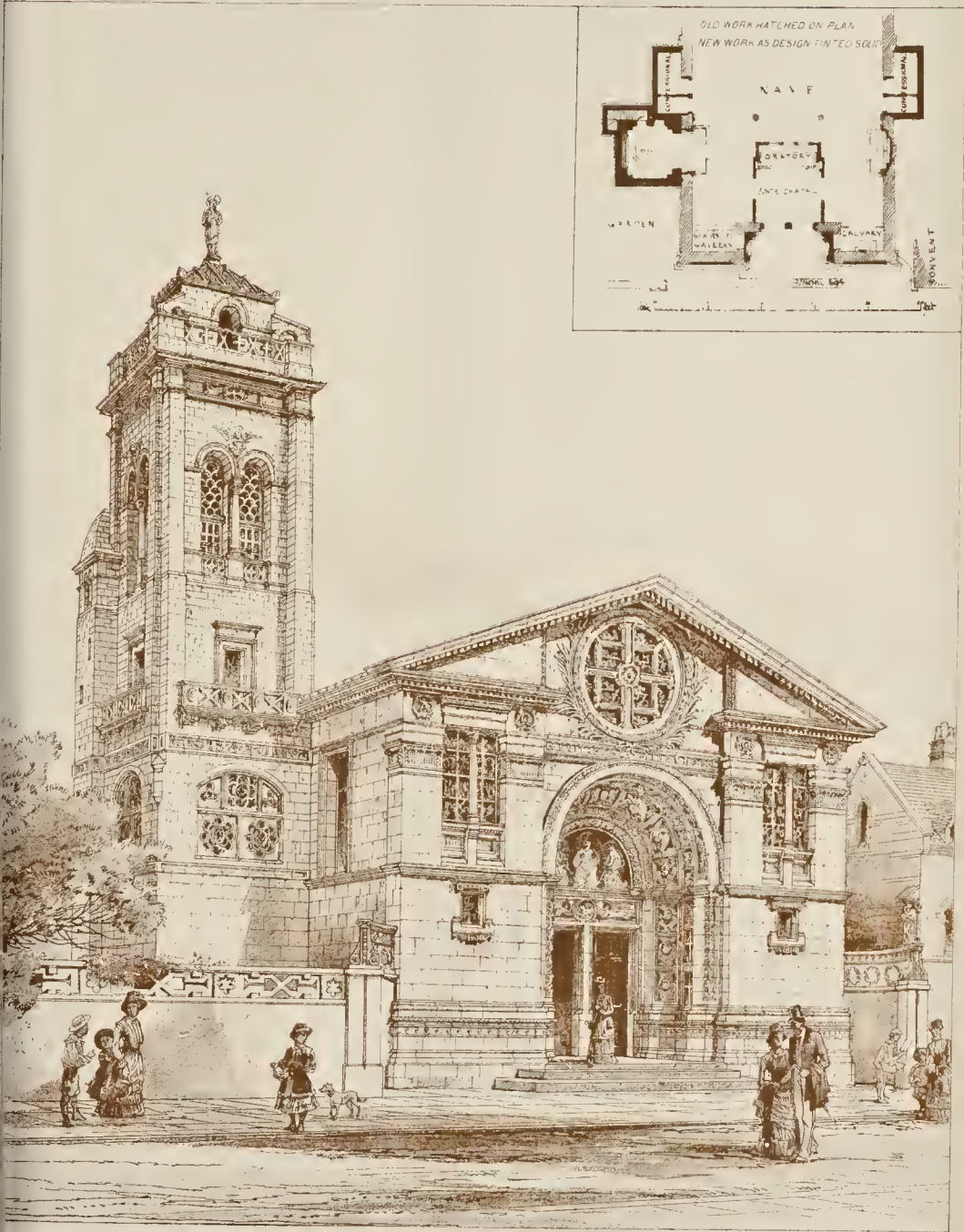


PHOTO LITHO SIMMONS & CO. 28, MARTIN LANE, LONDON E.C.

BUSINESS PREMISES & RESIDENCE, WIMBLEDON. — Messrs. POTTS, SULMAN & HENNINGS, ARCHITECTS.

*W. Potts*  
1887

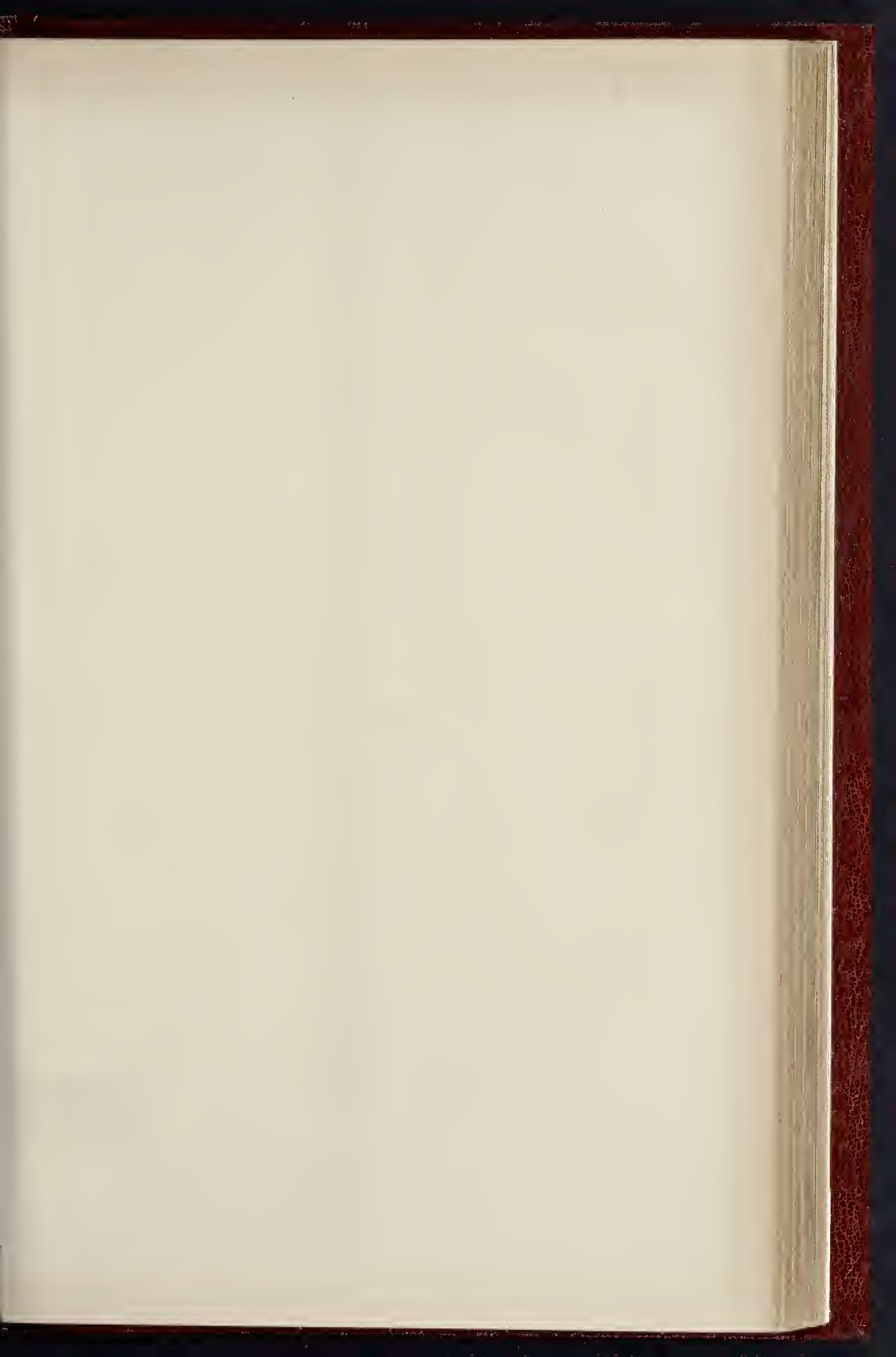




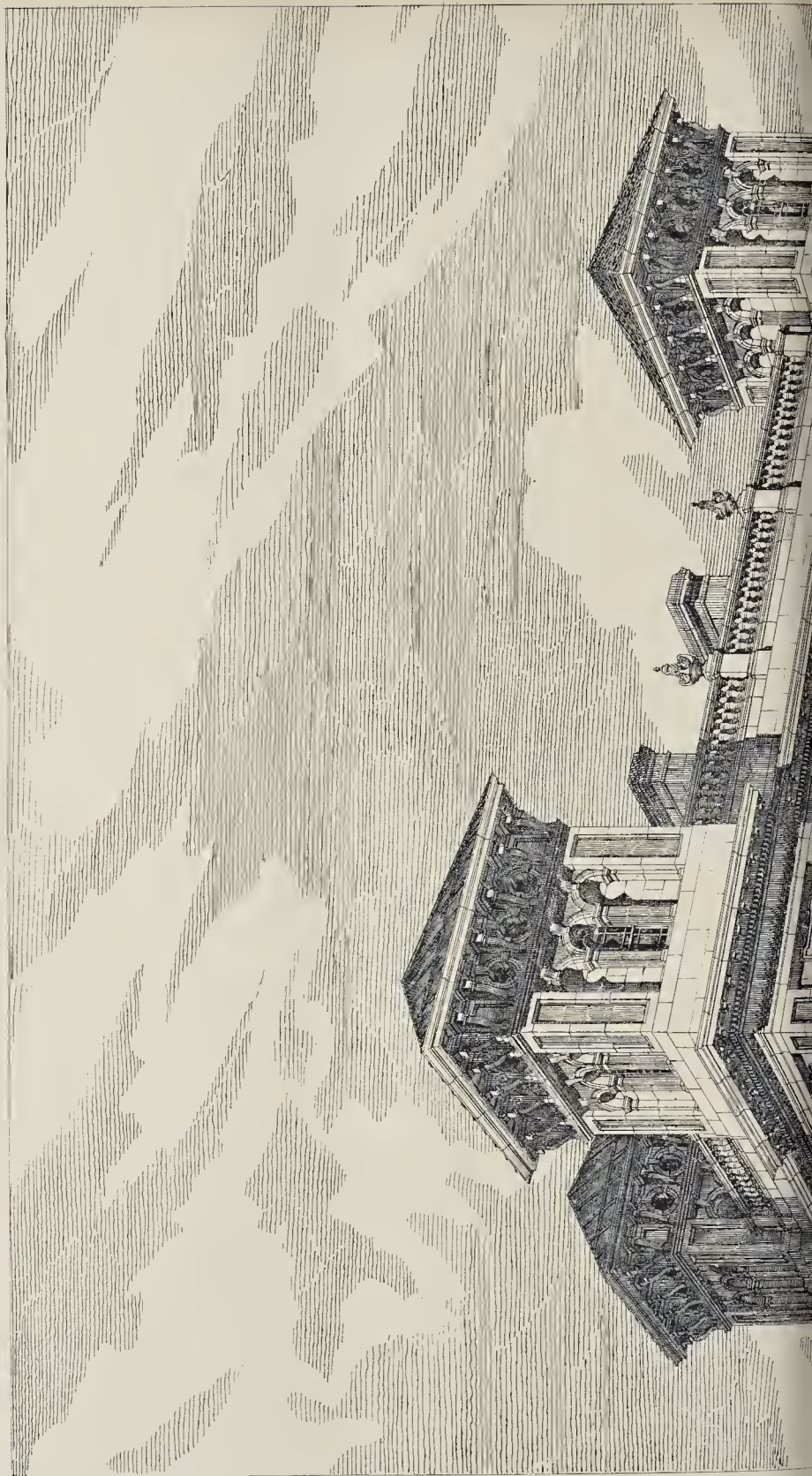
CHURCH OF ST. JOHN THE BAPTIST, BRIGHTON.—MR. S. J. NICHOLL, A.R.I.B.A., ARCHITECT.

THE PHOTO. SPRADLE & CO. 22 MARK LANE. AND 48 ST. LONDON E.

THE UNIVERSITY OF CHICAGO



THE BUILDER, MAY 21, 1887.







PHOTOGRAPH BY MR. J. P. MARTIN, 14, LONDON, E.C.

BRANCH PREMISES FOR THE BANK OF ENGLAND, FLEET STREET.—MR. A. W. BLOMFIELD, M.A., ARCHITECT

THE UNIVERSITY OF CHICAGO PRESS

THE NEW CLUB-HOUSE FOR THE  
NATIONAL LIBERAL CLUB.

THIS new building, visited by the members of the General Conference of Architects the other day, is fast approaching completion, and will be formally taken possession of by the members of the Club on Monday, June 20, in time for the Jubilee celebrations. By the kindness of the architect, Mr. Alfred Waterhouse, R.A., and of the Secretary to the Club, Mr. William Digby, C.I.E., we are enabled to give plans of six of the floors, together with such descriptive notes of the building as we have been able to get together within a comparatively limited space. Although the plans we give are of necessity very considerably reduced, they will suffice to make clear our description. We may mention here that in the *Builder* for May 9, 1885, we gave a view of the Club-house, together with the plan of the upper ground-floor. The plan of this floor has not been departed from in execution, although one or two of the apartments have been allocated to different uses than was intended two years ago; therefore, for convenience, we repeat the plan now, showing the allocation of the rooms as finally decided upon. We hope to be able to give views of some of the interiors soon after the Club-house has been opened. Without further preface we will proceed to describe the new building somewhat in detail.

With regard to the foundations, although the Club-house stands on what was the foreshore of the river at this point before the Embankment was made, very little difficulty was experienced. It was found that the Embankment work, executed by Mr. Webster for the Metropolitan Board of Works, and carried down into the line play, formed a complete cofferdam, and quite shut off the tidal water from the ground, whatever might be the height of the tide. The foundations of the building are carried down some 25 ft. below the level of the street pavement in Whitehall-place, and rest on solid masses of concrete applied or stepped at the sides in order to obtain a wide and solid bearing. These footings, which are of Portland cement concrete of extra good quality, rest on a hard and compact bed of yellow sand and gravel just above the level of the ground-water. In order to get down to this depth it was necessary to remove, firstly, a layer, about 10 ft. thick, of made ground and soft stuff; secondly, a layer, about 7 ft. thick, chiefly the residue of alluvial mud; and, thirdly, a layer of grey sandy loam from 3 ft. to 5 ft. thick. The brick bondings of piers and walls, which sustain great superincumbent weight, are of hard gault bricks supplied by Mr. Joseph Hamblet) set in Haslemort.

Having said thus much as to the foundations, we will briefly describe the chief features of the building which they support, beginning with the wine-cellar, which really forms a sub-basement, and is the lowest apartment in the building, with the exception of the sub-basement of the tower, which is on the same level and will be utilised as a beer-cellar, approached by one of the two staircases leading to the wine-cellar. The floors of the wine and beer cellars are about 17 ft. below the pavement level of Whitehall-place. The wine-cellar is 97 ft. long, with a general width of 35 ft., and is about 6 in. high from floor to ceiling. In recesses along the sides some of the wine-bins are placed, but by far the greater number of these are ranged in two double tiers erected along the centre of the cellar in the direction of its greatest length. These bins, of which there are upwards of 400, are built of brick and stone, the side partitions and back division walls being of brick, while the shelves are of York stone flags. These two double-ranges of bins along the centre of the wine-cellar are built right up to the underside of the ceiling, and, indeed, serve a secondary purpose, that of giving support to the floor of the Smoking-room above.

Ascending to the basement-floor, the general level of which is about 12 ft. below Whitehall-place, the most important apartment to be noticed is the Smoking-room, which has its floor 8 ft. 6 in. below the level of Whitehall-place. (See plan of basement floor.) It is made over the wine-cellar, and is nearly 100 ft. long by 35 ft. wide, not reckoning the space gained by the two large bay windows facing Whitehall-place, nor the deep recess on the other side of the room. In this recess, by the way, is a fireplace, and there will be two other fireplaces in this room, one at each end. The

room is about 23 ft. high from floor to ceiling. In addition to the three fireplaces just mentioned warmth will be supplied, when necessary, by means of steam-heated coils, some of which will rise through the centre of the floor and be concealed by ottomans. Ventilation will be provided for by inlets for fresh air at the skirting level, as well as at a height of some 10 ft. or 12 ft. This fresh air will be forced into the room in regulated quantities at each aperture, and will be warmed when necessary. These arrangements are referred to further on. Apertures in the ceiling and elsewhere at the top of the room will be provided for extraction purposes. These apertures lead into trunks and upcast flues or shafts, the extractive action being maintained and accelerated by means of steam-heated coils. The lighting will be by means of electricity, on the Swan-Edison system, as hereafter described. In the large Smoking-room, of which we are now speaking, the lamps will be suspended a few feet below the level of the ceiling, but in some other apartments the lights will be nearer the ceiling. Architecturally, the interior of the smoking-room is very effective. The ends are played or canted at each side, with fireplaces in the centre, as before mentioned. These canted ends, the two large bay windows, and the deep fireplace recess on the opposite side of the room, are emphasised by projecting piers and detached columns,—the latter being constructive as well as decorative, for they stand well away from the walls, and diminish the bearings of the girders which take the weight of the floor above, besides lightning the load on the walls. These columns consist internally of wrought-iron stanchions, built up in sections, on Lindsay's principle. The ironwork is surrounded by a core of coke-breeze concrete, which, while being light in weight, will serve to protect the ironwork in case of fire. This core of coke-breeze is put on to the columns by means of moulds specially contrived so as to obtain correctness of diameter and entasis. It also affords an admirable "key" for the Burnmantoffs faience work with which the columns, in common with the greater part of the wall-surfaces and certain portions of the ceiling, are decorated. It may here be mentioned that, as will be seen by the plans, detached columns of this kind, serving the double purpose of construction and decoration, are to be found in the Dining-room, Grill-room, Reading and Writing Rooms, and Gladstone Library, the design and colour of the faience and tiles differing in each apartment. The floor of the Smoking-room, like the floors of all the larger apartments of the Club-house, is of fire-proof construction, being arched in concrete over the wine-cellar, in which respect, however, it is exceptional, as the floor construction generally is on Lindsay's system of steel decking, hereafter referred to. The floor surface of the Smoking-room is of Eber's marble mosaic work. The three mantel-pieces in this room are of Hopton Wood stone, with walnut over-mantels. The doors, sashes, and other joinery in this room are in walnut, well designed and admirably executed. Before leaving the Smoking-room, we may mention that it is served from a bar contained in the basement of the tower, a bar above the level of wine and beer cellars. To mention the other apartments in the basement, immediately beneath the Club entrance and vestibule is a large dressing-room for the men-servants, with bath-rooms adjacent. Lighted from the open area fronting Whitehall-avenue are two large bed-rooms or dormitories for men-servants. Adjacent to these are the Steward's office and the Receiver's office, opening on to a corridor leading to the tradesmen's and servants' entrance. At the end of this corridor (which is bounded on one side by the party-wall between the club-house and the residential-chambers known as Whitehall-court) are lifts for stores and provisions. Adjoining these lifts is the men-servants' dining-room, served by two more lifts, and well lighted from the large open area between the buildings known as Whitehall-court. Still nearer the river, and within the main walls of the building, at its south-east angle, is the boiler-room. Close by, but in the basement of the terrace which overlooks the gardens and the river, are the dynamo and engine rooms. At this end of the terrace is the open area for the admission of fresh air for the supply of the building. It will be drawn in by means of a Blackman air-propeller, and conducted by means of air-trunks to the various parts of the building,

being warmed when necessary by steam coils on Mr. Phipson's system. Of the heating and ventilation arrangements generally we give a description further on. Northward of the boiler-room, and divided therefrom by a corridor, is large storage space for members' luggage, &c. This space extends up to the north-east angle of the Smoking-room. In an irregularly-shaped space, surrounded by the various apartments and offices which we have described, is disposed the bottom flight of the grand staircase, which latter is planned within an oval, 42 ft. by 31 ft., and brought down to this level from the entrance vestibule for giving access to the Smoking-room. In the lower part of this staircase further storage-space is obtained. Before leaving the basement floor we may add that, in the basement of the terrace, and lighted by a large bay window at the north-east corner, is another dormitory for men-servants.

Ascending to the next floor, namely, the "Lower Ground Floor" (see plan), we find ourselves on a general level with Whitehall-place. We may here mention that the Club-house has a frontage of about 130 ft. towards the river and Embankment gardens; a frontage of nearly 160 ft. to Whitehall-place, and a frontage of about 94 ft. to Whitehall-avenue. The party-wall dividing the Club-house from Whitehall-court is 127 ft. long. The Club entrance is at the angle formed by the junction of the new street known as Whitehall-avenue with Whitehall-place, and consists of a boldly-projecting and sculptured doorway leading into a vestibule and hall some 15 ft. wide, leading direct to the grand staircase, of which more hereafter. The sculptured figures surmounting the doorway are by Mr. Christopher Smith. Most of the other carved work has been done by Messrs. Daymond & Son. On the left of the vestibule is a small reception lobby, and on the right is the porter's office, with his bed-room below, reached by a circular staircase. Further on, on the right-hand side of the entrance-hall, is a large waiting-hall, accessible to the porter's office from two points. Adjoining this waiting-hall, and lighted from Whitehall-avenue, is the Conference-room, 38 ft. by 35 ft. Accessible from a corridor leading to the grand staircase are the members' hat and coat rooms, retiring-rooms, and lavatory. On the opposite side of the corridor just named are ranges of bath-rooms and dressing-rooms for members. On this floor of the building, and immediately beneath the terrace walk overlooking the Embankment gardens, are a series of billiard-rooms and card-rooms, some of which are top-lighted. At the north-east corner of the building, a porch (shown to the right of the plan of the lower ground-floor), beneath the small detached circular helvedere on the terrace (see right-hand corner of plan of upper ground-floor) gives access to a passage leading to the staircase in the tower, which leads up to the Gladstone Library and to the members' chambers on the upper floor. The remainder of the lower ground-floor is occupied by the upper part of the Smoking-room.

We will now ascend to the "Upper Ground-Floor" by the grand staircase, which, as we have already mentioned, is elliptical in plan. It has been executed by Messrs. Farmer & Bridley, and consists of three flights of solid Sicilian marble steps, 8 ft. in width, and landings. A solid alabaster cornice runs up the whole height, on which rest pedestals, with plinths and capping of Pavonazetto marble, and discs of alabaster, carrying columns of choice Broccia Africana, with caps and bases of cream-coloured statuary, the balustrade between having a Pavonazetto plinth and capping, and alabaster balusters, the whole being finished on top with white alabaster arches. The lower part of the wall is lined with alabaster slabs on a Pavonazetto plinth, the architraves, arches, and soffits to doorways being in the latter material. The principal apartments on the upper ground-floor (see plan) are the Dining-room, 110 ft. long by 38 ft. wide, facing the river and overlooking the terrace which has before been mentioned.\* This is the largest apartment in the building. At the north-east end access is obtained, through a door on the

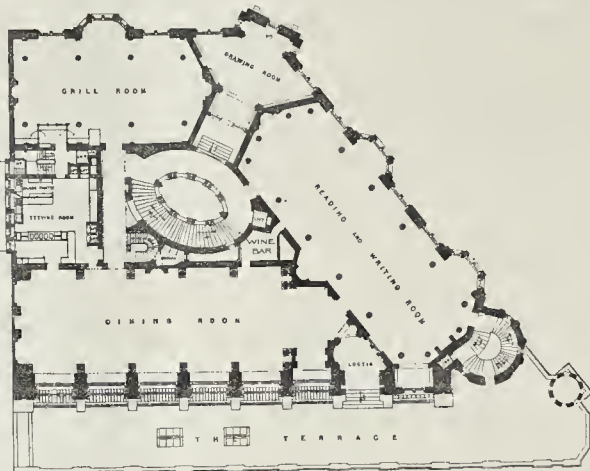
\* From this terrace, but not shown on the plans, a short flight of stairs, just by the first pier from the left-hand corner, leads down to the corridor on the lower ground-floor.

right, to a loggia opening on to the river terrace, and through a door on the left to the large Reading and Writing Room, which faces Whitehall-place, and is of the same size as the large Smoking-room below it. Over the entrance-hall and vestibule, and approached from the grand staircase, is the Drawing-room. Next comes the Grill-room, overlooking Whitehall-avenue. Between the Grill-room and the Dining-room is a corridor for members, and a large serving-room lighted from the area of Whitehall-court. Over this serving-room is a mezzanine containing retiring-rooms, lavatories, &c.

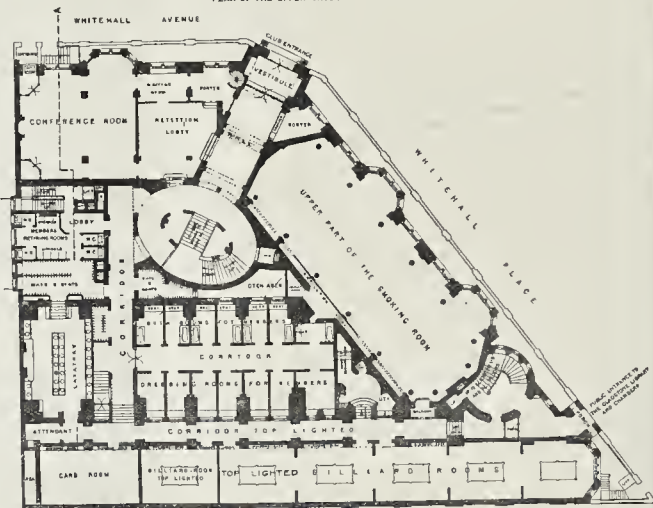
The principal apartment on the first floor (see plan) is the Gladstone Library, which is over the Reading and Writing Room, and of the same size as the latter and the Smoking-room, viz., about 97 ft. long, 85 ft. wide (exclusive of bays), and 24 ft. high. This Library will be approached from the grand staircase at one end and from the staircase in the tower at the other end. It will also open into the Smokers' Reading and Writing Room, which will overlook the river. This apartment is about 72 ft. long, and at one end has a large open loggia giving access to a balcony. Adjoining this room, and also overlooking the river, will be a private dining-room, 38 ft. by 35 ft. Behind this room will be another serving-room, and beyond that, and looking into Whitehall-avenue, will be the Committee-room, also available as a dining-room. Next will come the clerks' office and the Secretary's room, and, over the Drawing-room, the Members' Private Smoking-room. Over the service-room is a mezzanine giving more retiring-room and lavatory accommodation, and over the clerks' office is an additional room for clerks if needed. The grand staircase ends at the level of the first floor, and is lighted by a large lantern light, leaving the whole of the large internal area above it available for lighting the members' chambers and the domestic offices on the upper floors.

The second floor (see plan) contains about forty bedrooms, some of the larger ones having a recess, partly partitioned-off and partly intended to be curtained, for the bed. There are also bath-rooms, closets, &c. The third floor, which is almost identical in plan with the second floor, contains forty more bedrooms, besides bath-rooms, &c.; on both the second and third floors these chambers are disposed on each side of a continuous corridor running round the building, some of the chambers looking out from the three frontages, and others looking into the large inner area. On the fourth floor, however (see plan), accommodation has to be found for the kitchen, larders, pantry, scullery, &c., as well as for a number of the servants. The kitchen occupies the whole of the Whitehall-avenue frontage on this floor. The other portions of this floor are occupied as members' chambers and by servants' apartments and officers. Twenty bedrooms for members are obtained in the frontages towards Whitehall-place and the Embankment, but the servants' apartments and offices all look into the inner area, and are kept quite separate from the members' apartments by distinct though parallel corridors, approached by different stairs. The rooms on the fifth floor are, for the most part, located in the roof, and are largely devoted to storage purposes, and to bedrooms for the maid-servants. The Manager, Steward, and Housekeeper will also have their apartments here. The Manager's bedroom will be the topmost room in the tower, just below the open belvedere under the conical roof of the tower. From this belvedere, it may be remarked, a splendid view of London and its environs is to be had on a clear day. Above this open space, and beneath the slated conical roof, is an enormous tank containing about 100 tons of water, for working the hydraulic lifts, hydrants, &c. This tank will be supplied from the Chelsea Water Company's mains. It will thus be seen that the upper floors provide 100 bedrooms for members, besides kitchen and other domestic offices and servants' bedrooms. The building is 100 ft. high to the general line of coping. The gables and dormers go up above this, while the tower is 180 ft. high to the top. The building is faced with Portland stone externally, chiefly from the quarries of The Portland Stone Company, and roofed with green Westmoreland slates.

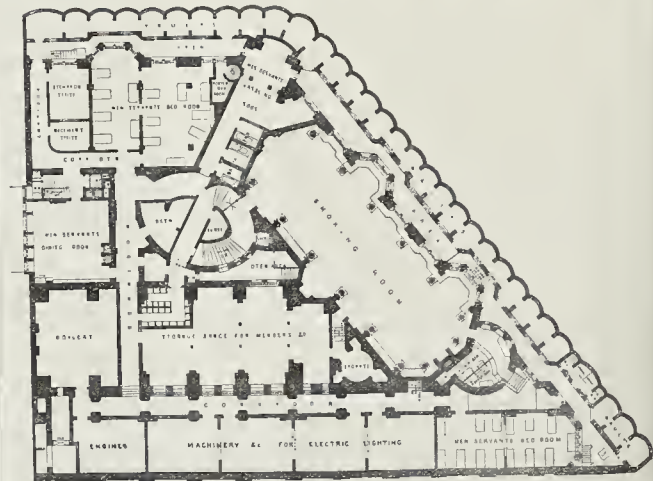
Having given this general description of the building, we proceed to describe in more detail some portions of its arrangement and construction.



PLAN OF THE UPPER GROUND FLOOR



PLAN OF THE LOWER GROUND FLOOR

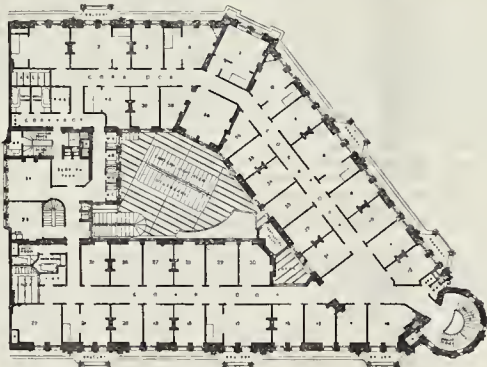


PLAN OF THE BASEMENT FLOOR

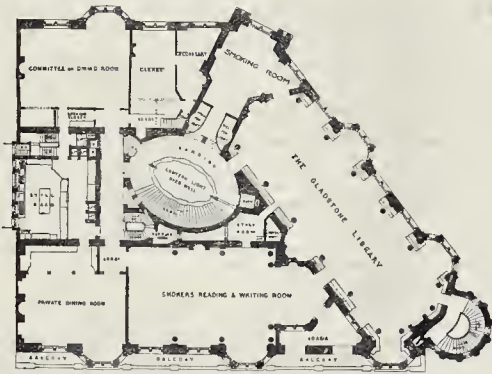
The National Liberal Club.



PLAN OF THE FOURTH FLOOR



PLAN OF THE SECOND FLOOR



PLAN OF THE FIRST FLOOR

The National Liberal Club.

dressing rooms, and the servants' rooms, are paved with 3 in. pitch pine blocks. The floors of the large Smoking-room, the Grill-room, and the large Dining-room have, for cleanliness' sake, been laid in mosaic, and it is intended to have small movable carpets under the tables and where else required. These floors are of Roman Meschiato, with rich borders between the columns. The entrance and staircase hall will also be laid with mosaic. The Billiard-room-corridor and other subsidiary corridors and retiring-rooms are laid with Ebner's improved Terrazzo mosaic, which makes an excellent floor, and is a cheap substitute for the more expensive Italian mosaics.

The ceilings, cornices, and casings to beams for the principal rooms have been executed by Messrs. George Jackson & Sons, of Rathbone-place, in their patent fibrous plaster. The enrichments were all specially modelled from designs supplied by the architect, Mr. Waterhouse. This fibrous plaster, as our readers know, has the great advantage of being fixed dry. It is screwed in large pieces to existing joists, no bracketing being required.

The staircase in the tower is fireproof, and has been constructed by Messrs. Dennett & Ingle. The wrought-iron balusters are by Mr. Peard (Hart, Son, Peard, & Co.).

In the decoration of the interior of the Club-house Mr. Waterhouse has adopted the use of Burmantofts faience, made and supplied by Messrs. Wilcock & Co. on a very comprehensive scale. For a building of this description it was thought desirable that as far as practicable the decoration should combine the qualifications of permanence, architectural treatment, and cleanliness. With this view the architect has adopted the material in a variety of ways, the result being effective without over-elaboration of ornament or cruddity of colouring. The large Smoking-room has its walls panelled in faience, the mouldings being old gold in colour, the panels a diaper of pale primrose, and the margin ivory and grey. Down each side of the room are columns, the cores of which are of iron and cement, as already described, with a covering of faience. The general result is very successful, the panels of the pedestals and the diapers of the shafts being especially noticeable. The colour of the lower portion of the pedestals is brown, picked out with bronze green, and the shafts are of the colour of old gold. These columns support an entablature, also treated in faience. The ceiling is cut up into square and hexagonal forms, arabesqued with designs in relief, supported by moulded ribs of canary wood screwed to wood framing bolted to the underside of the decking of the floor above. The larger panels are about 3 ft. square, each in four separate plaques supported at the intersection by a small metal boss. The arched and frieze on one side of the room are pleasing in effect. The workmanship is very good, and the appearance of the silver-grey tiles in the frieze panels is satisfactory. A pleasing feature is a faience balcony at one end of the room with access to it from one of the corridors on the lower ground-floor. The same material is being largely used in the Dining-room and in the Smokers' Reading and Writing Room. In the former the faience arches to the windows are full of character, and the rich brown employed in combination with the walnut fittings of the room when complete will give a distinctive feeling of comfort and character to this important room. In the Smokers' Reading and Writing Room the walls have been treated in panels on a distinct line from any other portion of the building, the methods employed being simple and the result satisfactory. The columns in this room, as throughout the building, including both pedestals, shafts, and caps, are all in Burmantofts faience. The billiard-rooms on the lower ground-floor, seven in number, are lined with faience up to 10 ft., panel and diaper treatment being again adopted, although there is considerable variety both in design and colouring. In a small room, originally intended to be used as the card-room, but subsequently appropriated as the principal lavatory, there is a very good faience frieze, and some well-executed pilasters in the same material. The principal corridors throughout the Club proper are lined with faience, and this treatment is also adopted for all the architraves to archways leading from main corridors. The outer wall of the grand staircase is being covered with faience in colours which harmonise with the general tone of the statbaster and marble. The entrance hall is being treated in

All the floors are of fireproof construction. As has been already stated, Lindsay's steel decking has been adopted by the architect for the principal floors, owing to its great strength and the saving of space obtained in being able to lay spans up to 30 ft. and 35 ft., with a floor thickness (including concrete) of only 15 in. Messrs. Lindsay's patent steel columns have also been used throughout the building, and while the floors may be said to be like so many diaphragms connecting and tying the building together, the weights are transmitted down the steel columns to the basement, thus relieving the walls of all undue strain or vibration.

The floors of all the principal apartments have been covered by Mr. J. F. Ebner, of Clerkenwell-road, either with parquet or mosaic. All the

parquet is laid on a new system patented by Mr. Ebner, described and illustrated in our last, and which consists in firmly attaching the wood to the concrete by means of specially constructed tiles with under-cut recesses on both sides; the tiles are floated on to the concrete, and the parquet is fixed to the tiles by a hard-setting bituminous composition, the whole forming a capital floor. All the members' chambers on the fourth, third, and second floors are paved with parquet in herring-bone pattern; but the Drawing-room, the Reading and Writing Rooms, the Cladstone Library, the Conference-room, the Billiard-rooms, and the private dining-room are of more elaborate but withal simple and effective designs. The corridors on the chamber floors, also the bath and

faience, the whole of the openings being arched; and the reveals and soffit panels to doors, balconies, windows, and other openings from the staircase, are also constructed in faience and panned. The tile-work in the Billiard-room-coriidor is by Messrs. Carter, Johnson, & Co.

The heating and ventilating arrangements were entrusted to Mr. W. W. Phipson. Two 97-horse power Babcock-Wilcox steam boilers are fixed in the basement. For the general steam service of the building, including the heating and ventilation, hot-water service supply, culinary department, electric lighting, pumping the return water from the hydraulic lifts up to the large cistern in the tower; and for each of the services, separate steam mains are provided and fitted with regulating valves. The Porter-Clark process will be adopted for softening the supply water for the steam boilers, and will also be used for the water supplied to the members' lavatories, baths, &c. The system of heating and ventilation adopted is a forced supply of fresh air, warmed or not, as may be required, in the several air-chambers previous to its distribution over the building, the points of admission into the apartments being at a low and at a middle level, with means for regulating it at will, as before mentioned. The diameter of the Blackman air-propeller is 6 ft., and it is capable of supplying at a moderate velocity 2,000,000 cubic feet of air per hour. The heating of the air-chambers is effected by low-pressure steam, passing through a series of coils or batteries of gill-pipes fixed in the same, with suitable means of moistening the air when necessary. These chambers are worked in series by a separate steam main, the whole being under control in the boiler-room, where the main distributor and main return collector are fixed. The steam having circulated through these chambers, and returned to the main collector, is then carried into the lower receiver of the return trap, and by an automatic action the water of condensation is lifted into the upper receiver of this trap, and is then forced by the alternative action of the valves into the boilers. The working pressure of the boilers being 70 lb. per square inch, this pressure is reduced, before the steam is admitted into the main distributor for heating, by a Royle reducing valve. By this means steam at any pressure can be used for heating purposes as low as 3 lb. per square inch, and the water of condensation, by means of the return trap, as above described, is automatically returned to the boilers. In the Billiard-rooms and Smoking-room direct radiation is used for heating, while for ventilation all these rooms are connected to the air-propeller. For the extraction of the vitiated air five up-cast shafts are provided, and the air in the same is rarefied by means of steam coils. By the construction of the floors, air-spaces over the whole of the ceilings are formed between the troughs of the decking, and by numerous perforations made in the ceiling an efficient outlet for the air is provided, the space between the ceilings and the under side of the steel deck floors being placed in direct communication with the extracting-shafts before mentioned. Valves are fixed on all the inlets, and also on the air supplies to chambers, and thus control will be obtained of the several main air deliveries. Sprays of water for cleansing the air are fixed near the propeller, and worked at high pressure. The whole of this work, including the steam boilers, &c., has been carried out by Mr. Wilson W. Phipson, M.I.C.E., of John-street, Adelphi. The grates and stoves used were supplied by Mr. D. O. Boyd.

The building is to be lighted by about 850 Edison-Swan incandescent lamps. In most of the rooms these will be suspended singly from the ceilings and enclosed in cut-glass globes. The suspending silk cords are of pale yellow silk, and are all but invisible when the lights are in use, an arrangement which gives the lamps an extremely light and airy appearance, and also ensures a perfect and equal distribution of the light. In the case of the Gladstone Library and the Reading and Writing Rooms, the lamps are to be placed close to the ceilings in the body of the rooms, supplemented by two-light pendants in the bays and recesses. Each of the large rooms is divided into several circuits, so as to admit of partial lighting, and each lamp in the members' chambers on the upper floors will be under separate control. All the dressing-rooms and water-closets are fitted with automatic switches, which cut off the light when the rooms are not in use, thereby

preventing waste of current. It is believed that this is probably a unique instance of a large installation in which every single lamp is controlled by a separate fusible cut-out; it has been carried out in strict conformity with the regulations which have been adopted by the fire insurance companies. There are in addition double pole cut-outs on the mains and sub-mains. The engine-room is on the river front, as before said, and in order to prevent any noise or vibration being perceptible in the billiard-rooms above, the utmost care has been taken in constructing the foundations of the machinery, which are isolated from the general foundations, and are of an exceptionally solid character. In addition the room will have a counter-ceiling below the iron decking, with layers of felt between the engine-bed and the brickwork supporting the same. The main switch-board is constructed of slate, on which are mounted massive gun-metal bars, so arranged as to admit of the complete control of each of the fifteen main circuits into which the lighting of the building is divided. Provision is also made for connecting a large battery of accumulators, with which it is contemplated to supplement the engine power, and the whole is so arranged as to admit of the connexions between the two sets of circuits, dynamo, and accumulators being interchangeable. The dynamo machines are of the Edison-Hopkinson type, constructed to run at 450 revolutions per minute. The engines are a pair of twin cylinder high-pressure horizontal engines, by Messrs. Marshall, of Gainsborough, and are fitted with special governing apparatus to ensure an equal and steady light under varying loads. The work has been carried out by the Edison & Swan United Electric Light Company, under the superintendence of Mr. T. O. Belslaw.

The kitchen, serving-rooms, &c., have been fitted up by Messrs. James Slater & Co., of the Holborn Engineering Works, with their own patent gas and steam cooking apparatus. The kitchen, sculleries, and larders have been arranged by the same firm, and all cooking apparatus is heated solely by either gas or steam. The sculleries are supplied with Messrs. Slater & Co.'s washing troughs, fitted with their combined water and steam inlet and waste outlet valves. The Grill-room is supplied with a large patent double gas grill, by which the whole of the grilling will be done, and with hot closets. The Smoking-room bar has also been arranged and fitted up by Messrs. Slater.

With regard to the lifts, the American Elevator Company is fixing one main staircase elevator, to rise from the Smoking-room floor level to the first floor, a distance of 58 ft. This will have an elegant car, with ample power, and will work in a brick shaft provided for it. There will be also a chambers lift, rising from the Lower Ground Floor to the fourth floor, a distance of 76 ft. This will be smaller than the staircase lift; it will also work in a brick shaft, and since, especially at certain hours of the day, its work will be heavy, it will run at high speed. There will also be a service lift, rising from the basement to the fifth floor, a distance of 112 ft. This, as its name implies, will be for the service of the Club-house, and for the servants as well. This also will have ample power, and will run at high speed. There will also be a wine lift, to take casks of wine, &c., from the ground to the basement level. This, however, will be a direct lift. The three first-named are of the American Elevator Company's Standard type of low-pressure hydraulic elevator. A large iron tank is fixed in the tower of the building, the water from which will be the motive-power for the elevators, and will also be available in case of fire. Since in this building steam-power is necessary for electric-lighting purposes, the elevators will discharge water as fast as it is used into a tank in the basement, and a Worthington steam-pump will be employed to lift the water back again to the tower tank, so that the water will be used over and over again continually, so far as the lifts are concerned; but water from this tank will also be used for other purposes, and the consequent continual fresh supply will keep the water in good condition. The cost of working the lifts in the building will therefore be merely the cost of pumping the water; and the working of the lifts only calls upon the steam- boiler employed for other purposes for the power required for the elevators, and this is estimated to not exceed three horse-power.

In order that the drainage arrangements of the building should be as perfect and complete

as it is possible to make them, the architect has adopted the Shone hydro-pneumatic system of sewerage. This system has been adopted as being the most effectual means by which the sewage in the metropolitan sewer could be prevented, in times of heavy rainfall, from flowing into the main and branch sewers of the building, and thereby flooding the basement. The sewage in the metropolitan sewer has been known to rise 13 ft. above Ordnance datum, which might, in case the flaps at the outlets into the metropolitan sewer failed, flood the basement to a height of 6 ft., if the building were drained on the ordinary plan, namely, that of allowing the gravitation sewers to discharge direct into the metropolitan sewer. But by interposing a Pneumatic Sewage Ejector between the Club premises and the metropolitan sewer, an effectual barrier is interposed against not only sewage gas, but also against the sewage itself, however high it may rise in the metropolitan sewer. The whole of the sewage and rainfall is conducted by means of 6 in. pipes into four manholes, situated in various parts of the basement. These manholes are each connected with a 6-in. outlet pipe, the gradients of which vary from 1 in 70 to 1 in 140, and by which the sewage gravitates to a manhole adjoining the ejector station, in the latter of which there are two of Shone's pneumatic ejectors, each of fifty gallons capacity; so that all the sewage and rainfall is collected at one point, and flows into the ejectors, which discharge it direct into the metropolitan sewer, even if the sewer is full. The compressed air which actuates the pneumatic ejectors will be supplied by a Westinghouse air compressor having a 6-in. steam cylinder and a 7½-in. air cylinder. The compressor is so arranged as to work automatically. The sanitary fittings, such as water-closets, lavatories, urinals, baths, &c., are by Messrs. Tylor & Sons.

Mr. James Hill, of Queen Victoria-street, has been entrusted with the contract for the whole of the locks and door furniture, together with the swing-door hinges, grip handles, sash and casement fittings, and all the brass-foundry work throughout. The locks are all under master-key arrangements, and Mr. Waterhouse's own designs have been carried out in the work generally. Mr. Pearse has supplied the metal ornaments, and Mr. Julius Sax has fitted the electric bells.

The cost of the building, exclusive of site, has been about 150,000l.

It only remains for us to add that the general contract was taken by Mr. George Shaw, of Westminster, and is being carried out now by his executors. The foundations were put in by Mr. Henry Lovatt, of Wolverhampton. The building, as a whole, reflects much credit upon the architect, Mr. Waterhouse, R.A. The design is Early Renaissance in character. The clerk of works, to whom we are much indebted for conducting us over the building, is Mr. Thomas Warhurton, a thoroughly practical and able man.

#### PUSH AND PULL LOCKS.

KAYE V. CHUBB AND SONS.

ON the 25th November last year, in an action for infringement of patent, brought by Messrs. Kaye against Chubb & Sons' Lock and Safe Company (Limited), Mr. Justice Mathew, sitting without a jury, gave judgment for the plaintiffs with costs. From this decision Messrs. Chubb appealed.

The question was whether a push and pull lock made by Messrs. Chubb was an infringement of the plaintiffs' patent of 1857. Messrs. Chubb contended either that Messrs. Kaye's patent was bad for want of novelty, or that, if good, the lock made by them (Chubb's) was no infringement; and they relied principally upon the prior inventions of Mr. Brodie and Mr. Inray in support of their case.

After hearing lengthened arguments of counsel on both sides, the Master of the Rolls, in giving judgment on Monday, the 16th inst., in favour of the defendants, Messrs. Chubb, said he had come to the opinion that what Mr. Kaye had done was to take the second alternative of Mr. Inray's specification and to claim a patent for that. That in law he could not do. He was aware that in this case he was assisted in that performance by Mr. Inray himself, but that could make no difference as to the construction. Mr. Inray was applying himself to that which was part of his professional skill, namely, to draw patents for people which should do exactly what his patent did in one of the alternatives, but without saying so. His judgment went on this ground, that the plaintiffs' patent was bad, because it was identical with the second alternative in Mr. Inray's patent. Therefore the defendants were

entitled to succeed in their appeal, and would receive costs in the action as well as the costs in the appeal.

Lords Justices Fry and Lopes concurred. Judgment was entered for Messrs. Chubb, the defendants, accordingly.

ON THE QUESTION OF LIFTS.

SIR,—May we ask the favour of space for one or two comments upon the remarks on lifts in Mr. Slater's paper on "New Materials and Inventions," read before the General Conference of Architects? (See *Builder*, p. 703, ante).

Our principal object in writing is to point out a very serious error into which Mr. Slater has fallen, no doubt inadvertently. He states (quoting your report) that the Otis Elevator "can be worked at a very low pressure, say 40 lb. to the square inch, whereas other hydraulic elevators require a very high pressure, that would have been almost impossible to obtain a few years ago, before the introduction of the hydraulic power system of high-pressure mains, where pressure up to 700 lb. per square inch can be obtained." In correction we beg to say—First, that twenty-five years ago we were erecting lifts working at 80 lb. per square inch. We have in London one passenger-lift working at 23 lb. per square inch, several between that pressure and 80 lb., and a large number at 30 lb. We think we are well within the mark in saying there are at least 30 hydraulic lifts, other than the Otis Elevator, working in London at pressures not exceeding 30 lb. Secondly, before the formation of the Hydraulic Power Co. we had erected many lifts working at 700 lb. pressure per square inch,—there is practically no difficulty in obtaining the pressure if it is required. Thirdly, there is scarcely a lift erected in connexion with the Hydraulic Power Co.'s mains which could not have been worked at 30 lb. pressure per square inch had it been considered desirable or advantageous to do so.

With Mr. Slater's remarks upon the safeguards requisite with suspended lifts we entirely agree, merely adding that we shall be pleased to show him lifts of English manufacture which comprise all the precautions he enumerates, and from which the serious danger he ascribes to the Otis lift is absent. The English lift, being absolutely controlled by its valve, cannot run down if overloaded; in it, overloading must be carried to the fracturing point before danger can arise.

Mr. Slater avoids the question of pressures, high or low. Much misconception exists upon this subject, and perhaps we may be allowed a few words upon it.

Each system has its proper place, and a few instances will make this clear.

1. A building in a position where a natural supply, or an ordinary town's supply, of fair pressure is available, no external high pressure to be had, and for a dozen conceivable reasons pumping machinery inadmissible. Low pressure is clearly the only possible resource.

2. A building of larger dimensions requiring, say, two or more lifts frequently in use; no natural head of water available, and the town's supply either too far away, or supplied at a price ranging from 6d. to 10d. per 1,000 gallons. It would generally be economical for such an establishment to pump its water up, and in so large a building a suitable position could be found for the machinery. Under these conditions we may have any pressure we please; we may pump into tanks within the building, giving a pressure up to perhaps 30 lb. per square inch, or tanks on a hill-side giving say 100 lb. to 150 lb. pressure, or we may pump into an accumulator, dispensing with tanks, and obtaining a pressure of from 500 lb. to 800 lb. according to fancy. Which shall it be? Economy of power, as measured by consumption of coal or gas, will be the same for all pressures, notwithstanding interested statements to the contrary. Wear and tear practically the same.

First cost of low-pressure lifts and pipes will be greater than the high pressure; but, on the other hand, low-pressure pumps and tanks will mostly be cheaper than high-pressure pumps and accumulator, and the difference for an entire system of slight difference will not be great,—the balance occasionally tipping to either side. Convenience will in this case decide. Suppose the building is residential; during the day, with the various noises of the daily routine in progress, with the majority of residents out, or moving about, the lift pumps would be unobtrusive; but in the evening the various conditions would all be reversed, and the slight noise of the pumps prove objectionable. Pumps must consequently be stopped, but lifts must continue working occasionally till all have retired for the night; and to meet this requirement considerable storage is requisite. Now, low-pressure tanks are cheap, and easily increased if required; high-pressure accumulator storage is the exact reverse, and therefore, in this case, low-pressure gain wins.

But if our building had been a warehouse or a factory, where the pumps may run as long as the lifts are required, and where the building, being comparatively low, no considerable height could be obtained for the tanks, then the balance of convenience would be in favour of the high-pressure system.

3. A building which can be supplied either by the low-pressure town's supply, with 30 lb. pressure, at say 10d. per 1,000 gallons, or by the Hydraulic Power Company, with 700 lb. pressure. Pumps inadmissible. Here the high-pressure lift will cost from two-thirds to three-fourths only the price of the low-pressure. The high-pressure pipes will cost a little over half. The high-pressure water for a given amount of work will cost one-fifth the price of the low-pressure. The space occupied by the high-pressure lift machinery will be only three-fourths that of the low-pressure. A 1½ in. high-pressure pipe will do the work of a 4 in. low-pressure.

With these facts before him, what purchaser would choose the low-pressure in this case?

To sum up, there is no inherent evil or difficulty in the use of high-pressure. On the other hand, the user's interests lie in its direction, and he should always endeavour to get the highest pressure available, assuming that he can get it without accompanying inconvenience. Let him not be frightened by the alleged dangers of high pressure, such as the bursting of cylinders and pipes, the "blowing out of valves," &c.; they are purely imaginary. We predict that some of this machinery, one five years and the other four years ago, and have never had to attend to either since.

ARCHD. SMITH & STEVENS.

May 11, 1887.

THE HOTEL BOURGTHEROLDE.

SIR,—It may interest your readers to know that the window in the Hotel Bourgethrolde, Rouen, illustrated in your impression of the 7th inst., is the one a plate of which, accompanied by highly laudatory remarks appears in Mr. Ruskin's somewhat scarce book "Lectures on Architecture and Painting."

T. G. ABBOT.

A CORRECTION.

SIR,—By your special report of the education meeting of the late Conference, I see that the Chairman, speaking very kindly of Mr. Millard and my intention to found an *atelier*, said that I had been a Pugin Student. That is a distinction of which those who have earned it are rightly proud, but, unfortunately, I am not one of the number; Mr. Cates was probably thinking of my colleague, who is,

FRANK T. BAGGALLAT.

A PROTEST.

SIR,—Mr. Beaumont, in his letter to the Architectural Association (*vide Builder*, May 14th), classifies quantity surveyors along with "young men just out of their articles" (which infers incompetence), "architectural fossils, and drunkards." Possibly Mr. Beaumont did not intend to cast any aspersions, but is not his particular form of expressing himself a little rough on the humble quantity surveyor? ONE OF THEM.

\* The sentence appears to us to be in exceedingly bad taste, to say the least.—ED.

STEAM-ROLLERS.

SIR,—The Court of Queen's Bench, presided over by Mr. Justice Grove, has recently been engaged on a very peculiar interest and of some importance to local authorities. The action in question was brought by the Gas Light and Coke Company to restrain the Vestry of St. George's, Hanover-square, from using steam road-rollers of such weight as would fracture or injure the gas-mains of the Company, and also for damages in respect of certain mains actually fractured by the Vestry's steam-roller. The weight of the roller used by the defendants was 15 tons, which weight, speaking without prejudice, but from a practical point of view, is not essential for making good roads. Macadamised roads are not much better now than they were some years ago in the days of the inventor of this particular kind of road, Sir John MacAdam, and before steam-rollers were invented; and though it cannot be denied for a moment that steam-rollers have great advantages, or that road authorities are entitled to use them for promptly and efficiently repairing the streets, yet it must appear to both practical and non-practical men that the weight of the roller used by the defendants was neither reasonable nor necessary.

The principle of the formation of macadam roads is that the stones, by reason of their angularity, should bond and key together, and if a light roller is used, the effect is produced, the stones being gradually consolidated and fitted into each other, forming an almost homogeneous mass. If a heavy roller is brought on them, the stones do not get pressed or wedged into this position, but are washed together, the angles of the small granite cubes being pulverised, and the holding power diminished. The passage of a heavy wagon, or even of a heavily-laden trolley, would not, as the Vestry have endeavoured to show, have the same damaging effect on underground pipes and mains as the steam-roller, and although their weight might be as great as the roller it would probably only pass over the mains for a short length, and then off again; whereas, a roller in rolling a street

passes and re-passes over the same spot scores of times before the road is properly consolidated.

Of course, it cannot be contended that work is as quickly or as cheaply done by the employment of light rollers; but there are other elements in the case than those of speed and economy, and where danger both to person and property is likely to follow the employment of rollers of such crushing weights as 15 tons, the road authorities should at least take care to ascertain the positions, size, and age of all mains likely to be affected, prior to the work of the formation of roads, by means of steam-rollers, being commenced. E. F. S.

RECENT PATENTS.

ABSTRACTS OF PATENTIFICATIONS.

5,442, Square Turning. J. C. V. Stacey.

The method of square turning by means of attaching the articles, newels, balusters, table and sofa legs, &c., by attaching them to a large revolving drum, is not here claimed as new, but the novel features claimed are: (1) The manner of securing the various articles inside the circumference of the drum by a recessed flange and two small steel pins. (2) Four loose iron sections of rings and four cramps are also used for securing; and (3) A large wooden ring attached to the inner circumference of the drum, diminishing the size of the drum, so that a smaller number of articles may be turned.

7,100, Wedge for Doors. J. G. Rollason.

The subject of this invention is a little wedge-shaped appliance with an inverted horn piece, so fixed that while the top part of the catch presses into the door or window the end of the inverted horn sinks into the wood of the floor or frame and effectually prevents it from being forced open.

7,282, Door Checks. J. H. Jefferys.

The subject of this invention claims to be an improvement on the ordinary form of pneumatic door-checks in the direction of greater compactness and, by hinging the arm of the appliance, greater ease and certainty in working.

9,824, Mitreing Machines. A. Muir.

This invention relates to a hand mitre-cutting machine consisting of a knife or cutter mounted on a triangular frame having a stud fixed on one side which carries a lever with a long slot; which slot operates on a stud fixed on centre of knife or cutter carrier. The lever operates at right angles to the machine. The machine is pivoted in front of a triangular frame, which enables it to be adjusted to any angle, so that all mitres, simple or acute, can be executed with ease and expedition.

15,965, Moulded Slag Paving. C. J. Dobbe.

According to this invention Glets are formed upon the side of the paving blocks, to obviate the use of the wooden strips generally employed. The fillets keep the blocks a proper distance apart, and form also a narrow channel between them, into which cement is run to bind the whole paving together.

1,908, Casement Fastenings. Kristensen and Jensen (Copenhagen).

This patent relates to a fastener designed with a view to extreme simplicity, and to operate in all sorts of weather, so as to enable the casement to be readily opened or closed. The lever, which slips into an ordinary catch, has two arms, a long and a short one, and when the short arm is moved across the opening or joint it fastens the casement securely. The longer arm also affords a means of drawing the sashes firmly together, or when opening to force them a little apart so that the casement may be readily opened.

NEW APPLICATIONS FOR PATENTS.

May 6.—6,648, J. and C. Severs, Draught, Dust, and Rain Excluder, for Doors and Windows.—6,649, W. Anderson, Ventilating Sashes.—6,651, R. Busted, Water-closet Pan.—6,672, A. Boul, Window-sash Balances.—6,675, A. Boul, Hangers for Sliding Doors or Windows.

May 7.—6,695, J. Fairbairn, Window-sash Fasteners.—6,701, B. Tawate and Others, Manufacture of Portland Cement.—6,709, G. Shepherd, Chambers for Drying Timber, &c.—6,741, J. Kliff, Sliding Square for Carpenters, Stair-builders, &c.

May 9.—6,802, J. Hoyle, Burning Cement and Lime, and Kilns for same.—6,804, J. Johnson, Machines for Sawing or Cutting Stone.

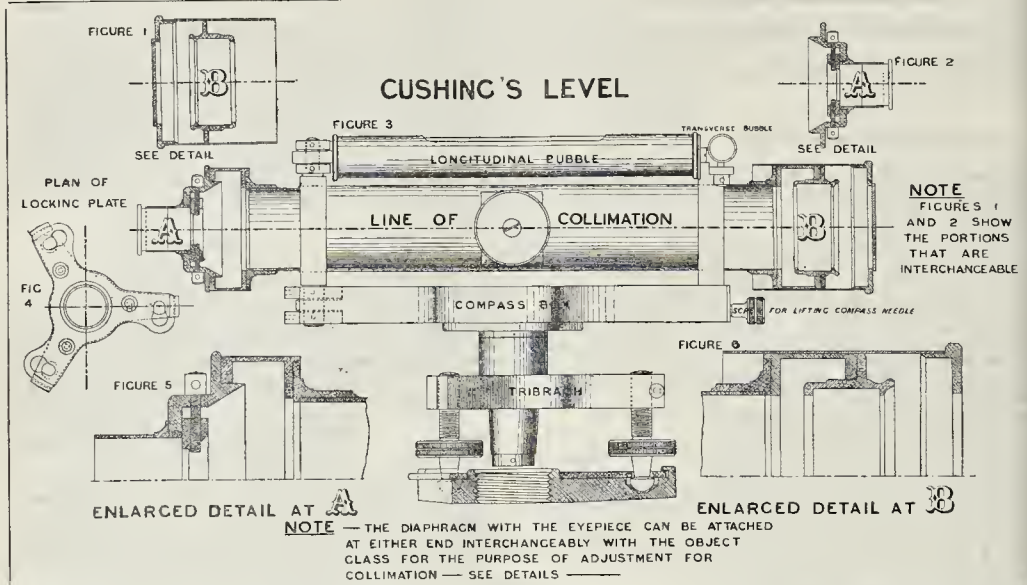
May 10.—6,803, J. and E. Eshelby, Electric Bell Indicators.—6,820, W. Grinist, Extra Pins with or without Gutter, for use with Corrugated Roof and Wall Coverings.—6,881, H. Lake, Window Frames and Sashes.—6,884, F. Chapman, Improved Nail.

May 11.—6,887, J. Jackson, Water-wash Preventing Syphon Cisterns.—6,919, A. Ward, Water-closets.—6,923, J. Nicholas and H. Fanshawe, Stoves.

May 12.—6,937, R. Ripley, Paint or Colouring for Metalwork, Stonework, Stucco, &c.—6,953, J. Campbell, Glue.—6,977, T. Roberts, Portable Terracotta Stoves.—6,990, L. Sunter, Water-closets.

PROVISIONAL SPECIFICATIONS ACCEPTED.

479, J. Shaw, Gullies and Sinks.—4,231, H. Lehmann, Wood Planing and Turning Machines.—4,417, J. Holding, Window Sashes in Open or Closed



Position.—4,773, A. Boul, Door Checks.—4,818, S. Taylor, Metal-covered Roofs.—4,835, T. Le Poidevin, Brickmaking Machine.—5,155, J. Hooton, Manufacture of Portland Cement.—3,459, F. Sage, Door Stops or Abutments.—3,536, B. Walchner, Saw-plate for Cutting Marble or Granite.—4,404, J. Killey, Air-inlets for Drains.—4,811, N. Naudey, Cross-cut Saws.—4,927, J. Wilson, Street Paving.—5,106, T. Robinson, Wood-planing Machines.—5,138, H. Hutchens, Chain Fasteners for Doors, Windows, &c.—5,171, N. Helme and Others, Paper-hangings.—5,477, D. Cowan, Cooking Ranges, Stoves, or Fireplaces.—5,762, T. Panario, Water-waste Preventers.—5,847, H. Hagon, Chimney Pot for Smoky Chimneys.—5,848, J. Ditchfield, Water Taps for Joining to Lead Pipes.—6,080, J. Eves, Water-closets.

COMPLETE SPECIFICATIONS ACCEPTED.  
Open to Opposition for Two Months.

6,517, A. Rust, Stoves.—7,888, F. Stokes, Manufacture of Cement.—7,941, J. Hill, Saw Sharpening Apparatus.—7,954, T. Twyford, Water-closet Basins and Mode of Flushing them.—8,093, Syer & Clark, Water-waste Preventing Apparatus.—8,876, W. Temple, Mouthpiece for Horizontal Brickmaking Machines.—8,876, H. Hennes, Self-acting Fastenings for Doors and Windows.—8,889, W. Dryden, Safety Fastenings for Window Sashes.—9,895, G. Rayner, Retaining Catches for Doors.—15,607, G. & M. Stowe, Bolt for Windows and Doors.—268, Cahuy & Lamal, Drain Traps.—5,907, T. Hellinwell, Fixing Sheets of Zinc, Lead, Copper, &c., to Roofs, Flats, or Sides of Buildings, &c.—9,111, H. Buchna, Valve Apparatus for Water-closets.—3,563, F. Frenzel, jun., Encaustic Tiles.—5,057, W. Townsend and F. Ullathorne, Sash Fasteners for Windows.—5,204, G. Price, Water-closets, &c.

The Student's Column.

FIELD WORK AND INSTRUMENTS.—XXI.

Leveling Instruments.  
V.—CUSHING'S LEVEL.

Cushing's level the object-glass and the eye-piece are constructed to be interchangeable. Figs. 1 and 2 show the eye-piece and object-glass ends, marked A and B, removed from the telescope. A gun-metal socket is fixed, as shown in section in fig. 3, upon one end of the inner brass tube and also upon the opposite end of the outer brass tube, both sockets being flanged to receive either the eye-piece or the object-glass fittings. The object-glass fitting at B is made somewhat longer than the fitting at A, because it has to carry the shade cover, but in other respects the bearing surfaces to receive either the object-glass or the eye-piece ends are identical. The eye-piece is attached to the telescope by a kind of bayonet fixing, in which it is brought to its proper position against stops, and secured to the flange of the socket by means of two screws. The object-glass end is fixed in a similar manner. The eye-piece end carries the

diaphragm plate, which contains fine lines ruled upon plain and parallel glass instead of spider's lines. Away from a town or city, where a mathematical instrument maker could not be found except at a considerable distance, the possession of a diaphragm of this character may be an argument in favour of its use, but the amount of light lost by the reflection and absorption of the glass plate gives to the ordinary open form of spider's web diaphragm a decided advantage. In Cushing's level the adjustable diaphragm plate being attached to the removable eye-piece end, it might be dangerous to remove it in the open field unless the diaphragm was of this permanent nature. The telescope is supported by the ends of the horizontal limb containing the compass, as shown in fig. 3, the support at one end (where a means is provided for lifting the compass needle), being capable of a slight rocking motion in the direction of the axis of the telescope, while the support at the other end has a lifting or lowering arrangement for adjustment in setting the axis of the telescope at right angles to the vertical axis of the instrument. The vertical axis is fixed rigidly to the limb, and revolves in a socket made in the central boss of the upper parallel plate, being secured by a nut at its lower end. The parallel plates as shown in plan in fig. 4, are constructed upon the tribrach principle explained in article xi. (March 12th, p. 412).

Having made the longitudinal bubble reverse by means of the capstan-headed nuts attached to the screws fixed at the end opposite to the transverse bubble, the parallelism of the optical axis in the telescope to the run of the longitudinal bubble can be tested by reversing the eye and object glass ends. If any adjustment is needed it is effected by means of the vertical capstan-headed nuts in the eyepiece. In thus testing the line of collimation it is, of course, necessary to traverse the telescope half-round, after reversing the ends A and B, so that the point in a distant object viewed with the eye-piece at one end of the telescope may be again observed with the eye-piece attached to the other end. It is important, in changing the object-glass from one end to the other in this adjustment, to observe that the part of the cell which has the small screw-hole in it is kept uppermost, and that the eye-piece is reversed without turning the diaphragm plate vertically over.

New R.C. Church for Liverpool.—In a limited competition for the new Catholic Church of St. Sylvester, Liverpool, the design with the motto "Lux" has been accepted. The authors of the design are Messrs. Pugin & Pugin.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.  
MAY 9.

By G. A. WILKINSON.

|                                                                  |        |
|------------------------------------------------------------------|--------|
| Shepherd's Bush—95 to 115, odd, Starch Green-road, copyhold..... | £2,350 |
|------------------------------------------------------------------|--------|

By A. CHANCELLOR.

|                                                                   |       |
|-------------------------------------------------------------------|-------|
| Richmond—Holbrook House, with grounds, freehold.....              | 3,080 |
| Bracknell (near)—Enclosures of land, 38a. 0r. 12p., freehold..... | 600   |
| Enclosures of land, 30a. 3r. 29p., freehold.....                  | 700   |
| Two enclosures of land, 6a. 0r. 24p., freehold.....               | 178   |

By J. WILKIN.

|                                                             |     |
|-------------------------------------------------------------|-----|
| Norwood Hill—Sherborne Lodge, 37 years, ground-rent 8s..... | 400 |
|-------------------------------------------------------------|-----|

By Messrs. LEAGE.

|                                                                    |     |
|--------------------------------------------------------------------|-----|
| South Hackney—7 and 8, Handley-road, 52 years, ground-rent 9s..... | 640 |
| Stepney—120, Clark-street, 14 years, ground-rent 4s.....           | 125 |

By RAIN & KAUFMANN.

|                                                     |       |
|-----------------------------------------------------|-------|
| Kensington—2 and 11, Drayton-gardens, freehold..... | 2,500 |
|-----------------------------------------------------|-------|

By R. TOMLINSON.

|                                                                                   |     |
|-----------------------------------------------------------------------------------|-----|
| Thornton Heath—2 and 3, Wilton-terrace, freehold 4, Wilton-terrace, freehold..... | 630 |
| Wandsworth—20a, 22a, and 24a, Cologne-road, 91 years, ground-rent 21s. 13s.....   | 390 |
| Barking—2 to 16, even, Hardwick-street, 97 years, ground-rent 22s.....            | 875 |
| .....                                                                             | 725 |

MAY 10.

By R. W. MARK & SON.

|                                                              |     |
|--------------------------------------------------------------|-----|
| Belgravia—The lease of 19, Chapel-street, term 23 years..... | 260 |
|--------------------------------------------------------------|-----|

By COLLIER & BOWDICH.

|                                                            |       |
|------------------------------------------------------------|-------|
| Cambridge Heath—475 and 477, Cambridge-road, freehold..... | 1,800 |
|------------------------------------------------------------|-------|

By WINSTANLEY, HORWOOD, & CO.

|                                                            |       |
|------------------------------------------------------------|-------|
| City—25, Paternster-square, freehold.....                  | 2,770 |
| Paddington—3, Amberley-road, 75 years, ground-rent 6s..... | 355   |

By E. & H. LUMLEY.

|                                                                                   |       |
|-----------------------------------------------------------------------------------|-------|
| Mile End—13 and 15, New-street, 19 years, ground-rent 4s. 2s. 6d.....             | 175   |
| 25 to 53, odd, 1, New-street, 20 years, ground-rent 27s.....                      | 1,725 |
| Spitalfields—34, 48, and 55, Flower and Dean-street, 4 years, ground-rent 8s..... | 205   |

By C. & H. WHITE.

|                                                                       |       |
|-----------------------------------------------------------------------|-------|
| St. Luke's—42 to 58, Bastwick-street, 44 years, ground-rent 120s..... | 3,400 |
| Halemeere, Surrey—Two enclosures of freehold land, 3 acres.....       | 140   |
| Bockhampton, Hants—Horn Cottage, freehold.....                        | 60    |

By H. J. BLISS & SONS.

|                                                                                   |       |
|-----------------------------------------------------------------------------------|-------|
| Bethnal Green—83 to 91, odd, Treadway-street, 49 years, ground-rent 20s.....      | 1,380 |
| Bromley-by-Low—15 and 17, Bick-street, 88 years, ground-rent 7s.....              | 130   |
| Bethnal Green—12 and 170, Sewardstone-road, 71 years, ground-rent 8s. 15s.....    | 650   |
| North Bow—29, 28, 36 to 54, even, Labor-road, 78 years, ground-rent, 44s. 6s..... | 2,230 |
| Hackney-road—93 and 95, Weymouth-terrace, 27 years, ground-rent 7s.....           | 570   |
| 14 and 16, Leidges-road, 55 years, ground-rent 12s. 7s.....                       | 300   |
| 6, Arthur-street, 56 years, ground-rent 4s. 6s.....                               | 295   |
| 155, Chatsworth-road, 92 years, ground-rent 15s.....                              | 225   |
| 61, 18s.....                                                                      | 225   |
| West Dulwich—1 and 2, Claremont-villas, 73 years, ground-rent 12s.....            | 300   |



MAY 11.

By HOBSON, RICHARDS, & CO.  
Wandsworth—1 to 5, Red Lion-square, 71 years, ground-rent 15*l.* ..... 2275

By ROBINSON & RUTEN.  
Eltham—The Park Tavern beerhouse, freehold..... 950

King's Cross—60, Barton-crescent, 19 years, ground-rent 31*l.* 10*s.* ..... 160

By A. J. ROOBES & CO.  
Thornton Heath—2, Brighton-street, freehold ... 200

By A. & A. FIELD.  
Stoney—1 to 13, Market-street, 88 years, ground-rent 40*l.* ..... 1,900

Mile End—27, 28, and 29, Lichfield-road, 68 years, ground-rent 16*l.* 10*s.* ..... 1,015

Linebush—14, Northey-street, freehold ..... 290

By MESSRS. CAONK.  
Acton, Creswick-road—Grasgarth, freehold ..... 2,100

Horn-lane—two plots of freehold land, with erections thereon ..... 409

Ilford, St. Mary's-road—A plot of freehold land ... 31

MAY 12.

By C. C. & T. MOORE.  
Stratford—97, 98, and 101, Angel-lane, 82 years, ground-rent 23*l.* 10*s.* ..... 1,000

Forest Gate—20, 22, and 24, Wellington-road, 77 years, ground-rent 9*l.* ..... 350

By C. P. WHITFIELD.  
Bloomsbury—28, Upper Bedford-place, 38 years, ground-rent 25*l.* ..... 1,100

An improved rental of 4*l.* 2*s.*, term 5 years ..... 160

By J. H. GREEN & SOX.  
Marylebone—9, 11, and 13, Richmond-street, 34 years, ground-rent 13*l.* ..... 500

By NEWSON & HARDING.  
Forest Gate—2, 4, 5, and 6, The Limes, freehold .. 910

Hackney—140, Amburst-road, 79 years, ground-rent 8*l.* 8*s.* ..... 705

Horton—83, Hertford-street, 55 years, ground-rent 6*l.* 6*s.* ..... 465

Holloway—16, Tollingham-road, 47 years, ground-rent 8*l.* 6*s.* ..... 325

61, Edm.-grove, freehold ..... 400

Ground-rents of 24*l.*, reversion in 98 years ..... 615

An improved rental of 16*l.*, term 16 years ..... 58

By E. SIMMONS.  
Camberwell—310*a*, Camberwell-road, 46 years, ground-rent 9*l.* ..... 170

Pockham—38 to 72, even, Cater-street, 75 years, ground-rent 69*l.* ..... 3,150

85, Camden-grove North, 75 years, ground-rent 4*l.* 2*s.* ..... 210

By FLEBBOBROTHER, ELLIS, CLARK, & CO.  
Hyde Park—68, Gloucester-terrace, 51 years, ground-rent 2*l.* ..... 2,500

Bede, Henlow—High-street, twelve freehold cottages ..... 905

Park-lane, four freehold cottages ..... 105

Lancaster—Two freehold cottages ..... 80

An enclosure of market-garden land, 2*l.* 8*d.* freehold ..... 600

MAY 13.

By DOWSETT & WOODS.  
Hackney—80, Downs Park-road, 89 years, ground-rent 7*l.* 7*s.* ..... 360

By BURN & SOX.  
Clapham—A profit rental of 8*l.*, a year, term 49 years ..... 1,210

By B. BROWN.  
Newington Causeway—21, Rockingham-street, 1 to 11, odd, Uxbridge-street, and 5 and 6, Dorset-street, 22 years, ground-rent 40*l.* 4*s.* ..... 575

Stoke Newington—33, Dynevor-road, 87 years, ground-rent 6*l.* 10*s.* ..... 320

Hackney-road—13 and 25, Gloucester-street, 18 years, ground-rent 2*l.* ..... 320

22 and 23, Gloucester-street, 25 years, ground-rent 3*l.* 3*s.* ..... 420

Improved ground-rent of 9*l.*, term 30 years ..... 165

Improved ground-rent of 9*l.*, term 25 years ..... 175

46 to 73, odd, Treadway-street, 19 years, ground-rent 6*l.* ..... 740

38 and 49, Temple-street, 19 years, ground-rent 6*l.* ..... 230

By WOODS & SNELLING.  
Lower Edmonton—1 and 2, St. Mary's terrace, freehold ..... 850

Caterham—4, 5, and 6, Asylum-view, 91 years, ground-rent 12*l.* 3*s.* ..... 85

Edge—Ground-rent of 8*l.*, reversion in 65 years ..... 210

Ground-rent of 8*l.*, reversion in 69 years ..... 175

Ground-rent of 3*l.*, reversion in 65 years ..... 65

28 and 30, Woodbine-grove, freehold ..... 245

MEETINGS.

SATURDAY, MAY 21.  
Architectural Association.—Visit to St. Thomas's eminary and Chelsea Church. 2.30 p.m. (See Advertisement.)  
Liverpool Engineering Society.—Visit to the Liverpool United Gas Light Company's Works at Linacre.

MONDAY, MAY 23.  
Royal Institute of British Architects.—Mr. John R.S., on "The Drainage of the Palace and City of Westminster." 8 p.m.  
Surgeons' Institution.—Mr. W. Simms on "The Agent's Park Estate: its Origin and Development."  
Sanitary Legislation Conference.—Discussion of the Sanitary Registration of Buildings Bill. 2 p.m.

TUESDAY, MAY 24.  
Royal Institute of British Architects.—Mr. Walter R.S., on "The Importance of the Applied Arts, and their relation to Common Life." Prof. Herkimer in the Chair. 8 p.m.  
Institution of Civil Engineers.—Sir Frederick Abel, R.S., on "Accidents in Mines." Part I. 8 p.m.  
Parkes Museum (Lectures for Sanitary Inspectors).—R. A. Wynter Blyth, M.R.C.S., L.S.A., on "Metropolitan Acts, By-laws of Metropolitan Board of Works."  
Glasgow Architectural Association.—Visit to Linnithgow.

WEDNESDAY, MAY 25.

Society of Arts.—8 p.m.  
Artists' Benevolent Fund.—75th Anniversary Dinner, Freemasons' Tavern. Mr. Alma Tadema, R.A., in the Chair. 7 p.m.

THURSDAY, MAY 26.

Society of Telegraph Engineers and Electricians.—(1) Mr. Charles Fleetwood on "Underground Telegraphs." (2) Professor W. Ayton, F.R.S., and John Perry, F.R.S., on "Driving a Dynamo with a very short Belt." 8 p.m.

FRIDAY, MAY 28.

Association of Public Sanitary Inspectors.—Meeting at Eastbourne.

Miscellaneous.

**Liverpool Engineering Society.**—A meeting of this Society was held at the Royal Institution, Colquhoun-street, Liverpool, on Wednesday, May 11th, Mr. John J. Webster, M.Inst.C.E., President, in the chair. A paper was read by Mr. J. F. Waddington on "Submarine Vessels." In commencing the paper, the author gave a brief history of what had been done in submarine navigation. Few persons, he said, would be aware that the idea of a vessel to travel under water was anything but a new idea. There were records of submarine vessels as far back as 1648, and a very interesting series of experiments were made by Fulton in 1801. Submarine vessels, he stated, were used in the American Civil War, and numbers of patents had been taken out in America, none of which, however, had come to anything. He then referred to the submarine vessel the *Nezucrang*, designed by Mr. Garratt, and tried in the Birkenhead Float in 1879, and also the Nordenfolt boats, which were also from Mr. Garratt's designs. His own submarine vessel, the *Porpoise*, which was tried last year before the representatives of the British and Foreign Admiralties, was then described. She was, he said, 37 ft. long by 6 ft. 6 in. beam, and was arranged to be propelled by electricity. The *Porpoise* was submerged when under way by means of inclined planes, which, when the buoyancy of the vessel had been sufficiently reduced by taking in water, were set over at an angle, and so guide the vessel below the surface. He also described the horizontal propellers, working in vertical tubes, used in his boats for the purpose of driving below in cases of emergency when there was no way on the boat. The great danger with submarine vessels of suddenly diving by the head when going at any great speed, was then dealt with, and he showed how, by means of a horizontal rudder arrangement, actuated by an automatic electric steering gear, he had met this danger. Compressed air for consumption by the crew was, he said, carried in two compartments at the ends. For the propulsion of the vessel, and for driving the various machinery on board the vessel, the electricity was stored in forty-five accumulators of 600 ampere-hours capacity.

**Formation of an Architectural Society in Sheffield.**—Last week, on the initiative of Mr. T. J. Flockton, a meeting was held to consider a proposal to establish an architectural society in Sheffield. Mr. Flockton presided, and the meeting was addressed by Mr. C. Hadfield, who pointed out that Sheffield had no representative body for dealing with professional questions and for communicating with other societies thereon. The R.I.B.A. was inaugurating compulsory examinations, and it was important that pupils and assistants should be prepared to pass the examinations, and encouraged to avail themselves of every opportunity for improving their technical education. Such a society would accomplish this end. Good work was being done in this direction in Liverpool, Manchester, Leeds, and other large towns by similar societies. Eventually it was resolved to form a society. Mr. W. C. Fenton was appointed hon. sec. pro tem. of the provisional committee.

**Stamford Hill.**—A three-light stained-glass window, representing "The Crucifixion," has just been placed in the new Church of St. John, Stamford Hill. The work has been carried out by Messrs. T. J. Marshall & Co., under design by Mr. John Stacy, and under the superintendence of the architect of the church, Mr. Spencer W. Grant.

**The "Hotel Victoria."**—Referring to the notice in our Supplement last week of the "Hotel Victoria," Northumberland Avenue, Messrs. Hayward Bros. & Eckstein ask us to mention that the whole of the basements are illuminated by Hayward's reflecting pavement lights.

Melbourne Centennial Exhibition.—It

has been decided by the Government of the Colony of Victoria to hold an International Exhibition of Arts, Manufactures, Agricultural and Industrial Processes and Products, in the City of Melbourne, in Celebration of the Centenary of the Settlement of Australia, and the Exhibition is to be opened on August 1, 1888, and will close on January 31, 1889. An Executive Commission has been appointed by the Governor under the Seal of the Colony to conduct the Exhibition; and its London Committee, who have control of all questions concerning the Exhibitors of the United Kingdom, has its offices at 8, Victoria-chambers, Westminster, adjoining the offices of the Agent-General for the Colony.

**Shepherd's Bush.**—A stained-glass window of two lights, containing respectively figures, "The Light of the World," and "The Good Shepherd," with tracery containing "The Crucifixion," has been placed at the east end of St. Mary's Church, Stamford-brook, Shepherd's-bush (presented by a friend). This was also designed by Mr. J. Stacy, and executed by Messrs. T. J. Marshall & Co.

**The Newcastle, Saltaire, and Liverpool Exhibitions.**—We will say something about these three exhibitions next week.

**Bestwood.**—For several years past the vicars of Bestwood have conducted Divine Service once on Sundays in the schoolroom at Bestwood Colliery, but the want of a more suitable building has been painfully felt. At length, mainly by the liberality of the Duke of St. Albans and of the Bestwood Coal and Iron Company, a mission church has been built, from the designs of Mr. Medland Taylor, architect, Manchester, and it was opened on a little inst. It is built mainly of brick, with a little stone at the principal doorway, and in the chancel windows. The roof is covered with red tiles. There is a broad nave with transepts, which are to be used more as class-rooms and for secular purposes; but which can, when occasion requires, be thrown open to the nave, and so largely increase the accommodation of the church. The chancel,—that part of it which contains the altar, credence, and altar rail,—is built and arranged as it would be in a more costly and regular church. The choir seats are arranged on a platform, three steps up from the nave, and projecting from the sanctuary into the nave. There is a dwarf screen round, and at the end next the nave is an oak arch, surmounted by a cross. On the one side is the lectern, and on the other the pulpit, projecting slightly from the screen, and entered from the chancel. The choir fittings and the chief doors are principally of oak. In the gable wall of the chancel are two two-light windows, and between them in the centre is a stone altar cross. There is a marble altar ledge above the Lord's table, and a credence shelf on the side. The chancel windows are filled with tinted glass, in lead work, of a lace-like pattern, with a tux in ruby glass at the foot of the lights. The font (as it may occasionally have to be removed) is of oak, pentagonal in form (an ancient form, by the way), standing on an oak platform, that the administration of the Sacrament may be duly witnessed. The seats in the nave are low, open, comfortable benches. In the transepts are convertible seats, usable either as forms and tables, or as church seats with backs. There are two side porches opening into the church and class-rooms. The girls' and young women's class-room contains a cooking-range, and a convenient china pantry, with sink, &c., adjoins it. On the other side, the west class-room will be available for use as a choristers' vestry. Adjoining it is a lavatory and cloak-room. There is a ventilating gabled turret on the middle of the roof, and a belfry on the front gable. When the transepts are thrown open to the nave, so as to use the whole building, there is comfortable sitting and kneeling room for about 360 adults. The contract sum for the entire building, fit for use, excepting only the fittings, is 1,250*l.* The builders, working under the architect's directions, are Messrs. Dennett & Inglo, of Nottingham.

**The Printing-Machine Managers' Superannuation Fund.**—The annual excursion to Hastings and St. Leonards, in aid of the funds of this charity, will take place on Saturday, July 2. The fund was established fourteen years ago, to provide a small allowance to printing-machine managers who from age or blindness become incapacitated from following their trade.

**Wallasey.**—The report of Mr. A. Salmon, surveyor to the Wallasey Local Board, upon the work executed in his department during the year 1886, has just been issued. It states that a further improvement in the property recently scheduled as insanitary has been made, by alterations in accordance with recommendations contained in a former report. The erection of the hospital for infectious diseases in Mill-lane having been commenced in April last, the buildings are now approaching completion. They consist of administrative block, isolation wards, disinfecting station, laundry, ambulance house, &c. The isolation block for the accommodation of patients consists of four wards and two rooms for nurses; two of the former contain three beds each, and the other two one bed each. The area of the hospital site is two acres in extent. The cost of the buildings, with the boundary fences, carriage-drives, and drainage will be about 3,000l., an apparently excessive figure for the number of beds at present provided; but it must be remembered (says the report) that the administrative building and the laundry and disinfecting station have been designed to afford the necessary accommodation for the requirements of forty-four beds, that being the number which there will be when the scheme is carried to completion. The additional thirty-six beds will be provided at a comparatively small outlay in three pavilions, and the cost of the whole of the beds will then compare favourably with the cost of any other similar institution in the country. It is hoped, however, that the existing buildings will be all that the district will require for some years to come, but as the population increases, one pavilion, containing twelve beds, can be erected at a time. The population of the town at the present time is stated to be 29,800,—an increase of 8,600 since April, 1881.

**Worcester.**—Since the opening of the new church at St. Paul's in November last, the old church has been undergoing alterations to make it adaptable for a school, so as to increase the accommodation which was urgently needed in the parish. The building is connected with the old school, which has been converted into a school for infants, and the former infants' school has been fitted up as class-rooms. The schools now afford accommodation for upwards of 800 children, the total accommodation previously having been for 445. The alterations, repairs, and improvements have cost about 1,300l. The work has been carried on by Mr. Inward, under the superintendence of Mr. L. Sheppard, architect.

PRICES CURRENT OF MATERIALS.

| TIMBER.                                      |                | £. s. d.  | £. s. d.  |
|----------------------------------------------|----------------|-----------|-----------|
| Greenheart, B.G.                             | .....ton       | 6 10 0    | 7 10 0    |
| Teak, E.I.                                   | .....load      | 6 0 0     | 13 0 0    |
| Geognois, U.S.                               | .....foot cube | 0 2 3     | 0 3 0     |
| Ash, Canada                                  | .....load      | 3 0 0     | 4 10 0    |
| Birch                                        | .....load      | 2 0 0     | 3 10 0    |
| Elm                                          | .....load      | 3 10 0    | 4 10 0    |
| Fir, Dantsie, &c.                            | .....load      | 1 10 0    | 4 0 0     |
| Oak                                          | .....load      | 2 10 0    | 4 10 0    |
| Canada                                       | .....load      | 3 0 0     | 6 0 0     |
| Pine, Canada red                             | .....load      | 2 0 0     | 3 10 0    |
| " yellow                                     | .....load      | 2 10 0    | 4 10 0    |
| Lath, Dantsie                                | .....fathom    | 3 0 0     | 5 0 0     |
| St. Petersburg                               | .....load      | 4 0 0     | 5 10 0    |
| Wainscot, Riga                               | .....log       | 0 0 0     | 0 0 0     |
| Deals, crown                                 | .....load      | 2 15 0    | 3 0 0     |
| Deals, Finland, 2nd and 1st, ad 100          | .....load      | 7 0 0     | 8 0 0     |
| " 4th and 3rd                                | .....load      | 5 10 0    | 6 10 0    |
| Riga                                         | .....load      | 5 10 0    | 7 0 0     |
| St. Petersburg, 1st yellow                   | .....load      | 6 0 0     | 13 0 0    |
| " 2nd                                        | .....load      | 7 0 0     | 6 0 0     |
| " white                                      | .....load      | 6 10 0    | 6 10 0    |
| Swedish                                      | .....load      | 6 0 0     | 15 0 0    |
| White Sea                                    | .....load      | 7 0 0     | 16 10 0   |
| Canada, Pine, 1st                            | .....load      | 16 0 0    | 24 0 0    |
| " 2nd                                        | .....load      | 10 0 0    | 15 0 0    |
| " 3rd, &c.                                   | .....load      | 6 0 0     | 9 0 0     |
| " Spruce, 1st                                | .....load      | 6 0 0     | 9 0 0     |
| " 2nd                                        | .....load      | 5 0 0     | 7 0 0     |
| Deals—New Brunswick, &c.                     | .....load      | 5 0 0     | 6 10 0    |
| Battens, all kinds                           | .....load      | 4 0 0     | 10 10 0   |
| Flooring Boards, eq., 1 in., prepared, first | .....load      | 0 8 0     | 0 11 0    |
| Second                                       | .....load      | 0 6 0     | 0 7 6     |
| Other qualities                              | .....load      | 0 5 0     | 0 6 0     |
| Cedar, Cuba                                  | .....foot      | 0 0 3     | 0 0 3 3/4 |
| Honduras, 2nd                                | .....load      | 7 0 0     | 8 0 0     |
| Anstralian                                   | .....load      | 0 2 0     | 0 3 0     |
| Mahogany, Cuba                               | .....load      | 0 4 0     | 0 7 0     |
| St. Domingo, cargo average                   | .....load      | 0 4 0     | 0 6 0     |
| Mahogany, Mexico, cargo av.                  | .....load      | 0 0 3 3/4 | 0 4 0     |
| Tobacco                                      | .....load      | 0 4 0     | 0 6 1/2   |
| Honduras                                     | .....load      | 0 0 3 3/4 | 0 0 5 1/2 |
| Maple, Bird's-eye                            | .....load      | 0 0 8     | 0 0 8     |
| Bote, Rio                                    | .....load      | 0 0 0     | 0 0 0     |
| Baba                                         | .....load      | 0 0 0     | 0 0 0     |
| Bor, Turkey                                  | .....ton       | 5 0 0     | 12 0 0    |
| Satin, St. Domingo                           | .....foot      | 0 0 5     | 0 0 10    |
| Porto Rico                                   | .....load      | 0 0 8     | 0 0 10    |
| Walnut, Italian                              | .....load      | 0 0 4     | 0 0 5     |

| METALS.                    |          | £. s. d. | £. s. d. |
|----------------------------|----------|----------|----------|
| Iron—Bar, Welsh, in London | .....ton | 4 7 6    | 4 16 0   |
| " " in Wales               | .....ton | 4 2 6    | 4 7 6    |
| " Standard, London         | .....ton | 5 10 0   | 6 0 0    |
| Sheets, single, in London  | .....ton | 6 15 0   | 8 10 0   |
| Hoops                      | .....ton | 6 0 0    | 7 0 0    |
| Nail-rod                   | .....ton | 5 15 0   | 6 10 0   |
| COPPER—                    |          |          |          |
| British, cake and ingot    | .....ton | 42 10 0  | 43 0 0   |
| Best selected              | .....ton | 44 5 0   | 44 15 0  |
| Sheets, strong             | .....ton | 50 0 0   | 0 0 0    |
| Chili bars                 | .....ton | 39 0 0   | 39 12 0  |
| YELLOW METAL               | .....lb. | 0 0 0    | 0 0 0    |
| LEAD—                      |          |          |          |
| Pig, Spanish               | .....ton | 12 0 0   | 0 0 0    |
| English, common brands     | .....ton | 12 7 6   | 0 0 0    |
| Sheet, English             | .....ton | 13 5 0   | 13 10 0  |
| SPRAYER—                   |          |          |          |
| Silesian, special          | .....ton | 14 7 6   | 14 10 0  |
| Ordinary brands            | .....ton | 14 5 0   | 14 7 6   |
| TIN—                       |          |          |          |
| Straits                    | .....ton | 104 15 0 | 0 0 0    |
| Australian                 | .....ton | 105 0 0  | 0 0 0    |
| English ingots             | .....ton | 107 10 0 | 0 0 0    |

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS. Epitome of Advertisements in this Number.

| COMPETITIONS.                    |                   |                   |                          |       |
|----------------------------------|-------------------|-------------------|--------------------------|-------|
| Nature of Work.                  | By whom required. | Premium.          | Designs to be delivered. | Page. |
| Laying-out Cemetery, &c., Oldham | Cemeteries Com.   | 60 gs. and 30 gs. | July 2nd                 | ii.   |

| CONTRACTS.                                 |                             |                                   |                          |       |
|--------------------------------------------|-----------------------------|-----------------------------------|--------------------------|-------|
| Nature of Work, or Materials.              | By whom required.           | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
| New Sewers, &c.                            | St. Mary, Islington, Vestry | Official                          | May 25th                 | ii.   |
| Tower and Spire to Church, Wandsworth      | Met. Asylums Board          | G. Patrick                        | do.                      | ii.   |
| Cleaning & Painting Works, Cotecham Asylum | Fulham Union                | Official                          | May 28th                 | ii.   |
| Painting and other Works at Infirmary      | Met. Board of Works         | do.                               | May 27th                 | ii.   |
| Repairing and Painting Lamp Columns        | The Committee               | A. Waterhouse                     | May 30th                 | ii.   |
| Rebuilding Royal Infirmary, Liverpool      | Great Western Ry. Co.       | Official                          | May 31st                 | ii.   |
| New Waiting-Room, &c., Bridgend Station    | St. Marylebone Urban        | H. Bancroft                       | do.                      | ii.   |
| Painting, &c. Works, Infirmary             | Northwich Local Board       | do.                               | do.                      | ii.   |
| Waterworks                                 | West Derby Union            | C. H. Lancaster                   | do.                      | ii.   |
| New Cottage Homes, &c.                     | H. Harvey George, Esq.      | C. J. Dawson                      | June 1st                 | ii.   |
| Erection of shops, Cottages, &c., Barking  | The Proprietors             | Oiles & Gough                     | do.                      | ii.   |
| Alterations, &c., to Chamberwell House     | Guildford School Board      | S. Welman                         | June 4th                 | ii.   |
| Alterations, &c., to Cator Estate Office   | Beckenham Local Bd.         | G. B. Carlson                     | June 6th                 | xii.  |
| Kerbing and Brick Paving                   | do.                         | do.                               | do.                      | xii.  |
| Oak Cleft Fencing and Dwarf Wall           | do.                         | do.                               | do.                      | xii.  |
| Broken Greenway Granite                    | Chelmsford Local Bd.        | Official                          | do.                      | xii.  |
| Main Drainage Works                        | Finchley Local Board        | G. W. Brummell                    | do.                      | xii.  |
| Laying-out Burial Ground                   | St. Olave's, Southwark      | do.                               | do.                      | xii.  |
| Erection of Markets, &c.                   | Churchwardens               | G. W. Thompson                    | do.                      | xii.  |
| Boating Pool and Swimming Bath             | Carlisle Cor.               | Cawston & Graham                  | do.                      | xii.  |
| Drainage Works                             | West Bromwich Cor.          | J. T. Eayrs                       | June 7th                 | ii.   |
| Carriageway and Footways                   | Chesham Local Board         | T. Bennett                        | June 8th                 | xii.  |
| Waterworks                                 | Metro. Board of Works       | Official                          | June 10th                | xii.  |
| Widening, &c., of Glasgow Bridge           | Chelmsford Local Bd.        | C. Perwee                         | June 13th                | xii.  |
| Alterations, &c., to Schools, Barking      | City of Glasgow             | Miller & Bell                     | June 15th                | xii.  |
| Painting, &c., Works, Portsmouth           | The Committee               | C. J. Dawson                      | Not stated               | ii.   |
|                                            | War Department              | Official                          | do.                      | xii.  |

| PUBLIC APPOINTMENTS.   |                         |            |                        |       |
|------------------------|-------------------------|------------|------------------------|-------|
| Nature of Appointment. | By whom Advertised.     | Salary.    | Applications to be in. | Page. |
| Borough Surveyor       | King's Lynn Cor.        | 250l. &c.  | May 30th               | xvi.  |
| Head Master            | Londonderry Sch. of Art | Not stated | June 4th               | xvi.  |

| TENDERS.                                                                                                                                                               |            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| BATTERSEA.—For alterations and additions to the schoolrooms at the Congregational Church, Bridge-road, Battersea. Mr. T. Heygate Vernon, architect:—                   |            |
| Richens & Mount                                                                                                                                                        | £892 0 0   |
| W. Johnson                                                                                                                                                             | 883 0 0    |
| Newton & Idle                                                                                                                                                          | 867 0 0    |
| Trigg                                                                                                                                                                  | 867 0 0    |
| Turtle & Appleton                                                                                                                                                      | 784 0 0    |
| Holloway Bros. (accepted)                                                                                                                                              | 778 0 0    |
| BATTERSEA.—For alterations and additions to the Alliance Banking Company's premises, No. 30, Victoria-road (Battersea Park Branch). Mr. Frederick Pinches, architect:— |            |
| G. N. Street                                                                                                                                                           | £1,408 0 0 |
| Turtle & Appleton                                                                                                                                                      | 1,290 0 0  |
| Holloway Bros. (accepted)                                                                                                                                              | 1,159 0 0  |
| F. R. Turtle                                                                                                                                                           | 1,135 0 0  |
| BEDFORD.—For the erection of Primitive Methodist chapel, Park-road. Mr. Charles Carter, architect. No quantities:—                                                     |            |
| Jay                                                                                                                                                                    | £577 0 0   |
| Haynes & Son                                                                                                                                                           | 530 0 0    |
| Harrison                                                                                                                                                               | 519 0 0    |
| Watson & Walker                                                                                                                                                        | 515 0 0    |
| Carter (accepted)                                                                                                                                                      | 485 15 0   |
| White (accepted)                                                                                                                                                       | 472 0 0    |
| BICKLEY (Kent).—For repairs and decorations at "Meravale" Rectory, for Mr. S. Green. Mr. Arthur W. Saville, architect, 99, Strand:—                                    |            |
| Harrison & Spooner                                                                                                                                                     | £389 0 2   |
| D. Ines                                                                                                                                                                | 334 0 0    |
| B. A. Lowe                                                                                                                                                             | 748 0 0    |
| Oldrey & Co. (accepted)                                                                                                                                                | 650 0 0    |
| FROWLESWORTH (Leicestershire).—For restoration of the parish church, for the Committee. Mr. W. Bassett Smith, architect, Drummond Chambers, 10, John-street, Adelphi:— |            |
| D. Ireson, Northampton                                                                                                                                                 | £1,453 0 0 |
| Baring & Son, London                                                                                                                                                   | 1,324 19 0 |
| * Accepted.                                                                                                                                                            |            |
| CORK.—For building dining-hall and other works, Cork District Lunatic Asylum. Mr. William H. Hill, architect:—                                                         |            |
| J. Demperton                                                                                                                                                           | £2,998 0 0 |
| S. Hill                                                                                                                                                                | 2,940 0 0  |
| S. Thomas                                                                                                                                                              | 2,888 0 0  |
| P. Murphy                                                                                                                                                              | 2,764 0 0  |
| J. Lisk                                                                                                                                                                | 2,658 0 0  |
| Official                                                                                                                                                               | 2,647 0 0  |
| B. McMullen                                                                                                                                                            | 2,600 0 0  |
| T. O'Flynn (accepted)                                                                                                                                                  | 2,540 0 0  |
| HACKNEY.—For boundary walls at St. Luke's Church, Hackney. Mr. Gilbee Scott, architect:—                                                                               |            |
| Barratt & Power                                                                                                                                                        | £890 0 0   |
| Harris & Wardrop                                                                                                                                                       | 698 0 0    |
| T. Boyce                                                                                                                                                               | 698 0 0    |
| W. Shurmut                                                                                                                                                             | 622 0 0    |
| HAMPSTEAD.—For completing stabling, West Hampstead. Mr. Banister Fletcher, architect:—                                                                                 |            |
| Jarris                                                                                                                                                                 | 1,134 0 0  |
| Neave & Neave                                                                                                                                                          | 1,097 0 0  |
| Neave & Neave                                                                                                                                                          | 1,098 0 0  |
| Blyton                                                                                                                                                                 | 969 0 0    |
| Stevens                                                                                                                                                                | 739 0 0    |
| Richardson                                                                                                                                                             | 729 0 0    |
| Bursill                                                                                                                                                                | 675 0 0    |
| Mansbridge (accepted)                                                                                                                                                  | 571 0 0    |
| HAMPSTEAD.—For alteration (1st contract) to "Anglesey," West Hampstead. Mr. Banister Fletcher, architect:—                                                             |            |
| Neave & Neave                                                                                                                                                          | £345 0 0   |
| Steele Bros.                                                                                                                                                           | 325 0 0    |
| Tout                                                                                                                                                                   | 310 0 0    |
| Bursill                                                                                                                                                                | 307 10 0   |
| Mansbridge (accepted)                                                                                                                                                  | 283 0 0    |
| J. M. Goodman (2nd lot)                                                                                                                                                | 275 0 0    |
| ILFORD.—For decorating and improving the Reading Room, for the Trustees. Mr. P. Watkins, architect:—                                                                   |            |
| W. Watson                                                                                                                                                              | £288 0 0   |
| G. Holmes & Sons                                                                                                                                                       | 286 0 0    |
| C. Barnes (accepted)                                                                                                                                                   | 242 10 0   |

**KENSINGTON.**—For the erection of St. Paul's Church, Vicarage-gardens, Kensington. Mr. Arthur Baker, architect, Warwick-gardens, Kensington. Quantities by J. H. Edwards, 214 Broad-street.

|                                             |             |
|---------------------------------------------|-------------|
| C. Wall.....                                | £11,225 0 0 |
| Lathey Bros.....                            | 10,423 0 0  |
| Lovatt, Wolverhampton.....                  | 10,334 0 0  |
| W. Davis.....                               | 10,293 0 0  |
| Mowlem & Co.....                            | 10,015 0 0  |
| Nash.....                                   | 9,900 0 0   |
| Thompson.....                               | 9,897 0 0   |
| Higgs & Hill.....                           | 9,896 0 0   |
| Garrud.....                                 | 9,777 0 0   |
| Peto Bros.....                              | 9,765 0 0   |
| Kilby & Gayford.....                        | 9,732 0 0   |
| Parrell, Rugby.....                         | 9,681 0 0   |
| J. T. Chappell.....                         | 9,444 0 0   |
| Macey & Sons.....                           | 9,300 0 0   |
| E. C. Howell & Son, London and Bristol..... | 9,980 0 0   |

**KINGSTON-ON-THAMES.**—For the construction of sewage outfall works, for the borough of Kingston-on-Thames. Mr. Henry Macaulay, architect and surveyor.

*Contract No. 1.—Buildings, Tanks, &c.*

|                                       |             |
|---------------------------------------|-------------|
| McKenzie, Wandsworth.....             | £24,078 0 0 |
| Webster, St. Martin's-place, W.C..... | 17,300 0 0  |
| Nearns, Leytonstone.....              | 17,134 0 0  |
| Nelson & Co., Cardiff.....            | 16,454 0 0  |
| Rirk Bros., Battersea.....            | 16,400 0 0  |
| W. Carrington.....                    | 16,400 0 0  |
| Cooke & Co., Battersea.....           | 15,950 0 0  |
| Mowlem & Co., Westminster.....        | 15,900 0 0  |
| Dickenson, Longborough Junction.....  | 15,565 0 0  |
| Marshall, Shalford.....               | 15,500 0 0  |
| Green & Parker, Cardiff.....          | 14,739 0 0  |
| Lucas & Son, Kensington.....          | 14,655 0 0  |
| W. Canfield, Dorking (accepted).....  | 8,450 0 0   |
| Simmonds, Beading.....                | 13,999 0 0  |

*Contract No. 2.—Engines, Boilers, Machinery, &c.*

|                                          |            |
|------------------------------------------|------------|
| Lucas & Son, Kensington.....             | 10,527 0 0 |
| Dickenson, Longborough Junction.....     | 9,833 0 0  |
| tion.....                                | 9,011 0 0  |
| Bird & Co., London.....                  | 9,000 0 0  |
| Holroyd, Horsfield, & Wilson, Leeds..... | 8,730 16 8 |
| W. Canfield, Dorking (accepted).....     | 8,450 0 0  |
| Greenfield Foundry Co., Kilmarnock.....  | 8,421 0 0  |
| Charleston Foundry Co., St. Anstall..... | 8,170 0 0  |

**KINGSTON-ON-THAMES.**—For alterations and additions to the Kingston Workmen's Club and Institute, Fairfield-road, Kingston-on-Thames. Mr. W. H. Hope, architect.

| General Estimate.            |             | Alternative Staircase. |
|------------------------------|-------------|------------------------|
| F. Smith & Son.....          | £2,657 14 5 | £73 3 6                |
| C. Wall.....                 | 2,428 0 0   | 92 0 0                 |
| A. Mowbray.....              | 2,425 17 0  | 106 15 0               |
| C. Oldridge & Sons.....      | 2,390 0 0   | 73 0 0                 |
| G. Huckle.....               | 2,389 0 0   | 84 0 0                 |
| W. Callingham.....           | 2,288 0 0   | 127 0 0                |
| C. Wrenford.....             | 2,232 0 0   | 82 0 0                 |
| R. L. Wood.....              | 2,195 0 0   | 79 0 0                 |
| W. H. Simmonds.....          | 2,142 0 0   | 66 10 0                |
| J. Bottrill.....             | 2,140 0 0   | 79 10 0                |
| W. Healey & Sons.....        | 2,139 12 0  | 79 0 0                 |
| A. Brett.....                | 2,130 0 0   | 110 0 0                |
| G. Constable.....            | 2,109 0 0   | 75 0 0                 |
| H. Stephenson.....           | 2,054 0 0   | 79 0 0                 |
| D. Taylor.....               | 2,000 0 0   | 110 0 0                |
| F. B. Furtle (accepted)..... | 1,988 0 0   | 52 0 0                 |
| G. Marsh.....                | 1,856 3 0   | 75 0 0                 |

**LEYTONSTONE (Essex).**—For alterations and additions to the casual wards at the West Ham Union Workhouse. Mr. F. T. Sturdy, architect. Quantities by Messrs. P. L. Curtis & Sons.—

|                                          |            |
|------------------------------------------|------------|
| B. E. Edwards, Cambridge-road.....       | £4,400 0 0 |
| Connell Bros., Bethnal Green.....        | 4,023 0 0  |
| C. T. Sherwood, Shalford.....            | 3,994 0 0  |
| Faulkner.....                            | 3,787 0 0  |
| D. Sayer, Leyton.....                    | 3,730 0 0  |
| A. Read, Stratford.....                  | 3,636 0 0  |
| Atherton & Latta, Stratford.....         | 3,590 0 0  |
| Greger, Stratford.....                   | 3,584 0 0  |
| H. Edwards, Cambridge-road.....          | 3,571 0 0  |
| Dabbs, Stamford Hill.....                | 3,508 0 0  |
| J. Holland, Poplar.....                  | 3,390 0 0  |
| A. Nicholls, Leytonstone (accepted)..... | 3,131 0 0  |

**LONDON.**—For interior repairs, cleaning, and painting at the Asylum Buildings, Cleveland-street, Fitzroy-square, W., and for alterations to receiving rooms, for the managers of the Central London Sick Asylum District, Mr. William Stephens Cross, 18, Outer Temple, Strand, architect.—

|                                          |              |
|------------------------------------------|--------------|
| H. Bodain, Leyton.....                   | £997 0 0     |
| W. Heneman, Windmill-street.....         | 974 0 110 0  |
| Collis Willmott, Hackney.....            | 858 0 0      |
| J. & F. Giew, Musson-street.....         | 719 0 79 0   |
| H. Edwards, Cambridge-road.....          | 69 0 69 0    |
| Woodard & Son, Blackfriars-road.....     | 630 17 0     |
| W. G. Silly, Pall-mall.....              | 630 0 59 0   |
| W. Furnies, Herne Hill.....              | 610 0 0      |
| J. H. Watkins, Kentish Town.....         | 610 0 0      |
| Hudson, Kearsley, & Co.,* Bood-lane..... | 589 0 0 60 0 |
| Bishop Bros. & Marston, Islington.....   | 559 0 0 62 0 |
| H. Edwards, Cambridge-road.....          | 460 0 0      |
| J. & F. May, High Holborn.....           | — 0 0 83 10  |

\* Accepted for both.

**LONDON.**—For new club premises for the Netherlands Choral Society, Great Aisle-street, White-chapel. Mr. Bentley Haynes and Mrs. Francis Miller, architects. Quantities by Mr. L. A. Francis.—

|                            |            |
|----------------------------|------------|
| Colls & Sons.....          | £2,877 0 0 |
| G. H. Hill.....            | 2,865 0 0  |
| Greenwood.....             | 2,777 0 0  |
| Honsgood.....              | 2,672 0 0  |
| Staines.....               | 2,454 0 0  |
| Patman & Fotheringham..... | 2,453 0 0  |
| Palmer.....                | 2,389 0 0  |
| Lusk.....                  | 2,289 0 0  |
| Jackson & Todd.....        | 2,110 0 0  |
| George Barker.....         | 2,069 0 0  |

**LONDON.**—For the erection of four shops, with dwellings, situate at St. Anne's Wharf, Burdett-road, Limehouse, for Messrs. Abbott & Fletcher. Mr. Charles Dunch, architect. Quantities by Mr. James F. Wesley, Forest Gate.—

|                        |            |
|------------------------|------------|
| Heard & Son.....       | £2,449 0 0 |
| Perry & Co.....        | 2,448 0 0  |
| W. Gregor.....         | 2,350 0 0  |
| J. & J. Greenwood..... | 2,338 0 0  |
| Morter.....            | 2,296 0 0  |
| J. H. Johnson.....     | 2,259 0 0  |
| Harris & Wardrop.....  | 2,278 0 0  |
| Shurmut.....           | 2,259 0 0  |
| Walker.....            | 2,098 0 0  |

**LONDON.**—For rebuilding No. 18, Princess-street, Cavendish-square, W., for Mr. E. Jones. Mr. J. E. Mathews, architect. Quantities supplied by the architect.—

|                               |            |
|-------------------------------|------------|
| Ashby Bros.....               | £2,268 0 0 |
| Colls & Son.....              | 2,237 0 0  |
| Rider & Son.....              | 2,249 0 0  |
| Downs.....                    | 2,239 0 0  |
| Kirk & Randall.....           | 2,231 0 0  |
| Sancera.....                  | 2,200 0 0  |
| Hunt.....                     | 2,184 0 0  |
| Patrick & Son (accepted)..... | 2,168 0 0  |
| Spencer.....                  | 1,885 0 0  |

**LONDON.**—For alterations and repairs to the out-patients' department of the City Orthopaedic Hospital, Hatton-gate.—

|                         |          |
|-------------------------|----------|
| Roberts.....            | £170 0 0 |
| Beasley.....            | 159 0 0  |
| Cornish (accepted)..... | 115 0 0  |

**LONDON.**—For painting works at the Workhouse and Infirmary, Prince's-street, Old Gravel-lane, St. George-in-the-East, for the Guardians of the Poor St. George-in-the-East. Messrs. Wilson, Son, & Aldwinckle, architects, 2, Bast India-avenue, Leadenhall-street.—

|                         |            |
|-------------------------|------------|
| Castle.....             | £1,447 0 0 |
| H. Halliday.....        | 1,076 0 0  |
| McCarthy.....           | 839 0 0    |
| Proctor.....            | 750 0 0    |
| Holland (accepted)..... | 698 0 0    |

**LONDON.**—For building new photographic studio and shop front, &c., No. 78, Wandsworth-road, S.W. Mr. Jas. M. Cable, architect.—

|                     |          |
|---------------------|----------|
| W. Jones.....       | £476 0 0 |
| Holloway Bros.....  | 476 0 0  |
| Stevens & Sons..... | 410 0 0  |
| Hooper.....         | 395 10 0 |

**LONDON.**—For alterations and additions to the London and County Banking Company's premises, Aldersgate-street Branch. Mr. Zephaniah King, architect.—

|                    |            |
|--------------------|------------|
| A. Bush.....       | £8,795 0 0 |
| J. Holloway.....   | 6,645 0 0  |
| Holloway Bros..... | 6,560 0 0  |
| Rider & Son.....   | 6,418 0 0  |
| Godfrey & Son..... | 6,268 0 0  |
| Higgs & Hill.....  | 6,828 0 0  |
| Chappell.....      | 5,798 0 0  |
| J. Morter.....     | 5,773 0 0  |

**LONDON.**—For alterations and additions to the London and County Banking Company's premises, Victoria-street Branch. Mr. Zephaniah King, architect.—

|                    |            |
|--------------------|------------|
| A. Bush.....       | £3,841 0 0 |
| J. Holloway.....   | 3,830 0 0  |
| Rider & Son.....   | 3,588 0 0  |
| Holloway Bros..... | 3,503 0 0  |
| J. Morter.....     | 3,427 0 0  |
| Godfrey & Son..... | 3,329 0 0  |

**LONDON.**—For residence, Bonford-road, B., for Mr. B. Witherspoon. Mr. C. E. Jackson, architect.—

|                        |            |
|------------------------|------------|
| Higgs.....             | £2,806 0 0 |
| Barnes.....            | 2,415 0 0  |
| W. Shurmut.....        | 2,397 0 0  |
| B. B. Nightingale..... | 2,362 0 0  |
| J. Morter.....         | 2,120 0 0  |
| H. Lees.....           | 2,044 0 0  |
| Jackson & Co.....      | 2,038 0 0  |
| Everard.....           | 1,967 0 0  |
| W. Greger.....         | 1,960 0 0  |

**LONDON.**—For rebuilding No. 62, Shore-ditch, for Messrs. Hopkins & Peggs. Mr. J. W. Peggs, architect.—

|                      |            |
|----------------------|------------|
| Kiddle & Son.....    | £1,840 0 0 |
| W. Shurmut.....      | 1,791 0 0  |
| J. Chessum.....      | 1,621 0 0  |
| J. R. Cordell.....   | 1,587 0 0  |
| Kilby & Gayford..... | 1,423 0 0  |

**LONDON.**—For proposed alterations at the Circus Cafe, 213, Oxford-street. Mr. Banister Fletcher, architect.—

|                            |            |
|----------------------------|------------|
| Patman & Fotheringham..... | £1,898 0 0 |
| B. B. Nightingale.....     | 1,840 0 0  |

**LONDON.**—For alterations to the Artichoke public-house, Clare-street, W.G. for Mr. Garney. Mr. Luckie, architect, 38, Gaisford-street.—

|                    |          |
|--------------------|----------|
| Davis & Son.....   | £518 0 0 |
| Knell.....         | 498 10 0 |
| Ward & Lambie..... | 427 0 0  |
| Hornett.....       | 425 0 0  |

**LONDON.**—For alterations and repairs to the Dolphin public-house, Milk-street, Cheap-side, for Messrs. Deakin & Crimmen. Mr. Arthur W. Saville, architect, 99, Strand. Quantities supplied.—

|                      |          |
|----------------------|----------|
| T. J. Green.....     | £298 0 0 |
| J. Anley.....        | 92 0 0   |
| W. Oldrey & Co.....  | 808 0 0  |
| Ward & Lambie.....   | 879 0 0  |
| Spencer & Co.....    | 877 0 0  |
| T. Gregory & Co..... | 847 0 0  |
| W. Royal.....        | 829 0 0  |
| John Walker.....     | 798 0 0  |

**LONDON.**—For alterations and repairs to the Dolphin public-house, Milk-street, Cheap-side, for Messrs. Deakin & Crimmen. Mr. Arthur W. Saville, architect, 99, Strand. Quantities supplied.—

|                 |          |
|-----------------|----------|
| W. Helling..... | £104 0 0 |
| Watts & Co..... | 88 17 0  |
| T. Heath.....   | 77 0 0   |

**LONDON.**—For new stable buildings at 14, St. Luke's-road, W., for Mr. J. Hughes. Mr. Arthur W. Saville, architect, Strand.—

|                                      |          |
|--------------------------------------|----------|
| C. H. Cutting & Sons (accepted)..... | £389 0 0 |
|--------------------------------------|----------|

**LONDON.**—For the erection of new warehouses and offices, Cardington-street, N.W., for McCorquodale & Co., Limited. Mr. H. Phelps Drew, architect, 99, Gloucester-road, South Kensington. Quantities by Mr. C. Danzell.—

|                               |            |
|-------------------------------|------------|
| Longmire & Burge.....         | £9,450 0 0 |
| Chappell.....                 | 8,934 0 0  |
| Bywaters.....                 | 8,867 0 0  |
| Brass & Son.....              | 8,786 0 0  |
| Grover & Son.....             | 8,768 0 0  |
| Scrivenor & Co.....           | 8,638 0 0  |
| Spencer & Co. (accepted)..... | 6,963 0 0  |

**MAIDENHEAD.**—For a swimming-bath, for the Maidenhead Town Council.—

|                       |          |
|-----------------------|----------|
| Woodbridge.....       | £356 0 0 |
| Snell (accepted)..... | 280 0 0  |
| Gilroy.....           | 223 6 8  |

**NEWINGTON.**—For dilapidations and repairs at No. 67, Newington Causeway, S.E.—

|                          |          |
|--------------------------|----------|
| C. Hyatt (accepted)..... | £243 0 0 |
|--------------------------|----------|

**NEWMARKET.**—For building new house and stables at Newmarket, for Mr. Peter Price. Mr. John Flatman, architect, Newmarket.—

|                         |            |
|-------------------------|------------|
| Kerridge & Shaw.....    | £2,997 0 0 |
| Smith.....              | 2,720 0 0  |
| Simpson.....            | 2,683 0 0  |
| Hook & Tebbitt.....     | 2,668 0 0  |
| Linzell (accepted)..... | 2,327 0 0  |
| Blyth & Hunt.....       | 2,290 0 0  |

**NEWMARKET.**—For building new drill-hall at Newmarket, for H Company, 6th West Suffolk R.V. Corps. Mr. John Flatman, architect, Newmarket.—

|                      |          |
|----------------------|----------|
| Kent.....            | £491 5 0 |
| Simpson & Smith..... | 375 0 0  |
| Linzell.....         | 360 0 0  |

**NORTHAMPTON.**—For new Wesleyan Church Queen's-road, for the trustees. Messrs. H. H. Dyer & Son, architects.—

|                                      |            |
|--------------------------------------|------------|
| Reynolds & Son, Northampton.....     | £4,004 0 0 |
| H. Watkins, Northampton.....         | 3,691 0 0  |
| C. Claridge, Banbury.....            | 3,899 0 0  |
| Woodford & Son, Northampton.....     | 3,540 0 0  |
| A. E. Austin, Northampton.....       | 3,543 0 0  |
| Green Bros., Northampton.....        | 3,320 0 0  |
| H. Martin, Northampton.....          | 3,464 0 0  |
| G. Fisher, Northampton.....          | 3,445 0 0  |
| D. Ireson, Northampton.....          | 3,444 0 0  |
| S. B. Clarke, Northampton.....       | 3,398 0 0  |
| Clayton Bros., Cooknoe.....          | 3,393 0 0  |
| S. Wingrove, Northampton.....        | 3,345 0 0  |
| W. Heap, Northampton (accepted)..... | 3,220 0 0  |

**NORTHAMPTON.**—For alterations at the Union Workhouse, Northampton, for the Board of Guardians. Mr. Edmund Law, architect.—

|                                  |          |
|----------------------------------|----------|
| G. W. Mitchell.....              | £995 0 0 |
| Clayton Bros., Cooknoe.....      | 767 0 0  |
| Ireson, D.....                   | 749 0 0  |
| Beardmore, W.....                | 721 0 0  |
| Woodford & Son, Northampton..... | 720 0 0  |
| Branson & Son.....               | 711 0 0  |
| G. J. Fisher.....                | 695 10 0 |
| H. Martin.....                   | 693 0 0  |
| A. P. Hawtin.....                | 688 0 0  |
| J. Dunkley & C. J. Bronson.....  | 675 0 0  |
| Green, Bros.....                 | 674 0 0  |
| G. Waisie (accepted).....        | 641 0 0  |
| R. Hickman (accepted).....       | 523 10 0 |

\* The rest of Northampton.

**NORWOOD.**—For outdoor relief station, lodge, and stables, and other works, at Lower Norwood, S.E., for the Guardians of the Poor of the Parish of Lambeth. Mr. S. B. J. Smith, architect. Quantities supplied.—

|                                                         |            |
|---------------------------------------------------------|------------|
| Ookenden.....                                           | £5,868 0 0 |
| Martin White & Co.....                                  | 4,940 0 0  |
| W. Smith.....                                           | 4,696 0 0  |
| Saley & Son.....                                        | 4,499 0 0  |
| L. Leek & Hooker.....                                   | 4,470 0 0  |
| W. Fox.....                                             | 4,426 0 0  |
| E. C. Howell & Sons.....                                | 4,421 0 0  |
| F. & H. Higgs.....                                      | 4,352 0 0  |
| Bentley.....                                            | 4,312 0 0  |
| W. Downs.....                                           | 4,310 0 0  |
| B. Mayo.....                                            | 4,250 0 0  |
| W. Johnson.....                                         | 4,240 0 0  |
| Leslie & Knight.....                                    | 4,100 0 0  |
| A. Deacon & Co.....                                     | 4,098 0 0  |
| W. & H. Castle.....                                     | 3,987 0 0  |
| J. O. Richardson, Albert Works, Peckham (accepted)..... | 3,909 0 0  |

**New Roads, &c.**

|                          |          |
|--------------------------|----------|
| Mayo (accepted).....     | £340 0 0 |
| F. Higgs (accepted)..... | £290 0 0 |

**PLASBAT (Essex).**—For repairs and painting at the Industrial School, Plasbat, for the Guardians of the Poor of St. George's-in-the-East. Messrs. Wilson, Son, & Aldwinckle, architects, 2, Bast India-avenue, Leadenhall-street.—

|                         |          |
|-------------------------|----------|
| McCarthy.....           | £290 0 0 |
| Proctor.....            | 275 0 0  |
| Holland (accepted)..... | 236 0 0  |

**BICHMOND (Surrey).**—For alterations and repairs at Old Friars, The Green (Richmond Liberal and Radical Club), for Mr. C. Durent Hodgson. Mr. T. C. Barrelet, architect, Bridge Chambers, Richmond. Quantities supplied.—

|                        |          |
|------------------------|----------|
| Field.....             | £279 0 0 |
| Roole & Son.....       | 245 0 0  |
| Cain & Son.....        | 241 0 0  |
| Collings.....          | 240 0 0  |
| Garman (accepted)..... | 234 15 0 |

**SOUTHGATE.**—For additions to six houses at Boves-road, Southgate, for Mr. Sidney. Mr. W. Smith, architect, 1, Gresham-buildings.—

|                    |          |
|--------------------|----------|
| Mastock Bros.....  | £515 0 0 |
| Larke & Son.....   | 445 0 0  |
| Dearing & Son..... | 495 0 0  |
| Wheeler.....       | 480 0 0  |
| Clarke Bros.....   | 450 0 0  |
| Ward & Lambie..... | 437 0 0  |
| Saye.....          | 390 0 0  |
| Langham.....       | 339 0 0  |

**SHADWELL.**—For taking down and rebuilding premises known as Union Wharf, situate and being No. 63, Wapping-wall, in the parish of St. Paul, Shadwell, for Gingsell, Son, and Company (Limited):—  
 Colls & Son.....£3,490 0 0  
 Shurmur.....3,393 0 0  
 Mowlem & Co.....3,347 0 0  
 Mark Comity.....3,240 0 0  
 Morter.....3,187 0 0  
 Harris & Wardrop.....3,173 0 0  
 Gladding.....3,154 0 0  
 Nightingale.....3,077 0 0  
 Ashby & Horner.....3,000 0 0  
 J. & J. Greenwood.....2,899 0 0  
 J. Grover & Son.....2,788 0 0

**SOUTH KENSINGTON.**—For new drains, access-chambers, and plumbers' work, and other alterations and improvements, to 6, Foulis terrace, S.W., for Miss M. Gremston. Mr. Chas. Ed. Gritton, A.-M. Inst. C.E., surveyor:—  
 Winsor & Co. 62, Buckingham Palace-road\* £100 0 0  
 \* Lowest of three tenders received (accepted).

**SOUTHWARK.**—For rebuilding premises, No. 19 and 19, Newcomen-street, S.E. Mr. E. H. Burnell, architect:—  
 Hall, Beddall, & Co.....£1,934 0 0  
 Rider & Son.....1,930 0 0  
 Wagstaff & Son.....1,928 0 0  
 W. Downes.....1,887 0 0  
 Holloway Bros.....1,811 0 0  
 Hart.....1,780 0 0  
 Castle.....1,677 0 0  
 W. D. & F. Croaker.....1,620 0 0

**SUTTON.**—For additions to "Grange Bank," Sutton, Surrey, for Miss Smith. Mr. Frederick Colyer, architect, 18, Great George-street, Westminster:—  
 S. Pego, Croydon.....£471 0 0  
 R. J. Humphrys, Sutton (accepted).....461 0 0

**WALTON-ON-THAMES.**—For building new Wesleyan chapel and schools, Walton-on-Thames. Mr. J. Herbert Isett, architect:—  
 Kentish Rag.  
 Donbley & Son.....£4,390 .....4,300 0 0  
 R. Pink.....3,697 .....35 14 0  
 Howell & Son.....3,547 .....—  
 Piller & Son.....3,513 .....—  
 S. Wood.....3,500 .....30 12 0  
 W. & A. Brown.....3,433 .....63 0 0  
 Kirk Bros.....3,400 .....45 0 0  
 W. R. Wood.....3,400 .....—  
 A. R. Flew.....3,390 .....65 0 0  
 A. Brett.....3,335 .....30 0 0  
 Sanders.....3,323 .....25 0 0  
 Smell & Co.....3,314 .....127 19 0  
 Faulkner.....3,298 .....102 0 0  
 Reevol.....3,279 .....—  
 Peters.....3,270 .....30 12 0  
 Whistley.....3,248 .....30 12 0  
 J. W. Jones.....3,239 .....20 0 0  
 Bottrill.....3,194 .....57 0 0  
 Hickenbotham.....3,100 .....—  
 Knight & Son, Chertsey\* 3,101 .....36 0 0  
 Ingram & Son.....3,077 .....64 0 0  
 Newland.....3,045 .....60 0 0  
 Carlisle.....2,987 .....60 0 0  
 E. Jarvis, Banbury.....2,770 .....20 0 0  
 \* Accepted.

**WANDSWORTH.**—For bar fittings at the Plough Hotel, St. John's Hill, New Wandsworth, for Mr. J. Row. Mr. H. L. Newton, architect, Queen Anne's Gate, Westminster:—  
 Godden.....£760 0 0  
 Lambie.....679 0 0  
 Jackson & Todd.....665 0 0  
 Burman & Son (accepted).....640 0 0  
 Peatner's Work.  
 Heath (accepted).....79 0 0

**WINCHMORE HILL.**—For the erection of a pair of semi-detached villa-residences, Winchmore-hill. Mr. H. Towleley Sngden, architect, King-street, Chesham. Quantities by Messrs. Duffield & Player, Bromley, Kent:—  
 Riley Bros., King's Cross.....£1,395 0 0  
 Mitchell, Soho.....1,364 10 0  
 Wheeler, Winchmore-hill.....1,359 0 0  
 Sayer, Enfield.....1,178 0 0  
 Fairhead & Sons, Enfield (accepted) 1,150 0 0  
 [Surveyor's estimate, £1,234.]

**WEST HAM (Essex).**—For the erection of one dwelling-house in Godwin-road, Forest Gate, for Mr. C. J. Barr. Quantities not supplied:—  
 G. Healey, Forest Gate.....£785 0 0  
 Carrington.....635 0 0  
 A. Nicholls, Leytonstone.....631 0 0  
 Boney, Leytonstone.....626 0 0  
 Catley, Leytonstone.....595 0 0

*Villa Residence, Wimbleton.*—The architect of these buildings, for which we published tenders last week (p. 738), is Mr. J. Hume, of Hammermith.

\* \* \* **SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., not later than 12 Noon on THURSDAYS.

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\* \* \* Stamps must not be sent, but all small sums should be paid by Cash in Registered Letters or by Money Order, payable at the Post-office, Covent-garden, W.C. to

DOUGLAS FOURDRINER, Publisher,  
Addressed to No. 45, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

**SPECIAL.**—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY mornings.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that the COPIES ONLY should be sent.

PERSONS Advertising in "The Builder," may have Replies addressed to the Office, 46, Catherine-street, Covent-garden, W.C. Free of charge. Letters will be forwarded if addressed in envelopes are sent, together with sufficient stamps to cover the postage.

AN EDITION Printed on THIN PAPER, for FOREIGN CIRCULATION, is issued every week.

**FIRE BRICKS.**

BEST STOUTEBRIDGE FIRE BRICKS, and Cement Fire Clay, Gas Refractory, Mullow, &c. Fire Bricks and Blocks for the Highest Tests, for Iron Blast Furnaces, Forges, Boilers, Foundries, and Steel Furnaces, Flint Glass Furnaces, Roasting and Refining Furnaces, Chemical Works, Coke Ovens, &c. Boiler Seating Blocks, Pine Covers, Locomotive Bricks, Turbine, Steel Runners, Grate Backs. Special Sizes and Shapes made to Engineers' Drawings. Prices quoted to any Port or Railway Station.

R. CULL & SON, Palmerston-buildings, E.C.

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# The Builder.

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SATURDAY, MAY 29, 1887

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### Applied Mechanics and the Resistance of Materials.

THE stability of structures depends upon that branch of applied mechanics which deals with the resistance of materials. The majority of writers upon this subject treat it in too

abstract a manner for ordinary use, and illustrate it by conventional examples simplified to suit the formula, so that a reader unfamiliar with the higher mathematics finds that either the reasoning is beyond him or the examples are not sufficiently practical to guide him in the actual cases arising in his daily routine. The writer of the portly volume before us\* endeavours to place himself in the position of the average professional man, and, while simplifying as much as possible the statement of the principal theories, he shows various methods of application, chiefly graphic, and then takes as illustrations numerous examples borrowed from every-day practice. The general method of the book has our warmest approbation; though lacking somewhat of the preciseness of allied works, the deficiency is more than compensated for by the extensive range of information and the lucid manner in which it is put before the reader. An English translation would, we think, be very acceptable, as the only work of the kind we have now is Col. Wray's "Some Applications of Theory to Construction," which partakes more of the character of a student's note-book than a compendium of the mechanics of construction. The author's remarks upon his mode of dealing with the subject are suggestive. He says that when one endeavours, not to establish formulae more or less ingenious, but to arrive at simple conclusions, clear and practical, he quickly perceives how much the theories are actually obscure on certain points, incomplete upon others, and too often remain mute upon questions which particularly interest the practitioner, who is then obliged to fall back upon empirical formulae, which are only reliable within very narrow limits. While keeping the practical requirements ever in view, M. Planat has introduced just sufficient theory to justify his conclusions, and his work therefore appeals to that class of professional men who like to know something of the "why" as

\* *Pratique de la Mécanique Appliquée à la Résistance des Matériaux.* Par P. Planat, Directeur de la *Construction Moderne*. Première édition. En vente: aux Bureaux de la *Construction Moderne*, 8, Place Boisdeau, Paris, 1887.

well as the "how." Its general scope includes fundamental principles, moments of inertia, simple beams under various conditions, columns and pillars, compound beams, trusses of wood and iron, arched trusses, pressure of earth, and equilibrium of walls and arches. Each section is amplified by division into subsections, and these latter, so far as possible, are individually treated under the heads of experimental data, formulae, graphic diagrams, and examples of application.

Commencing with the alteration which a body undergoes when subjected to stress, it is shown that all the various strains are reducible to the six elementary displacements, and these again may be classified under the ordinary deformations of *allongement*, or lengthening; *raccourcissement*, or shortening; *glissement*, or sliding; *torsion*, or twisting; *flexion*, or bending. These deformations are accompanied by reciprocal internal efforts or stresses, classified as *extension*, or tension; *compression*, or compression; *cisaillement*, or shear; *torsion*, or torsion; and *flexion*, or bending; the last two being measurable by moments instead of by direct effort. The action of external forces is then analysed, particularly in relation to the internal forces engendered by them. In the next chapter we have some useful information upon the phenomena of experiments, and the author reminds us that in practical work we do not so much want to know the ultimate limit of strength as the internal state of the material under ordinary stresses which do not surpass the elastic limit, and he refers to this later on in greater detail. We then have diagrams showing "*la marche des phénomènes*" for various qualities of iron and steel, the extension produced by the load until rupture occurs being graphically delineated.

An interesting illustration is a Creuzot experiment: a test piece of wrought-iron plate of the usual form, with a hole at each end for applying the load, and the sides cut away from the middle portion, is ruled all over with lines making small equal squares, and is shown after rupture by tension, the alteration in shape of the squares presenting a self-evident picture of the nature of the internal strains throughout the piece. Following this are some comparative curve diagrams of the lengthening and shortening of wrought and cast iron under tension and compression, which are most instructive, although their character is now pretty well known. An account of experiments upon steel and wrought iron at temperatures ranging from 25° C. to 100° C. shows that steel is rather stronger at the lower temperatures, while iron is slightly weaker. The experiments upon timber, as is usually the case, are very meagre; there is certainly scope at the present time for a new series of investigations

upon this material, and we trust that before long some one will take the matter up.

The next chapter, upon stone, is of some importance to the architect, the more so as in what little has hitherto been written it has been treated without much detail. A long course of experiments was undertaken by M. Michelot, in connexion with the new Opera House of Paris, to determine the strength of various building stones. The first point established was a confirmation of Rondelet's statement that the resistance was proportional to the sectional area; secondly, that the safe load should be rigorously limited to one-tenth of the crushing weight of ordinary stone, while the limit may be raised to one-sixth for hard homogeneous stone, well proportioned and carefully bedded. Then it was proved that non-stratified stone might be placed in any position "*de lit ou de champ*," with equal effect, but stratified stone must always be placed on its natural bed, or so that the pressure is perpendicular to the stratification. Testing stone when wet, as against the same stone dry, it was found that in some cases it lost one-third to one-fourth of its resistance, and some freshly-quarried stone only gave half the resistance which was obtained after it had become dry and seasoned. With stone belonging to the same general class the strength was found to vary with the density, and the results for limestones being plotted gave a very definite hyperbolic curve.

It is shown that this curve may be used for ascertaining approximately the resistance of any limestone from the weight of a small cube, and a similar curve laid down from experiments upon other stones would give a like result in their case. Rondelet's experiments upon superposed stones are recapitulated in a useful form, and the reduction of strength from a monolithic pillar is shown to vary with the number of joints. For sandstone, the graphic diagram of strength compared with density is an undulating curve, but the examples given are not sufficiently numerous to settle this definitely for other varieties. In testing grit stone and schists, the great variation of strength due to the presence of fissures and cracks is noticed. In the chapter upon limes, cements, mortars, and concrete, no mention is made of any of the English engineers,—Fasley, Reid, Grant, and others,—who have experimented and written upon the subject, although the results they obtained appear to be adopted. The ultimate tensile strength of lime mortar with sand in proportion of 3 to 1 is about 14 lb. per square inch as a minimum, and the compression strength 72 lb. per square inch; the difference after ten days is not very notable, although to some extent age adds strength.

The author discusses at some length the relative value of experiments upon (a) the limit of elasticity, and (b) the ultimate strength of materials. In England the majority of experiments have been conducted with the view of ascertaining the latter, and the working loads are still usually calculated as bearing a certain ratio to it. Recently, however, since autographic test-recorders have been brought into use, it has been seen that the ultimate strength is more or less a matter of accident; that after a certain point is reached it is essentially a question of time, and that only up to the limit of elasticity does the material follow any exact law. In France, on the other hand, the limit of elasticity is looked upon as the only valuable criterion, and the matter has been the subject of some important discussions before the Société des Ingénieurs Civils. In Germany the chief experiments are those which fix the maximum load that ceases to produce rupture, whatever be the number of times it is applied or removed, and the working load is fixed at a certain fraction of this maximum; all consideration of the limit of elasticity, as such, is ignored, but practically the experiments fix the maximum load as coincident with it, and therefore the actual basis is the same as that of the French engineers.

The next division of the book deals with moments of inertia, showing in a simple manner how they are arrived at for all leading sections, and graphic tables are given for those most in use, enabling the moments for any section and load to be read off without calculation. Examples follow to exemplify the use of the tables in the selection of rolled girders, &c., to fulfil required conditions. The various methods of supporting beams in general and applying loads are considered, and the moments determined graphically for simple and compound beams, the funicular polygon being introduced where desirable. The use of cantilevers and pieces with overhang is well treated, and the examples are thoroughly practical. Consoles, corbels, balconies, and other forms are included under this head. Two complete sections are devoted to the elucidation of the bending moments of *encasté* and continuous beams, and this is perhaps necessary, because it is a part of the subject generally much neglected. To take a simple instance:—In the case of a beam uniformly loaded, continuous over two spans, Rankine shows that about 18½ per cent. of the total load rests on each of the outer supports, and 63½ per cent. on the centre. Other writers virtually agree with this, in dividing the load as  $\frac{1}{4}$ ,  $\frac{3}{4}$ ,  $\frac{1}{4}$ ; but the common practice is to divide the load in the proportions  $\frac{1}{4}$ ,  $\frac{3}{4}$ ,  $\frac{1}{4}$ ; hence there may be many cases in which the central support is receiving 25 per cent. more load than it was designed for.

In dealing with columns, the experiments of Hodgkinson are mentioned as those which have exercised the greatest influence upon construction, and the principal ones are detailed. The American repetition of these experiments with more powerful apparatus, and particularly the experiments upon built-up columns of wrought iron up to 14 in. diameter, are favourably criticised, and the conclusion drawn that Rankine's formula applies more exactly than that of Gordon to the observed results. "See now in what embarrassment the French constructor finds himself: we have at our disposal the formulæ of Hodgkinson, drawn directly from his experiments, the first in date; their form presents certain conveniences, in spite of many anomalies, and one often uses them; we have also the two formulæ of M. Love employed with equal constancy, of a form a little more simple; we have finally the two English and American formulæ that we exhibit, sustained, as all those which precede, by experiment." The author then goes on to show that the imperfections of the theory, giving rise to these different formulæ, are due to the ordinary assumption that the deformation of materials under stress proceeds uniformly up to the limit of elasticity, whereas the assumed straight line is actually part of a hyperbolic curve. Some of the discrepancies of the theories were pointed out nearly twenty years ago in a paper

before our Society of Engineers, but little or no progress has been made in practical adaptation.

The value of any formula is tested by plotting curves from it and comparing all known experiments; M. Planat does this in the case of columns, and a series of twenty-three of Hodgkinson's experiments show a remarkably close approximation. The graphic table, however, relating to oak and fir posts is based upon very few experiments, and hardly seems to accord with them.

We now come to the chief examples from practice, and these include a great variety and number of all kinds, forming a synopsis of the theory of construction particularly suitable for architects. It supplies a want often felt by practical men when they apply to books for assistance; they see some theory apparently suited to their purpose, but they lack either the skill or the patience to work it out. Here there are so many examples worked out that one may find almost the identical case required. Floors of brick, iron, concrete, and wood, trussed beams, trellis and lattice girders, bowstring and parallel, and other forms, are worked out, some useful notes being added upon the arrangement of the various joints. The chapter on riveting is brief and rather weak; a few general principles only are enumerated, and some examples of covers to joints worked out. Nothing is said as to general riveting, and many other points which would have to be studied before attempting to design an iron structure of any magnitude. Roof trusses, cranes, compound trusses, centres for vaults, and the carpentry of spires are among the general examples given, and many of the forms are not to be found in other books: hence the solution of these problems has an additional value; the iron trusses include many varieties, the stresses in which are worked out in detail. A matter that is often insufficiently considered is the effect of temperature upon iron construction. It is here illustrated by a trussed rafter roof of 20 metres span, where it is shown that, if the ends were fixed, an additional load, equal to one-third of the breaking-weight, would be caused by the extreme variation of temperature, and this, in addition to the ordinary load, would cause a dangerous stress. A chapter on curved beams is carefully worked out, and theory compared with practice. In the section on the thrust of earth and construction of walls the information is very clear and simple, enabling one to design retaining walls under any given conditions. The safe load in foundations upon gravel or dry sand is given as equal to  $3\frac{1}{2}$  tons per square foot, and upon virgin soil as  $1\frac{1}{2}$  ton. The friction of masonry on masonry, with fresh mortar, equals 0.5 to 0.7; masonry on earth or ordinary sand, 0.57; on dry clay, 0.51; and on tempered clay, 0.3. A *résumé* of the experiments of M. Gobin upon the thrust of earth is given, but while those experiments were sufficient to prove the general theory, they were naturally surrounded with so much difficulty of manipulation that their practical value is considerably limited. To compensate for this, we are presented with a good collection of examples of retaining walls for earth and water, and also of walls for buildings. For arches and vaults, graphic diagrams are given, from which can be measured the dimensions for given loads and spans, similar to those for girders and beams. The book closes with a section upon vaulted roofs for churches, and flying buttresses, the reasoning in which is made perfectly clear by graphic diagrams. In fact, so much use of graphic curves has not before been made in any work which has come under our notice, although the modern engineer is well aware of the value of plotting all experiments and empirical data amenable to this method, as a check upon their accuracy; and the value of the system, for all manner of purposes, cannot be over-estimated.

In various small matters we should hardly be inclined to accept the author's dictum; and some of the woodcuts, not being drawn to scale, give a false impression, but in view of the very great utility of the work as a whole, we abstain

from calling more specific attention to what, after all, are not serious faults. It is the sort of book we want to enable education to keep pace with the increasing demands made on the practical knowledge of the architect and engineer, and is a good attempt at a combination of theory and practice.

#### THE ARCHITECTURAL ASSOCIATION SKETCH-BOOK.



IN preparing for the issue of the first part of Vol. VII. (new series) of the Architectural Association Sketch-book, the Committee append to their usual circular in regard to the objects of the Sketch-book, the conditions of contributing, &c., a special note calling the attention of subscribers to the fact that by enlarging the number of members, and consequently increasing the income at the disposal of the Committee, various improvements might be introduced and the usefulness and artistic value of the work increased. From another official circular we learn that one of the contemplated improvements is to include several coloured plates in the next volume, a form of illustration which, multiplying as it does the operations of printing, of course adds materially to the cost of the volume.

It is with a desire to assist in this extension of the suffrage in regard to the Sketch-books that we devote a few lines to a special recommendation of it to the notice of those members of the profession (a very large number, as will appear) who are not subscribers to it, and are presumably more or less unacquainted with the character and contents of the collection; and that on their own account as well as on the account of the Sketch-book Committee. We are exceedingly surprised to note in the last report that the number of subscribers for the year 1885-6 was only 205. The subscription is a guinea, and for that sum the subscriber obtains twelve numbers, each containing six plates reproduced from as many original drawings: seventy-two large-sized sketches, some of them finished drawings, all well executed, some representing some of the best architectural draughtsmanship of the day, and illustrating many buildings or details which are little known, and of which no other illustration is perhaps in existence or attainable. The contents are of a nature to meet the most catholic tastes. They include measured drawings, some of them of the most careful and finished execution; sketches of picturesque architecture, all up to at least a fair standard, many admirable, some few of them remarkable; drawings of decorative work of various descriptions, also drawn in many cases from out-of-the-way and little known works. Even independently of any use which may be made of it as a "source of inspiration," or, in other words, a capital publication to "crib" from, the Sketch-book is a most pleasant and interesting collection of plates to turn over, and, if known to them, would probably be welcome even to many who are not professedly architectural students, but who are enough for architecture to value a collection of good architectural sketches. To architects it certainly ought to recommend itself as one of the most interesting publications of the day in the way of architectural illustration. The small number of subscribers to the work can only be accounted for by supposing that a great many of the profession are not acquainted with the contents and the interest of the book.

Each of the twelve parts in a volume is made up of three transfers, two photolithographs, and one ink-photo or chromo-litho. The "transfers" are tracings on lithographic tracing paper from the original sketch. We presume this method is encouraged to a certain extent for the sake of greater economy of production, as the cost of photolithographing is saved; but drawing on transfer paper can seldom have all the freedom of a drawing on ordinary drawing paper; the surface of the transfer paper is not favourable to the free working of the pen. We observe some directions are given in the notice to subscribers as to the use of tracing transfer

paper, pointing out that "the side of the paper for writing on is the one which adheres most firmly to the thumb and finger when slightly damped and the paper pressed firmly between them." This is rather a round-about test. The right side for drawing on has a thin composition on it which gives a slight glaze to the surface; the wrong side has a duller surface; no one who has once seen it can make a mistake. On most sheets of "transfer" the maker's stamp is placed on the working side of the paper, which is another safeguard against mistakes. In regard to the lithographic ink, the note is made that there is no necessity to rub it quite "black," which is true; but he who works with black ink will judge better what is the effect he is producing, as the impression will come out black anyhow, unless it is taken off in a brown or red or other tinted ink.

The larger proportion of the drawings in the Sketch-book are of the order of picturesque or freehand sketches; there are a certain number of measured drawings, however, and those which are carried out in this manner are very well and carefully executed. In the last completed volume (vi.) we may point out especially Mr. Shearman's measured drawings from Westminster Abbey, for instance, which are executed with admirable clearness and precision. Mr. Lewis's coloured drawings of hits of glass diaper from Thaxted Church are of considerable interest as out-of-the-way hits of glass detail. Ornamental subjects have been coming more to the front lately in the Sketch-book; and some of Mr. Wacher's, from old brocades, printed in white and a delicate grey, are very well executed both by draughtsman and lithographer. Mr. Amhler has too much of the ruler in his perspective sketches, which look rather hard and toneless in consequence, though careful and precise. Mr. W. Riley's "The Folly, Settle, Yorkshire," is a good example of another type of illustration, picturesque pen sketches of picturesque old houses. All sorts of delightful "hits" of this kind are to be found in turning over the Sketch-book; and if they are used as hints, and not as mere eccentricities to be reproduced in modern buildings, they may be as useful as they are pretty. Mr. W. R. Lethaby is not so well represented in this volume as in the last, where his powerful sketch of the interior of Tewkesbury was the finest thing in the volume; but his sketch of decorative details, "Roman and Renaissance," is admirably free in touch and execution, and makes a most interesting page. A drawing by the late Mr. Deshon, "St. John, Devizes," is one to be noted, as also Mr. Bidlake's drawing, a lithograph printed in red, of the pastoral staff preserved in Westminster Abbey; an excellent bit of detail sketching. The Renaissance iron-work from All Hallows, Barking, "measured and drawn out full size on the spot," by Mr. Rix and Mr. Banher, is a very careful illustration of some very curious and charming wrought-iron work. The measured drawings from various portions of St. Paul's, by Mr. R. W. Schulz, drawn out with the greatest minuteness and refinement of execution, are examples of the class of more distinctly architectural drawing,—geometrical elevation, of which, perhaps, there might be more in the book; at all events, if they were as good as these. Pencil seems rather at a discount in the sketches; of course it does not reproduce as well or as cheaply (in general) as ink line; Mr. Hardy's "Palazzo Uguccione" is a nice hit of sketching of this class, however. Mr. Cresswell's leading of Henry VII.'s tomb, reproduced in light red with a very delicate effect, deserve notice, and Mr. Bidlake's excellent and effective drawing of the Easter Sepulchre at Savenhy. And in mentioning these as among the things that attracted us most on a turning over the volume, we have omitted any other plates of great interest. Mr. Orpen is to be complimented upon his humorous and clever title-page to the volume before us. The title-page is a new one every year, settled by competitive sketches. The whole volume is an excellent guinea's worth for any architect or anyone with a cultivated taste for architectural and decorative work, and we strongly

recommend those who think it any object to collect a number of good sketches of architectural subjects, whether for study or pleasure, to turn their attention to the Architectural Association Sketch-Book.

## NOTES.

**T**HE death of M. Ruprich-Robert, the eminent French architect, is a real loss to architecture, and one to be felt on both sides of the Channel, inasmuch as his most important labour, that which he valued most, was his work illustrative of Norman architecture in Normandy and in England, a work to which the labours of thirty years had gone, and in the final correction of which he had been recently occupied. To his works and career we shall refer again.

**T**HE Friday evening lecture on "Bridging the Firth of Forth," by Mr. Baker, at the Royal Institution, was in every sense a "popular" lecture, perhaps rather more so than one expected to hear in these precincts, but it was exceedingly successful in the aim which the lecturer evidently proposed to himself, that of conveying a general idea, without going into technical details, of the magnitude of the work, the special difficulties of the task, and the means taken to overcome them. Mr. Baker had prepared a special illustration, which caused some amusement, of the cantilever principle of construction, in the shape of a photograph of a group arranged purposely at the works, showing a living cantilever construction. Two of the main piers were represented by a couple of chairs, on which two men seated represented the central truss supported on the pier; one arm of each figure, outstretched towards the central space, represented the tension member of the cantilever, and each hand grasped the end of a staff, shutting against a rail of the chair, and representing the compression member of the cantilever; a third man on a slung seat in the centre, supported by the other two, represented the intermediate portion of the bridge carried between the two cantilevers. On the outer sides of the two seated figures a rope grasped by the hand and fastened to a heap of bricks, represented the shore anchors of the cantilevers. This living construction was certainly ingenious and amusing, but we have some doubt whether it brought home the facts of the construction to those unacquainted with it better than an ordinary drawing and a simple and precisely worded description would have done. Models to scale of the Menai tubular bridge and the Forth bridge served to give an idea of the immense scale of this most remarkable of modern engineering works, but this was much better conveyed by the fine series of photographs of various portions of the work in progress, thrown on the screen by a lantern. These also gave a vivid idea of the boldness of the scheme and the unusual conditions under which the work was carried on; the photograph showing the commencement of the compression rib or tube of the cantilever, projecting out into space, and in process of being carried forward through the air, so to speak, with no point d'appui for support to the workers except the rib itself, was almost startling in its effect. Mr. Baker paid a well-deserved compliment to the courage of the workmen and the coolness with which they worked under circumstances and in positions certainly calculated to be trying to the nerves. While alluding to the lecture, we may assist Mr. Baker in dispelling one curious confusion of mind to which he alluded, in regard to the locality of the bridge. It appears that its progress is asked after as that of "the Tay Bridge," by about half the persons who make inquiries concerning it, and the suggestion that they mean "the Forth Bridge" is usually accepted merely as an example of the hypercritical accuracy of speech characteristic of engineers!

**I**T is probable that the fire risks of electric lighting were as grossly exaggerated when the new illuminant was introduced as was the

case at the time of the introduction of gas, when people feared to touch the pipes lest they should be burnt. But in the event of bad workmanship, unskilful installation, or carelessness in keeping all the wires dry, the risk of fire is a very real one, and it is most important that all proper precautions should be observed. Mr. Musgrave Heaphey, of the Phoenix Fire Office, was the first to appreciate the necessity of laying down certain rules in accordance with which installations should be carried out, and he formulated these rules five years ago. They were found to be of such value to the fire offices that the ninth edition has now been issued, with the additions and revisions which increased experience has shown to be necessary. The chief points to be attended to are—1. That the conductors be of sufficient sectional area. 2. That they be properly insulated. 3. That they be kept a sufficient distance apart. 4. That they be covered with waterproof coating. 5. That a sufficient number of automatic safety cut-outs be provided. Details as to the proper methods of ensuring that these conditions should be carried out are given in the rules, and no one should attempt to put up even a small installation without their guidance. There is one matter which we think Mr. Heaphey should alter in his next edition. He says that in passing through party-walls, provision must be made that fire cannot be communicated by the conductors. It is most undesirable that conductors should pass through a party-wall at all, and this should be absolutely forbidden. If several houses are fed with the electric current from a common source, the connexions of the branches with the main should be perfectly separate for each house.

**T**HIS present season will be marked by the more than usual number and extent of certain properties in Scotland which, in the course of two or three weeks, are to be offered for sale at auction. Chiefest amongst these are the Dee-side Estates, including the deer forest of Glentanar, together with Ahoynie Castle and its demesne, belonging to the Marquess of Huntly. Extending over 60,000 acres, and with salmon fishings along fifteen miles of the Dee, the property will, failing a purchaser for the entirety, be put up in six lots, each to give certain valuable sporting rights. Of his lordship's house were the celebrated royalist George (Gordon), sixth Earl and first Marquess of Huntly; the as famous Duchess of Gordon, who, in 1711, forwarded the "Reddite" medal to the Dean and Faculty of Advocates in Edinburgh; and George, fifth and last Duke, who was familiarly known in his own country as the "Cook of the North," and whose statue has been set up in Aberdeen. When holding a lieutenant-colonel's commission in the regiment now known as the Scots Guards he received letters of service, under date February 10th, 1794, for raising the existing 92nd Gordon Highlanders from amongst his own people in this district. It was his mother Jane, *née* Maxwell, the beautiful Duchess of Gordon, who enlisted most of the recruits with the irresistible bounty of a guinea and a kiss, holding the coin in her lips. Amongst the other estates are Dallas, in Morayshire, covering nearly thirty square miles, and yielding a rental of 3,800*l.* a year; Ballimore, in Argyllshire, of 1,200 acres, prettily situated near to the head of Loch Fyne; Glenrossal, a small but capital sporting estate of some 2,000 acres in Sutherlandshire; and that of Tarvie, in Perthshire, near to Pitlochrie, and adjoining to the Edradour Moor owned by the Duke of Atholl. Also the Glensanda deer forest, on the shores of Loch Linne, in Argyllshire, with its 12,000 acres of moor and forest land, having a sea frontage of nearly seven miles; with the neighbouring, but less extensive, estate of Kilmalcolm, in the same county, famed for its lochs full of trout, grise, and salmon; and that of Benmore (10,700 acres), by Loch Eck and its affluent the river Echaig. We should mention, too, the Farnich property, of nearly 30,000 acres, by Kinlochhichart, county Ross, and the magnificent deer forest of Applecross, in the Macraes' and Mackenzie's country, Ross-

shire, whose 75,000 acres comprise some of the best romantic scenery in Scotland. The tenants of this last-named estate were largely represented in the now 72nd and 78th (Seaforth) Highlanders when those two regiments were originally raised last century by Kenneth, seventh and last Earl of Seaforth, and his kinsman, Lord Seaforth, hereditary Chiefs of Kintail.

AT a meeting of the Sanitary Legislation Conference, on Monday last, the remaining clauses of the draft Act, which is proposed on the Sanitary Regulation of Buildings Bill, were read and agreed to, with only one addition on Clause 10, to the effect that "every certificate for a building used as a hospital shall specify the cubic contents of each ward, and set forth in detail the provision made for warming, lighting, and ventilating each ward." The Bill, however, still retains the inadvisable feature of making "Corporations" pecuniarily responsible, and levying penalties against them which will be found to be extremely harmless weapons when there is any occasion to brandish them. The Bill is to come on for second reading on the 22nd of June. It will serve as a feeler to indicate the state of public opinion on the matter of sanitary registration, but any such step requires a great deal more consideration in detail, before final effect is given to it, than appears to have been given in this case.

THE eleventh Congress of Delegates of Fine Art Societies will be held at the Sorbonne from the 31st of May to the 3rd of June. The general meeting will be held on the 4th of June in the large Amphitheatre, the Minister of Public Instruction and Fine Arts in the chair. The Society for the Protection of Ancient Buildings have been invited to send a delegate from their Society to the Congress, and the Society have, we understand, accepted the invitation. It is to be hoped that the meeting will take the statements and views of the society *cum grano*.

THE case of Jackson v. The Farnham Water Company is a warning to householders to be sure of their ground before they go to law about their water supply. The plaintiff complained of the insufficiency of the supply of water, because the supply was turned off at ten o'clock every morning. As the Company had not agreed to afford a constant supply, it is difficult to see how the plaintiff could suppose he was wronged. It was proved there was no tank or cistern in the house; but that had clearly nothing to do with the rights and duties of the water company. That an intermittent supply of water is inconvenient, and that cisterns are often the cause of disease, no one, we suppose, can doubt; but the remedy for this state of things is not in actions for breach of contract, but in bringing public pressure to bear on the Legislature, so that they should make a continuous supply imperative by an Act of Parliament.

THE Exhibition of "East London Industries," opened on Tuesday last by the Countess of Rosebery at the People's Palace, Mile End, though interesting enough in its way, hardly comes up to what we had been led to expect. As at first proposed, it was intended, as we understand, that the exhibitors should be entirely or mainly confined to handicraftsmen themselves, but at present exhibitors of this class are few in number. The exhibition was, however (like most other exhibitions), admittedly incomplete on the day of opening, and we understand that several exhibitors belonging to the artisan class have yet to occupy the spaces allotted to them. We will take another look at the exhibition a week or two later. In face of the apathy of the class for whom the exhibition was mainly intended, the Committee seem to have had no option but to allot space to large manufacturers, so that the exhibition presents no marked contrast to other shows of the kind. Among the exhibitors of the artisan class may be named Mr. H. Staines, well known in connexion with technical education in the build-

ing trade, who exhibits an instructive series of diagrams and models illustrating the principles of carpentry and joinery. A dock labourer, named James True, exhibits two or three cabinets made by him in his leisure time; they are much better in workmanship than in design. One or two looms are at work, one of them producing some excellent figured silk for well-known West End firms of upholsterers. The Thames Iron Works and Ship-building Company lend an admirable collection of models of some recent men-of-war, including the *Sans Pareil* and the *Benbow*, and the East and West India Dock Company and the London and St. Katherine's Dock Company lend a series of large models of their respective docks. The proceeds of the Exhibition, which will remain open for three months, will go in aid of the People's Palace Fund.

WE have received from the "Fireproof Cyanite Co." some specimens of paper and cotton stuffs impregnated with cyanite, accompanied by pieces of the same material untreated. The test is perfectly satisfactory as far as it goes. The untreated pieces burned freely when a lighted match was applied; the cyanised pieces, though they blackened in the flame, entirely refused to burn.

THE Exhibition of the Royal Scottish Academy was closed on Saturday, after having been kept open for a somewhat longer period than used to be the case previously to last year, when an experiment was made in that direction which proved successful. This year the experiment has met with a like success, and we are informed that sales have been good and the prices realised high.

THE building erected in Queen-street, Edinburgh, for a National Portrait Gallery and Museum of Antiquities, has been completed so far as contemplated at the outset and as the funds permitted. The unfinished portion, as designed by Dr. Rowand Anderson, consisting of projecting wings at either end of the central oblong, is now to be proceeded with, the donor of the building fund having come forward with a sufficient sum for that purpose. It is now pretty well understood that the anonymous donor is one of the Members for the city, who has displayed even greater munificence in other directions.

A PIANOFORTE, designed by Mr. Tadema, and of which a drawing hangs in the Architectural Room at the Royal Academy, has been on view recently at Messrs. Johnstone, Norman, & Co.'s, in Bond street. It forms the second portion of a commission for furniture from the designs of Mr. Tadema, given by an American gentleman, Mr. Marquand, with "no limit as to price." The pianoforte is a superb piece of workmanship, and shows a great deal of fine detail in design, of course in a character mainly Greek, or based on Greek work. The main material is ebony, which forms the groundwork of the decoration, the finest and most remarkable portion of which, perhaps, is in the scroll-work which decorates the sides of the instrument, and which is formed of various-coloured woods inlaid but left projecting in relief from the ebony ground, and carved (if we understood aright) *in situ*. The rich and solid effect of this relief inlay must be seen to be duly appreciated; and the truth of execution of the curves deserves the highest praise, especially in the portions of the instrument where the ebony is itself on a curved plan, and the delicate curves of the scroll carving, vertically, have to be adjusted also to this horizontal bend. The top of the piano is covered, unsymmetrically, with inlaid wreaths, filled with the names, in Greek capitals and decoratively arranged, of Apollo and the Nine Muses. The underside of the lid is decorated with bands of inlaid ornament, alternately ivory in cedar and cedar in ivory. The treatment of the arms at each end of the keyboard, in ivory with convex flutings, spreading fanwise as they fall over the curve of the arm, is very fine and massive, with a touch of Egyptian

taste about it. The space at the back of the keyboard, under the keyboard fall-cover, is painted by Mr. Poynter with an allegorical subject, "The Wandering Minstrels." The music-desk is of beaten and carved brass inlaid with copper and silver, and is one of the finest bits of work in the whole. Altogether, this is a quite exceptional piece of furniture both in design, material, and execution; in regard to execution, indeed, one may say that it could not be surpassed.

WE mentioned a little while since that it was intended to erect a monument in Vienna to the memory of Mozart, on the space in front of the Opera House. We understand, from a Vienna paper, that it is proposed to have an international competition for the monument, and that 6,000*l.* have already been raised towards this object. Much more than this, however, would be required to erect a monument worth an international competition.

THERE is in Coventry a fine old hall called St. Mary's Hall, and used as the Guildhall of the city. From an advertisement which has been forwarded to us, and which is signed by the Town Clerk of Coventry, it seems that this building is in danger of being evil-entreated at the hands of any one who may offer to do so at the lowest figure. The advertisement in question invites "tenders to supply a complete set of drawings of the exterior of St. Mary's Hall, in all details of mouldings, canopies, tracery, and other parts, according to the original design of the building." This, apparently, must mean a contemplated restoration. In that case the only reasonable thing to do, supposing "restoration" is necessary or desirable at all (about which we decline to speak positively without another inspection of the building), would be to select the architect most eminent for his knowledge of work of that date, and put the matter into his hands. To put the treatment of an old building up to auction, so to speak, in this way, would be a blunder of the first magnitude; and if the only object is to get a restored drawing of the building as it was at first, that is not the way to go about it. To make any such restoration even on paper requires a great deal of knowledge and study, and no architect of standing, we should imagine, would consent to give in his name in a matter of this kind, and give a tender, like a contractor, for supplying a restoration of the Hall. The idea is absurd, and shows an entire ignorance of professional proprieties. All that the municipality will obtain will probably be "tenders" from some few artful pupils or builders' clerks who want to turn a little money; at least, we should be very much surprised if their advertisement drew any one of higher standing.

THE latest "one-man" exhibition of importance is that of Mr. Henry Moore at the Society of Fine Arts; a collection of sketches in oil and water-colour under the title "Afloat and Ashore." The second half of the title indicates that Mr. Moore has gone out of his usual beat, and for once is to be seen as a painter of landscape as well as of sea pieces. Among the landscapes, "Gelli Gynan, North Wales" (2), and "Gorse Time, Thorpeness; Shower passing off" (30), are two of the best and most characteristic. The greater part of the exhibition, however, is occupied by seas in all stages of first sketch and final finish. Among these may be named especially "Evening off the Coast of Normandy" (35), an evening scene with the sunset behind the spectator and lighting up the cliffs opposite,—this is a very fine little work, a mere sketch, remarkable for its effect of light and atmosphere; "A Rough Day, Lowestoft" (11), a rapid sketch of the movement of water; "The Dingy Atern" (15); "A Short Cut to the Mussel Rocks, Wimereux" (20), a grand scene of stormy sunlight; and among the oil paintings "Thunder Shower passing off" (65); "Weymouth Bay and Portland Bill" (66); "Sunset after Storm" (71); "The Jersey Packet" (75), the packet in the distance, and in front a most spirited representation of the pleasant short seas which she



has to tumble over, and which suggest *mal de mer* at once. The large painting entitled "Wreck of an Austrian Barque, Yarmouth" (59), rather suggests questions. The rush and movement of the water is splendidly given, but what about the colour and texture? Certainly we cannot accept this as like any sea water we ever saw. The large moonlight, "Queen of the Night" (51) is a fine sketch in oil of a moonlight effect.

**MR. WALTER CRANE'S** lecture at the Society of Arts was an eloquent protest in favour of handicraft art, the poetic sentiment that could be enshrined in it, and against everything artistic, being regarded from a pictorial point of view. Mr. Crane appears to have been very desirous also to emphasise the distinction between nature and art, "so often lost sight of." Our present system of designing he described as a search after the superficial naturalism. It might be said that it would be something to know that there was any "system of designing" at all at present. We can hardly recognise that there is, and we should hardly say that the most prominent feature of decorative design at present is a search after naturalism; there is certainly a good deal of practical recognition of the fact that decorative art does not consist in the imitation of nature. Mr. Crane's complaint that industrial organisation had destroyed the art of the people is only too sadly true, for the most part; but the fact is that there is not time, in the present race for life, to give the individual thought and skill to each article produced which is necessary to make it a work of art. Things are wanted quickly and in the mass. We may regret it, but it seems a vain regret for the most part. Circumstances are too strong. It is well to continue to strive against them, for all that, and we are glad to learn in the course of the discussion which followed that the Society of Arts would give its reward and recognition to the makers and not to the sellers of articles. That is a step in the right direction, at all events; and perhaps presently we shall hear a little less of the beautiful designs turned by "— & Co.," and a little more about the men who really design them.

ARCHITECTURE AT THE ROYAL ACADEMY.—V.

1649, "SOMERVILLE HALL, Oxford," Mr. H. Wilkinson Moore. Hung too high to be well seen; a block of collegiate residences of a suitably homelike character of architecture; the portions between the gables want a little more decisive finish at the eaves, the windows run too much up into the gutter. Plans are appended, but cannot be seen to any purpose.

1651, "Design for a Stained-glass Window," Mr. C. Hardgrave. A two-light window in memory of Trevithick; the central portions of each light represent Trevithick constructing a steam-engine,—a novel subject for stained glass, and treated with more success than might have been thought possible in that medium of illustration. The deeper tones of the window are concentrated on these centre portions, which are finished with canopy work of rich design; the upper and lower portions are occupied by canopy work of fourteenth-century character, with figures of angels holding scrolls with the inscription "Peace on earth, goodwill towards men," &c., words which are appropriate enough to the commemoration of a steam-engine inventor, in spite of Mr. Ruskin. At the foot is the inscription, "In memory of Richard Trevithick, born 13 April, 1771; died 22 April, 1833." Then why commemorate him in the style of the fourteenth century? Apart from this consideration, the window is a good piece of work.

1652, "Ceiling in Black and White, for Belton Hall," Mr. John H. Pollen. A comparison of this with No. 1642 seems to imply that the author is prepared to design in all styles, for these two are certainly as opposite in taste and feeling as could well be imagined. This is a slight pencil sketch showing a pretty design of Renaissance character; a wide border is marked off by a flat rib bearing a key pattern, and the border is filled up with central and angle panels with genii supporting shields and underlined

with wreaths; a centre space is marked off by a flat rib designed on curved lines and bearing a guilloche pattern; a large shield with lion surmounters occupies the centre, and medallion heads are placed in circular wreaths at the angles. The general effect is pretty and graceful, though the detail is not of the best school, and conventional foliage is used along with natural sprigs, which never looks in keeping.

1654, "Drawing-room Ingle, Holcombe Wood, Kent," Mr. J. Belcher. A capital little water-colour sketch bearing the signature of Mr. A. B. Pite; the ingle-nook, a very spacious one, opens under a large arch flanked by coupled red marble columns; warm tones predominate; perhaps more so than is likely to be altogether the case in the actual scene; but it is admirably harmonious in colour and handled with the feeling of an artist. The rib pattern in the ceiling is not quite true in perspective.

1656, "Birds-eye View of Proposed Royal Infirmary, Liverpool," Mr. A. Waterhouse, R.A. A view in watercolour, of a very extensive group of buildings in the plain style of architecture suitable for a building of this class. Three large longitudinal ward blocks run parallel at right angles to the street on which their ends abut, and with green lawns between them; some architectural effect is obtained on the ends towards the street by flanking towers and a large open arch and balcony in the upper story and a loggia in the lower; a cross block of buildings of communication apparently connects the main blocks at their upper ends; the centre one runs on into what is evidently the administration block behind; the side blocks, continued further apart, terminate each in a circular ward. So far one can pretty well read the plan from the drawing, but no plan is appended; and we are left in doubt whether the circular wards are for special cases, or merely as experiments in that form of ward, which few builders of hospitals as yet like to commit themselves to entirely.

1657, "Design for Commemorative Schools and Clock-tower," Mr. E. Hodgkinson. A capital tinted drawing. The author of it is the draughtsman who is responsible, as mentioned before, for drawings representing the work of more than one other architect in the room. The tower has a good deal of originality, though we cannot say we like the effect of the twisted columns, with no capitals or finish of any kind, butting against a soffit; it is a whim, but not a happy one. As a clock-tower, the design rather fails in point from the fact that the clock face is the most insignificant feature in it, being merely sunk in a small square panel midway in the height of the tower, whereas a clock-tower should carry the clock stage as its most important feature. From the large amount of opening provided in the upper portion of the tower, it is perhaps intended to have an extensive carillon peal; this would be an excuse for the treatment of the design, which otherwise seems rather out of keeping with its alleged object.

1659, "Interior of proposed Church," Mr. W. Young. A large longitudinal section of a Gothic church, which claims notice as one of the very few examples of genuine architectural geometrical drawings exhibited, and is very carefully executed. It is unfortunately simply a reproduction of Gothic, not of the most refined detail.

1660, "Hôtel Bourgethrolde, Rouen," Mr. Ernest C. Lee. A good sketch in crayon, which has been reproduced in our pages. It might have claimed to be hung better than it is.

1661, "Houses at Chiswick-mall," Mr. John Belcher. A view of two or three houses in a very quiet style, suitable to the *genius loci*. Some years ago they would hardly have been called architecture, but we have changed all that.

1662, "Montreal General Hospital," Mr. Alexander Graham. A water-colour view hung too high to make anything of it, except that, for a hospital, it seems a somewhat picturesque group of buildings.

1664, "Entrance Gateway" of the hospital just named. A good massive piece of work, though we should have liked it better without the big stone spikes on the superstructure of the gateway; in fact, the whole of this structure over the gateway is rather "tracery-like," with its big scrolls, &c.; but, at all events, it is not timid. The drawing (water-colour) is a very good one.

1665, "House near Blackheath Hall," Mr. John Belcher. An interior showing a hall,

wainscoted on the lower part, and with a ceiling panelled with massive moulded beams and intermediate ribs. A good pen drawing, but presenting nothing for special comment. By the same architect is,—

1666, "Morden Grange, Garden View." A bird's-eye view, in a rather sketchy pen drawing, of a very home-like old-fashioned-looking house, with a large extent of garden laid out with precise regularity, with those thick trimmed hedges which are the delight of artists like Mr. Penleylove; a sun-dial and a fountain on the centre axis of the garden; a plot on the left laid out in walks crossing at the centre, which is marked by floral arches and a statue. The house is exceedingly simple, with a loggia with plain cylindrical columns in the middle of the ground story, forming a vestibule to the library, which opens on to the garden. The first-floor story is decorated with brick plasters. The whole thing is in keeping, but looks so old-fashioned that one is in doubt whether it is a new house or an old one added to. A plan is appended. It is a pity the whole was not treated in a water-colour. The effect of the old-fashioned garden might have been charmingly given in a good water-colour; in the pen drawing the effect is lost, and it looks rather scratchy and straggling.

1667, "Snowdenham," Mr. Ralph Novill. Two views and a plan of a picturesque house of the style which may be generally termed "Old English," though there are bits of actual Gothic in it, as a large "Tudor" window, a *porte-cochère* with buttresses and four-centred arches, and a terrace carried on a similar construction. The great merit of the building is that the picturesque arrangement of the windows arises naturally out of the features of the plan, and really expresses the arrangement of the interior. The very spacious hall, in comparison with the general scale of the house, is an instance of the growing tendency towards giving importance to this feature, even in houses of moderate size. The offices are conveniently arranged among themselves, but it is rather a long course from the kitchen to the dining-room.

1668, "Perspective View of Clyde Trust Buildings, Glasgow," Messrs. John Burnet, Son, & Campbell. This, which is a very good water-colour sketch, signed "Jules Lessore," may be taken along with No. 1681, "Proposed Extension to Clyde Trust Buildings, Glasgow, with Clock-tower to Harbours," this latter being a geometrical drawing in line, showing end and side elevations. We do not exactly make out how much of the building is new, except that the clock-tower manifestly is. The side elevation shows a building mostly of an Italian character, boldly treated, the lower half strongly rusticated. The principal entrance, under three large arches, is accentuated by an order and a pediment above. The tower is very boldly treated, somewhat Venetian in character, rising with strongly-marked vertical lines to a considerable height and there carrying a clock-stage with balconies (?) on heavy brackets under each clock-face, the object of which is not very apparent, unless we are supposed to go up into them to look at the clock. If the clock-face had been corbelled out it would have been more to the purpose. The tower is surmounted by an open octagonal lantern with a short stone spire, or rather conical roof, over it, and four bronze (apparently) seated figures occupy pedestals on the angles of the tower and fill up the line from square to octagon. The water-colour sketch, whether intentionally or not, does not quite tally with the elevations, and represents the tower with a considerable amount of batter, which is not discernible in the geometrical elevation, but which is an improvement to its effect. As shown in the perspective sketch, this appears a fine bold piece of design, solid and massive, and with no nonsense about it.

1670, "House at Elstree," Mr. E. J. May. A picturesque house of the "cottage architecture" type, with a plan appended, but hung too high to be seen. The bit stuck on at the end of the house, with two big chimneys rising from it, comes in rather awkwardly, and looks like a subsequent addition to the house.

1672, "All Saints' Vicarage, Plymouth," Mr. J. D. Sedding. A picturesque house, but rather too eccentric; it looks tumbled together; the small bays on the road-front, connected by a balcony and a roof, form a good feature. The house seems to have shaved off its eyebrows, having no projection or moulding worth the speaking of either at eaves or gables. This is

"characteristic" in a sense, but it does not add force to a building. Two small plans are appended; they cannot be well seen, however.

1673, "House at Tunbridge Wells," Mr. Jas. Neale. A beautifully-executed pen drawing, almost as soft and graduated in tints as a good engraving; the house, with an upper story of half-timber work seated on brick walls, and with strongly accentuated eaves, looks solid and at the same time picturesque; but it owes something of its effect to the well-executed background of the picture; the house and its surroundings make a good whole.

1674, "Design for a Town House," Mr. T. MacLaren. This we have already illustrated; it has been well hung and deserves its position in spite of the overpowering roofs with which the author has spoiled it (if it were a house for execution) both architecturally and practically. The centre pile of roof is as high from the main cornice to the peak as the cornice is from the plinth line, and in execution all this would be nearly wasted material and space, only available for badly-shaped and ill-lighted attics. But the lower portion of the house is dignified in design and very well drawn. The device of carrying the capitals of the upper wall columns past the architrave and frieze, and making them carry the cornice only is, however, hardly to be commended.

#### A RELIC AT AUSTIN-FRIARS.

A SUPPOSED relic of the former settlement of Mendicant Friars in Broad-street Ward has just come into view. It consists of a leaden coffin, temporarily deposited, though not for exhibition there, in the Guildhall,—which has been discovered in a vault whilst making excavations for the rebuilding (Messrs. James & J. S. Edmeston, architects) of No. 57½, Old Broad-street, and No. 7, Austin Friars. The coffin, being of full size, is slanted to the body, and is of unusual width across the shoulders, though very narrow at the feet. It was found some 15 ft. below the surface, against what is possibly the northern chancel wall of the Friars' church. The amount of present work remains turned up in course of the present works goes to show that here was the Friars' burial-ground. A church was erected here for the Augustines in 1253, by Humphrey de Bohun, Earl of Hereford and Essex, a grandson to their founder. The church's gilded spire was one of the very few for which London in those days could lay claim to distinction; and even by Stow's time, having survived St. Paul's, it had no superior. He dwells with evident delight upon the "Augustine Friars' church and churchyard," entering thereunto by a south gate to the west perch, a very large church having a most fine spired steeple,—small, high, and straight. I have not seen the like." At the Dissolution King Henry VIII. bestowed the conventual house upon Sir William Paulet, Lord St. John of Basing, one of that sovereign's executors. Paulet converted the Friars' lodgings, cloister, and garden into a suitable residence, which continued in his family for scarcely more than half a century. On January 12th, 1550, Paulet was advanced Earl of Wiltshire, and further on October 12th, 1551, Marquess of Winchester. His new home, for a while known as Paulet or Winchester House, adjoined to that of his contemporary Sir Nicholas Throckmorton. Here he lived with his wife Elizabeth, daughter of his near neighbour Sir William Capel, ancestor of the Capels, Earls of Essex. By being, in his own words, a willow and not an oak, Paulet contrived to serve the Lord Treasurership of England to Edward VI. and his two successors on the throne: he died in his 98th year, on March 10th, 1572. His son and successor, John, sold the church monuments at Austin Friars for 100l., as also the lead from the roof. His great-grandson, William, fourth Marquess, having spent more than he could afford in various ways, including a magnificent reception of Queen Elizabeth at Basing, county Hants, was in 1602 fain to part with his property here for 4500l. to Sir John Swinnerton (Lord Mayor 1612). He had for tenants Fulke Greville, Lord Brooke, and the Countess of Shrewsbury; and in Wilkinson's "Londina Illustrata" is quoted a letter under date September 23, 1602, from Greville to the Countess. He writes:—"I thought it my duty to give your ladyship notice, because both your house and my Lady of Warwick's are included in this bargain; and we, your poor neighbours,

would think our dwellings desolate without you, and conceive your ladyship would not willingly become a tenant to such a fellow." The monuments alone testify to the pristine importance and accredited sanctity of the Friary. They comprised the tombs of Richard (Fitzalan), Earl of Surrey, whom King Richard II. beheaded in 1397; Humphrey de Bohun, King Edward I.'s god-father, who fought at Evesham; Edward, infant son of the Black Prince and Joan, his wife, the Fair Maid of Kent; Edmund Guy de Meric, Earl of St. Paul, who is said to have instigated the death of Thomas, Duke of Gloucester, in 1397; the tenth Earl of Arundel, executed in West Cheap, 1397; John de Vere, twelfth Earl of Oxford, beheaded on Tower-hill in 1461; many of the barons who fell in the Lancastrian defeat at Barnet Field, 1471; William, seventh Lord and first Marquess of Berkeley, with his wife Joan,—he died 14th of February, 1492; and Edward Stafford, Duke of Buckingham, who was beheaded through Wolsey's machinations, 1521. Some remains of the old Winchester House remained standing until about forty-five years since. Of the imposing block of three houses, styled Winchester House, in Old Broad-street, the front portion was demolished (together with other premises) in September, 1883, in pursuance of a scheme referred to in our columns of the 4th of August in that same year. The back premises had been removed in 1857. The site of Pinner's Hall, which stood hard by, was that of a Venetian glass factory that had been set up within the precincts of Austin Friars. Of this factory Howell, author of the Letters, was some time manager. After the suppression, Sir Francis Walsingham succeeded to the house here owned by a branch of the fraternity of the Papey, founded (1430) in honour of St. Charity and St. John the Evangelist at St. Augustine Papey in the Wall.

Before Humphrey de Bohun's death the nave of the Friars' Church was assigned "to the Germans . . . for their church, to have their service in, for avoiding of all sects of Anabaptists, and such like,"—according to the passage in King Edward VI.'s diary, under date 1550, June 29. The "Germans" of the charter included certain Dutch and Flemish refugees, who united themselves with the original Protestant congregation of Jean à Lasco, the Polish exile, church, that migrated from Emden in East Friesland. For a period, the Dutch or Flemish community shared this their "Temple du Seigneur Jesus" with the French refugees, who, subsequently migrating to St. Mary's Chapel, Threadneedle-street (pulled down in 1841), afterwards removed to the church, designed by Owen, in St. Martin's-le-Grand, which in its turn will soon have to make way for an extension of the General Post-office. After the fire of 1862, the valuable library of the Dutch Church community in Austin Friars, rich in MSS. and letters of Calvin, Peter Martyr, and others, Continental reformers, was, we understand, entrusted to the City Corporation for its better safety, and to render it more accessible to readers. It contained a copy of the Decalogue, attributed to the hand of Rubens.

#### ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The eleventh ordinary meeting of this Institute for the present session was held on Monday evening last, Mr. E. T. Anson, F.G.S. (President), in the chair.

#### Obituary.

Mr. Macvicar Anderson announced the decease of Sir Horace Jones, City Architect, and past-President of the Institute. Mr. Anderson's remarks and those of other gentlemen on this subject, will be found in another column of this week's *Builder*.

Mr. William H. White (Sec.) announced the death at Cannes, on the 7th inst., of M. Ruprich-Robert, an Hon. Corresponding Member of great distinction, after a long and painful illness. A notice would appear in the "Journal of Proceedings." The Council last heard from the deceased member in December last in a charming letter written from Cannes, at a time when he was very ill. He had been engaged for several years upon a well-known work on Norman architecture, which included notices of a great number of edifices erected in this country. That had been almost the work of his life, but he was also known as the author of several other works. M. Ruprich-Robert was Inspector

General of Historical Monuments in France for a number of years, and was a Member of the Commission during the year 1844.

#### Drainage of the City and Palace of Westminster.

Mr. John Phillips, C.E., then read a paper on "The Drainage of the Palace and City of Westminster," of which the following is an abstract:—

Before entering upon a detailed description of the drainage of the Palace and City of Westminster, the author referred generally to the important question of town drainage,—a subject even now not so well understood and practised as it should be. One object should be, he said, in draining a house, a mansion, a village, or a town, to make the drains and sewers so that the sewage in them shall never stagnate at any part, but be constantly flowing with a self-cleansing velocity; and so that the air in them shall never stagnate at any part, but be always flowing, by fresh air passing into their lowest parts, and by foul air discharging from their highest parts into the stratum of the atmosphere above that in which we live and breathe.

Town drainage consists, first, of the comparatively clean surface and subsoil water; and, secondly, of soiled and used water containing organic matters called sewage. The combination of comparatively clean and of highly foul water in the same channels was established in London and its suburbs about the commencement of this century, at the time that water-supply by pipes to houses became general. A largely increased amount of water was used and was discharged into the old cesspools, and thence by overflow drains into the ditches, watercourses, and sewers, open and covered, which received the surface-water, and conveyed it into the natural streams and rivers. What was at first a makeshift or temporary expedient was continued, and became a system which has been extolled as the best course to pursue. The evils arising from this combination are, however, continually asserting themselves, and they become masters of the situation.

The two systems of drainage should, the author said, be kept separate by the provision of one set of drains for receiving the surface and subsoil water, and discharging it into the natural streams and rivers; and of a second set for receiving the sewage, and conveying it in self-cleansing drains as fast as it is produced to suitable and prepared agricultural land. This separate system was recommended by the author, Mr. Phillips, thirty-eight years ago, in his preliminary report on the drainage of the metropolis, and he advocated it now as the only effectual remedy for the evils arising from a combined system we have, up to the present, been pursuing. The sewage would in this system be conducted to reservoirs, and the suspended organic matters therein called sludge would be precipitated by lime and sulphates of alumina and iron. The sludge would be used by farmers, and dug or ploughed into the land the same as farm-yard manure. The liquid sewage would flow by irrigation upon, and find its way by filtration through, the land to the natural water-courses as a purified effluent, leaving its fertilising constituents in the soil on the way to be assimilated into growing crops.

The rain or surface water from the houses and streets would be carried away into the natural streams by glazed stoneware or fireclay pipes embedded in concrete, of diameters varying from 3 in. to 24 in. or more. The sewage from the houses would be carried away by glazed pipes of cast iron of 6 ft. to 9 ft. length, with inspection covers, curved junctions, and perfectly water-tight joints, laid with a proper fall on concrete, directly under the basement floors and paving, so as to be always accessible without opening the ground to get at them.

Where towns or districts are hilly or on sloping ground the necessary fall for the drains is easily obtained; but there are many towns and districts where the ground is low and flat, and where it is impossible to give the drains the necessary fall to be self-cleansing without going to excessive depths. Such districts, for instance, are Fulham, Chelsea, Pimlico, Westminster, and Poplar, on the north side of the Thames; and Battersea, Lambeth, Southwark, Bermondsey, and Deptford, on the south side. In such districts, however, the difficulty might easily be overcome by dividing the drains into sections, converging to receiving stations where the sewage might be lifted to sufficient altitudes

to ensure its flowing by gravitation to distant agricultural land, or down to the sea to be discharged therein from the level of the highest gides under low-water level. This mode of dealing with sewage is already in active operation at the Palace of Westminster, at Eastbourne, at Southampton, and at other places, where Shone's Hydro-Pneumatic system is employed in ejecting the sewage, with economical and completely successful results.

The author then proceeded to describe in detail the drainage of the Palace of Westminster as originally laid down by the architect of the building, and to point out the defects of the system employed, and the evils attendant upon the subsequent laying down of the main low-level sewer, through Westminster and Pimlico, by the Metropolitan Board of Works. The Palace stands, as is well known, beside the Thames. Its entire area, including Westminster Hall and Old Palace Yard, is about 14 acres. Its roofed, flagged, and paved surfaces, off which rain runs into the Palace drains, is about 10½ acres. The whole Palace might have been well and efficiently drained in the first instance if the simple expedient had been followed of keeping the rainwater drains separate from the sewage drains. The surface water might have been discharged direct into the Thames, and the sewage through a ventilated siphon-trap into a sewer in Bridge-street, at the south-west corner of old Westminster Bridge.

The manner in which the Palace was actually drained was as follows:—In 1838-39 the architect laid down a brick main sewer running from north to south along the centre of the Palace, into a main sewer then existing in Abingdon-street, the outlet being near the south-west corner of the Victoria Tower, and the head on the north side of the Speaker's court. The length of the sewer was about 1,000 ft.; its size was 5 ft. 6 in. high by 3 ft. wide; its shape was a segment bottom, 6 in. deep, with upright sides and semicircular crown; and its fall was 1 in 923, or 1 in 1,078 ft. Into this sewer was conveyed, by numerous 9-in. and 12-in., and 2-ft. by 1-ft. brick drains rendered inside with cement, all the sewage produced in, and the rain falling on, the Palace. This sewer, owing to its excessive size, had shape, little fall, and absence of any means of flushing it, accumulated sewage in deposit to depths varying from 6 in. to 18 in., and from the decomposing sewage noxious gases continually escaped into the Palace. The sewer was occasionally cleansed, and additional traps were provided to keep down the smells, but all to no purpose.

At last, in October, 1846, the smells were everywhere so bad, that the author, who was then Chief Surveyor to the Westminster Commission of Sewers, was consulted by the architect of the building. He found upon examination that the main sewer was little better than an extended cesspool. By levelling he discovered that the sewer in Bridge-street, already mentioned, was 5 ft. lower than that in Abingdon-street. He therefore recommended the architect to take out the invert of the Palace sewer, and to put in a narrow deeply-curved invert with a reversed fall of 1 in 215 in place of it,—then to continue the sewer northward across the Speaker's Green into the sewer in Bridge-street. This recommendation the architect adopted and carried out, and in the end the sewer as altered, and the main drains connected therewith, became self-cleansing. They continued in this improved condition for a quarter of a century, until about fourteen years ago, when the main low-level sewer was put down through Westminster and Pimlico by the Metropolitan Board of Works. Since then the discharging level of the sewage from the Palace sewer, as well as from the sewers generally in Westminster and Pimlico,—instead of being lowered and the flow accelerated,—has been materially raised and the flow retarded; and the sewers themselves have been converted into sewage and rainfall reservoirs.

The principal cause of this state of affairs is the level at which this low-level sewer has been put in, namely, at least 5 ft. higher than it should be for properly draining the low flat districts through which it passes. When rain falls on the districts draining into it, the rain and sewage together sometimes fill it, and sometimes rise to 5 ft. and even 10 ft. above its crown, thus driving out the sewage gas, generated in the sewers, into the streets and houses. At such times the sewers in Westminster and

Pimlico, as well as the basements of many houses there, are flooded to the hydraulic level; the foul drainage rises in the low-level sewer, and the sewage overflows into and pollutes the river. In dry weather the height to which the sewage formerly accumulated in the sewers, when the flap-valves on their outlets were tide-locked, has been materially and permanently raised by the height to which the sewage now flows in the low-level sewer. At the point where the Palace sewer joins the main low-level sewer, the level of the latter was so little below the former, that the 4-ft. depth of sewage flowing in the latter in dry weather formed a permanent head or dam, about 2 ft. 4 in. deep, against the outlet of the Palace sewer. This sewer for considerable length was thus converted into a permanently elongated sewage pond and sewage gas-retort; indeed, the flap-valve fixed near its outlet was recently found to be standing open and useless, and in rainy weather the accumulated drainage in the low-level sewer prevented that in the Palace sewer from discharging.

It is evident from the foregoing particulars and facts concerning the drainage of Westminster and Pimlico, that the insufficient depth and capacity of the main low-level sewer have materially injured, instead of benefited, the sewers in those districts, which, therefore, as regards their drainage, are in a far worse condition now than they were when they drained direct into the Thames. The real remedy for the evils which arise from the insufficient depth and capacity of this main sewer consists, in the author's opinion,—(1) In lowering its bottom from near the District Railway Station at Charing-cross to the western pumping-station at Chelsea, a depth of at least 5 ft., and in so doing altering its section from an 8 ft. circle to a 13 ft. by 8 ft. egg-shaped sewer; (2) In lifting the drainage near the railway station, a height of about 20 ft., by compressed air, having a pressure of about 10 lb. on the square inch above the pressure of the atmosphere, to be admitted into suitable ejectors placed underground near the low-level sewer, and discharging into the same sewer beyond; and (3) In thoroughly ventilating the sewer in sections from end to end by fresh-air down-cast and foul-air up-cast pipes, the latter discharging considerably above the house-tops. If this improvement were carried out, the main sewer would then drain the Westminster and Pimlico districts sanitarily, so far as the combined system will permit this to be done.

Mr. Phillips then stated that, in 1886, the Select Committee of the House of Commons appointed to consider the subject of the drainage of the Palace consulted him as to the best means of improving the same. His chief proposals were the following:—

Firstly.—That while the Metropolitan low-level sewer should continue to be the outfall for the Palace drains and sewers as at present, yet the arrangements for this should be such that neither rain nor flood water, nor sewage and sewage gas, should by any possibility come from the former into the latter.

Secondly.—That inside the Palace main sewer, a small egg-shaped sewer, having a fall of 1 in 212, be constructed of white glazed fire-bricks, and all existing drains be properly connected therewith.

Thirdly.—That at the lower end of the egg-shaped sewer, under the Speaker's Green, the sewage and rainfall of the Palace be continually discharged into the low-level sewer by three of Shone's pneumatic ejectors worked by compressed air produced by three gas engines,—only one ejector and one engine to be used in dry weather, and one or both of the remainder as required during wet weather.

Fourthly.—That the small egg-shaped sewer be ventilated by a fresh-air downcast pipe carried into its lower end, and a foul-air upcast pipe carried from its upper end into the ventilating shaft going to the top of the Victoria Tower.

These proposals were adopted by the Select Committee, and Mr. Isaac Shone, C.E., was appointed by the First Commissioner of Her Majesty's Office of Works the engineer to prepare the drawings and specification, and to superintend the work, and Mr. Phillips was then appointed by Mr. Shone as the resident engineer.

The work was eventually executed in the following manner:—A 12-in. cast-iron main drain, about 1,000 ft. in length, with a fall of about 1 in 212, was embedded in concrete

along the bottom of the old main brick sewer. Two branch 9-in. cast-iron drains, and about 120 separate smaller drains, conduct all the sewage of, and rain falling on, the Palace and grounds, into the 12-in. main drain, which discharges into a receiver at the bottom of a sewage manhole under the Speaker's Green. From the side of the receiver a 12-in. cast-iron inlet-pipe is carried horizontally into the adjoining ejector chamber. This chamber is 20 ft. deep from the surface of the ground, and is 38 ft. long by 13 ft. 6 in. wide in the clear. In it are placed three cast-iron ejectors, one of which is capable of discharging 480 gallons, and the other two 335 gallons each, per minute. From the 12-in. inlet-pipe the sewage is delivered by branch 6-in. cast-iron pipes into the three ejectors. From the bottom of each ejector a 6-in. cast-iron pipe passes vertically upwards into a 12-in. cast-iron horizontal outlet-pipe. This pipe is carried through a solid brick dam, 8 ft. long, built in and entirely closing the old main sewer, and discharging beyond the dam into the outlet portion of this sewer communicating with the low-level sewer, about 1 ft. above the normal sewage flow in the latter sewer.

The compressed air for ejecting the rainfall and sewage from the ejectors is produced by Atkinson's differential gas engines placed in the basement, about 650 ft. distant from the ejector chamber. There are four of these engines of four-horse power each, though one of them is capable of compressing sufficient air for ejecting not only all the sewage under ordinary circumstances in dry weather, but a large amount of rainfall in addition. The compressed air is conducted from the engines by a 6-inch cast-iron pipe to three cylindrical wrought-iron receivers placed near the engine-room, and thence it is conveyed in 6-in. cast-iron pipes along the basement to a subway leading to the ejector chamber. From this pipe a 3-in. wrought-iron pipe conveys it into a small cast-iron horizontal cylinder fixed on the top of each ejector. The ingenious automatic arrangement by which the compressed air is conducted into the cylinders and thence into the ejectors, as well as the arrangements of the ball-valves inside the pipes for admitting and expelling the sewage, were described in detail by the author. The ejectors work, slowly or fast, according to the quantity of drainage coming to them, and they require no other attention than occasionally cleaning and oiling the joints, and the slide and main valves. The moment each ejection is completed the compressed air in the ejector is discharged therefrom by a 3-in. wrought-iron pipe connected with a 6-in. cast-iron main pipe, which leads into the ventilating shaft going to the top of the Clock Tower.

The height the drainage is ejected in dry weather is 11 ft. 6 in., and in wet weather, when the main low-level sewer is in flood, 15 ft. to 20 ft. The air-pressure for ejecting the drainage is maintained at 10 lb. per square inch above the atmospheric pressure, in order to meet immediate requirements for rainfall. About 5½ lb. pressure is sufficient in dry weather to eject the sewage alone. The amount of sewage ejected in dry weather has been tested and found to average no more than 40 gallons per minute, so that a 6-in. pipe would really carry away all the sewage produced in the Palace. This, subtracted from 1,150 gallons, the total ejecting capacity of all three ejectors working together, leaves 1,110 gallons, which is, therefore, the quantity of rainfall they are capable of ejecting per minute, and which would come to them, from the ten acres and a half of roofed and paved surfaces draining from the Palace, at a rate of rainfall equal to 28 in. in depth per hour, or 672 in. in depth per twenty-four hours.

Fresh air is admitted into the subway through two grated openings let into the footway in the Speaker's Green, and is thence conducted into the ejector chamber, and thence into the sewage manhole. From the manhole the air flows up the main 12-in. drain to near its upper end, whence it is conducted by a 12 in. pipe over a furnace in the large ventilating-shaft, going from bottom to top of the Victoria Tower. The 9-in. main branch drain, which is carried under the basement along the west side of the Palace, is also completely ventilated by receiving fresh air into its top end, and discharging the foul air under the furnace at the bottom of the Clock Tower ventilating-shaft. The subway over the 12 in. main pipe receives fresh air from the surface down the old manholes, and

from an opening in the sewage manhole. The air in the subway flows along a 16-in. cast-iron pipe to the ventilating-shaft in the Clock Tower.

These new main drainage works have been in operation nearly six months, and are completely successful. They at once convey away all the sewage produced in the Palace, and the rain falling thereon. There is now no stagnant sewage or foul air in the drains, and consequently no noxious gases arise from them into the building.

The total cost of the works, including the four gas-engines, the three compressed air receivers, the pipings, and the three ejectors, has been a little over 11,500*l.*

Sir Robert Rawlinson, in opening the discussion, said he had been sorry to hear a good deal Mr. Phillips had said. Mr. Phillips laid down a theory with regard to combined drainage, which he (Sir Robert Rawlinson) protested against. He (the speaker) knew of no such system, and had never advocated such a thing. Taking London as it was now drained, there might be some ground for fault-finding, but, on the whole, there was very much to praise. London was an enormous area, and certainly if one had to sewer it *de novo* some points might be usefully considered. In an ideal system, every valley line and valley stream should be rigidly kept as a surface-water channel and as a rain-water outlet. Then the sewage proper should be intercepted from the valley lines, and carried down to some intercepting sewer. But to have laid down a system of duplicate sewers in London would have been a mischievous failure, and he was very glad it had never been carried out. In a place like London, where the river was tidal, and where the main sewers which the Metropolitan Board had carried out would not take the volume of storm water,—there was the river to resort to, and the overflows of extremely diluted foul water would thus be conveyed away harmlessly. With regard to the drainage of the Houses of Parliament, Mr. Phillips had not said one word about all the preliminary reports made on the condition of things. Mr. Phillips knew well that he (the speaker) had had to do with it from the beginning to the end; that he had given evidence before the committee; and that, when asked how the sewage should be dealt with, he had said that if they determined to treat it in the way they had treated it there were three methods that could be followed,—by using gas-engines to lift it, or a common steam-engine, or a pneumatic ejector, worked from the existing boilers below the Houses of Parliament. He had not a word to say against the method Mr. Phillips had carried out, but he had a great deal to say against the allegation that the building was in the condition described. Let the officials of the House speak for themselves, and they would say that it was in no such condition. The cause was to be found outside, in the sewers put in Old Palace-yard, Bridge-street, &c., and their outlet ventilators. The sewers beneath the House were not perfect, certainly, but they could never have caused the amount of stench they were charged with causing, and that the officials would corroborate. Again, as to the cost, he could only pronounce it as monstrous that 11,000*l.* should have been expended upon the work. That amount would have sufficed to drain a population from beginning to end of 20,000 people. He could not understand how they had managed to get rid of the money.

Mr. William H. White (Sec.) next read two letters from Sir Henry Roscoe, Chairman of the Select Committee, speaking in terms of satisfaction as to the sewerage works lately carried out at the Houses of Parliament. A communication from Lieut.-Col. Jones, V.C., who was well known as taking great interest in sewerage matters, and referring principally to the combined and separate systems, would be printed in the "Journal of Proceedings."

Mr. R. F. Grantham said he had had some experience in designing and carrying out the drainage of several towns. He had taken special interest in the separate system, and had carried it out, completely separating the sewerage from the rainfall. With regard to country and small towns, it was all very well to design on the separate system, because an opportunity was afforded of discharging the rainfall into the ditches, but where it had to be disposed of by a mechanical process it made a material difference in separating the rainfall from the sewage. He had had an opportunity of com-

paring the drainage of Romford with that of Slough, the drainage of the latter being carried out on the separate, and the former on the combined system. He found that in the case of Romford the sewage pumped was just four times as much in quantity as that pumped at Slough, showing the great advantage in such country towns of separating the rainfall from the sewage. To think of doing this, however, in a place like London was out of all reason. Mr. Phillips seemed rather to complain of the deficient fall of the Metropolitan main sewer, which he said was about 1 in 2,640 from Chelsea to Abbey Mills pumping station, and proposed to lower the sewer from Charing-cross to Chelsea. He would like to ask Mr. Phillips whether in doing that he would not very much diminish the fall, and make it worse than it now was? [Mr. Phillips: "The sewage would be lifted by ejectors."] In that case he wished to know what would be the size of the ejectors, and their capacity for lifting the sewage at Charing-cross? He agreed with Sir Robert Rawlinson that the expense of the works at the Houses of Parliament had been something tremendous, and that a population of from fifteen to twenty thousand could be sewered for the same amount.

Mr. Harry Newton said that by the method he advocated he followed a totally different principle in dealing with sewage, viz., in trying to exclude all air from it in every possible way, and thus preventing the formation of sewage gas.

Mr. Henry Dawson remarked that it appeared to him that, assuming Mr. Phillips's diagrams correctly represented the facts [Mr. Phillips: "They do"], the constantly charged sewer from the House of Commons must have been the main source of the mischief.

Mr. Edmund Woodthorpe proposed a vote of thanks to Mr. Phillips.

Mr. Henry Curry seconded the motion, adding that the Shone system had been introduced at Eastbourne with very happy effects. The great convenience of that system was that the outfall might be situated at one particular place, and the engine and machinery at another, as at Eastbourne, where it was a mile and a half away, and where it had been of the greatest possible benefit in lifting and getting rid of the sewage at all states of the tide.

After a few remarks by Mr. Atkinson on the mechanical details of the ejectors,

Professor Kerr said he was sorry that Mr. Phillips and Sir Robert Rawlinson should be of different opinions, but it must be a matter of congratulation at the same time that their friends the engineers differed as well as the architects did. The architectural profession was very much indebted to both those gentlemen. He did not wish to undervalue Sir Robert Rawlinson's labours for a moment, but Mr. Phillips deserved great credit for what he had done. They, as architects, were concerned with drainage chiefly within the walls of buildings, or not far beyond them, and they held the engineers responsible for all the mischief that occurred outside, under the streets, and so on. The sewer gas was the engineers',—it was their own penicillar and pet ammoniac (laughter), and architects looked to the engineers to get rid of it. Mr. Phillips seemed to imply that the architect of the Houses of Parliament was somewhat to blame in regard to the drainage, but it should be recollected that at that time of day architects did not know all that they now know [Sir Robert Rawlinson: "Nor did the engineers"]; and if Sir Charles Barry, whom they held in the greatest esteem, displayed some ignorance of what was now known, it was no discredit to him. It was some satisfaction to find that the engineers had at last got, in the form of the pneumatic injector, an apparatus that would enable them to get rid of the sewage whenever they happened to make a mistake, as they appeared to have done in the district of Westminster, in collecting the sewage at a level from which it could not escape. What Sir Robert Rawlinson had said was worthy of admiration as a common-sense way of dealing with the matter, viz., that if the engineers had to deal with London *de novo* they would preserve the water-courses for the water-flow, and confine their engineering to sewage proper. That could not now be done, but he supposed it was a fact that not only Westminster, but certain other districts of the metropolis, happened to lie below the level of convenient sewage disposal. Whether that could be remedied it was a matter not for the

architects, but rather for the engineers, to decide. The engineers were responsible for it, and he hoped they would proceed with a better plan for dealing with the matter.

Mr. Phillips said he must be allowed to express his surprise at the remarks of Sir Robert Rawlinson.

Sir Robert Rawlinson said that he had not in any way intended to disparage Mr. Phillips. They were like the knights of old, and had been each looking at different sides of the same shield. He believed if he and Mr. Phillips could sit down together, there would be no difference between them as to what the latter had called the "separate" system of drainage. Mr. Phillips was far in advance of him in taking up the sewage question, and he (Sir Robert) had learned from him in his early days, but Mr. Phillips had been long lying fallow. He (the speaker), on the other hand, had been in the field, working the whole time, and that under every sort of aspect. He had laid out thirty years ago a system of sewers in West Ham, a district which was as flat as a pancake, with only 3 ft. fall in a mile, and it had worked satisfactorily from that day to this. The population, which was then 36,000, had risen to close upon 200,000, and though there had been additions, not a single yard of sewer had been altered.

The President, in putting the vote of thanks, remarked that Mr. Phillips was the oldest living pioneer of the modern science of drainage. The resolution was then put and carried.

Mr. Phillips, in replying, said he was quite satisfied that if he and Sir Robert Rawlinson were to talk the matter over they would soon agree. He did not advocate that the separate system should be carried out in London, but he affirmed that it was the proper system to be adopted in all new works, a conclusion he had come to nearly half a century ago. In reply to the question about the fall of the sewer, he believed the main low-level sewer had a fall of 2 ft. in the mile. He had suggested that the main low-level sewer should be lowered say 5 ft. The sewage, instead of standing in the sewers of Westminster as it now did, would flow easily away.

The President announced that the next meeting would be held on the 13th proximo, when a paper would be read by Mr. T. G. Jackson on "The Art of Dalmatia."

#### VISIT TO ST. THOMAS'S SEMINARY AND CHISWICK CHURCH. ARCHITECTURAL ASSOCIATION.

The ninth and last Saturday afternoon visit of the Architectural Association for this session was made on Saturday, the 21st inst. The first place visited was the St. Thomas's Seminary, Hammersmith. The members were met by Mr. Bentley, the architect, and the Bishop of Amylea, and conducted over the building, which is designed to accommodate fifty to sixty students, of which number some thirty are now in residence. It is built on the site of a religious house which existed there for many years, and when completed will comprise two complete quadrangles. Only one is at present finished, and in it are placed the dining-hall and kitchens, arranged on the ordinary college plan, and approached from a wide passage, or closed corridor. The common room is fitted up as a temporary library, and the students' rooms and those of the Principal and other officials occupy the remainder of the quadrangle. The chapel forms one side of the future quadrangle, next the Hammersmith-road, and the library, when built, will occupy the other.

The next place visited was Chiswick Church, where the rector, the Rev. Lawford Dale, met the party, and showed the church, which has been almost entirely rebuilt from the designs of Mr. Pearson. The seating is of polished teak; the choir-stalls and screens are of oak.

**Surveying Class, Architectural Association.**—The preliminary meeting to form the class for the study of land surveying and levelling will be held at 9, Conduit-street at 6:30 p.m. upon Tuesday next, May 31. Owing to the annual dinner being fixed for Thursday, June 9th, the field lesson announced in the Brown Book to be held that evening will in consequence be transferred to Friday, June 10.

THE LATE SIR HORACE JONES.

WE announce with much regret the death of Sir Horace Jones, the City Architect, which took place on Saturday last, May 21, at his residence, 30, Devonshire-place. He had only a day previously completed his sixty-eighth year, having been born on May 20, 1819. He leaves a widow and one child,—a daughter. According to the *City Press*, he was born in Sise-lane, Bucklersbury, where his father was a solicitor in practice, which was carried on after the father's death by the elder son, Alfred, who died about ten or eleven years ago. According to the same authority, Horace Jones was articled to Mr. John Wallen, architect and surveyor, in Aldermanbury. Subsequently he spent some time in studying the works of ancient architecture in Italy and Greece, the late Mr. George Vulliamy (Architect to the Metropolitan Board of Works), Professor Hayter Lewis, Mr. G. R. Burcell, and others being his companions. In the year 1846 he commenced practice as an architect at 16, Furnival's-inn, Holborn, and during a period of eighteen years designed and carried out numerous buildings of importance, such as the British and Irish Magnetic Telegraph Company's offices in Threadneedle-street, the Sovereign Assurance office in Piccadilly, the Royal Surrey Music Hall in the Surrey Zoological Gardens [both hall and gardens are now things of the past], Messrs. Marshall & Snelgrove's premises in Oxford-street, completed by Mr. Octavius Hansard after Mr. Jones's appointment to the City Architectship; Messrs. Hyam's premises in Oxford-street, Cardiff Town Hall, Caversham Park, and many other buildings, warehouses, schools, gentlemen's residences, &c. He also held the offices of Surveyor to the Tuffnell Park Estate, the Duke of Buckingham's, the Barnard Estate, Bethnal Green, and others. A vacancy occurred in November, 1863, by the death of Mr. James B. Bunning, in the office of City Architect, and although it was then strongly felt by a large number of the Corporation that the office should not be continued as that of an Architect, and although the Officers and Clerks' Committee in the report adopted that view, and recommended that a "City Surveyor" should be appointed to advise on all matters relating to the City's Estates and public buildings,—architects to be obtained by competition or otherwise for new buildings,—yet it was finally decided by a narrow majority to re-establish the office on its former extensive footing, a right, however, being reserved to the Corporation to employ other architects if they saw fit; and accordingly on February 26th, 1864, out of eleven candidates Mr. Horace Jones was elected Architect and Surveyor to the Corporation of London.\* During the twenty-three years he held the office he designed and carried out a very large number of buildings, amongst the number being the Central Meat Market, in 1868. This was followed in 1875 by the adjoining Poultry and Provision Market, and in 1883 by the Fruit and Vegetable Market, subsequently turned into a fish market; and now a fourth market in Snow-hill is in course of construction. In the year 1871 the old Government Dockyard at Deptford was converted into a Foreign Cattle Market at a very considerable cost, and works are still going on there; in 1877, Billingsgate Market was entirely reconstructed and enlarged; in 1882, the new Leadenhall Market was built, and subsequent additions have been made, and are in course of execution. This makes a total of seven markets which have been carried out from designs of the late City Architect, besides extensive alterations and additions to the Battle Market at Islington. In 1864 Mr. Jones completed the City Lunatic Asylum, Dartford, built from the designs of the late Mr. Bunning, and has since added several other buildings. In this year the design by Mr. Bunning for the new roof of the Guildhall was set aside, and that by the new Architect adopted as being more in accordance with archaeological concavity. Mr. Bunning's design was not without merit. The subsequent restorations of the masonry, windows, &c., were also carried out by Mr. Jones in 1872; the Library and Museum were added to Guildhall from his designs, and in 1884 the new Council Chamber. He also made several designs for remodelling other portions of the premises comprehended under the general head of Guildhall, but these have not reached the dignity of bricks and mortar.

\* See *Builder* for that year, pp. 115, 157, 177.

He designed several police stations in the City,—Bishopsgate-street, with the hospital, in 1867; Seething-lane, 1870; Snow-hill, in 1875; Bridewell, in 1879; Cloak-lane, in 1886; besides police dwellings in Rose-alley, Bishopsgate-street. He also carried out, in 1867, upon a plan designed by Mr. Alfred Allen, chief assistant to Mr. Bunning, but with his own elevation, some artisans' dwellings in Farringdon-road, and, a few years later, the dwellings to the rear of Charterhouse-street, facing Safron-hill. In conjunction with Sir Charles H. Gregory he designed a widening of London Bridge, but the scheme did not meet with the approval of Parliament, and so fell through. In 1887 he conceived the idea of a bascule bridge, to be erected below the Tower, and persistently advocated this idea, until at last, in 1885, the Corporation obtained powers to put the idea into execution, the result being the bridge now in course of construction, Mr. John Wolfe Barry being associated with the architect as engineer. Mr. Jones's last important work was the Guildhall School of Music on the Embankment, and one of his smallest the Keeper's Lodge, in Highgate Wood. So far we have been mainly indebted to the *City Press*, but to this list of works we must add the much-criticised "Temple Bar Memorial."

In 1882, Sir (then Mr.) Horace Jones was elected President of the Royal Institute of British Architects, and held that office for two years; but he was not knighted "on his retirement from that office," as the *Times* erroneously states in its short obituary notice. He was not knighted until last year, the honour being accorded (as we stated at the time\*), "for his distinguished services to the City of London as Architect to the Corporation." Some years ago he read a paper before the Royal Institute of British Architects describing some of his market buildings.

We append a list of those of his buildings which have been illustrated in our pages:—Concert Hall, Surrey-gardens, vol. for 1856, p. 395; Sovereign Life Office, Piccadilly (corner of St. James's-street), 1857, p. 219; New Roof of the Guildhall, 1864, p. 829; Corporation Buildings, Farringdon-road (artisans' dwellings), 1865, p. 485; Smithfield Meat Market, 1867, p. 261; City Library and Museum, Guildhall, 1870, pp. 686-687; New Billingsgate Market (river front), 1874, p. 866; ditto interior view, 1875, p. 188; New London Central Poultry Market, 1875, p. 823; New Fruit and Vegetable Market (since used as a fish-market), Farringdon-road, 1880 (January to June), pp. 70-73; New Council Chamber, Guildhall (interior), 1883 (July to December), p. 728; the Guildhall School of Music, 1885 (July to December), pp. 323, 328; and the Tower Bridge, 1886 (July to December), pp. 24, 25.

Sir Horace Jones had for the past few years held high office in the Masonic body as Grand Superintendent of Works.

At the meeting of the Royal Institute of British Architects on Monday evening, the President (Mr. E. P. Anson) in the chair,

Mr. J. Macvicar Anderson (Hon. Sec.) addressing the meeting, said:—We cannot pass through life without occasionally having painful as well as agreeable duties to discharge. It falls to my lot to-night to discharge the painful duty of intimating to you officially the loss of one who has occupied the position of President of this Institute, and who was one of our most distinguished members. The official intimation of the loss we have sustained is contained in the following letter we have received from Mr. Octavius Hansard:—

"30, Devonshire-place, W., May 22, 1887.  
Dear Mr. White,—With deep regret, at the request of Lady Jones, I have to inform you that my old friend, Sir Horace Jones, the City Architect, and Past President of the Royal Institute of British Architects, departed this life last evening. Will you please to lay this before the Council to-morrow evening, and to announce the same to the General Meeting?—I am, yours truly,  
OCTAVIUS HANSARD.  
W. H. White, Esq., Sec., R.I.B.A."

The familiar presence and genial face of Sir Horace Jones are too fresh, I think, in the memories of all present for us to realise that so recently as on Saturday last the silver cord was broken, and that within the next day or two the mourners will go about the streets. Yet so it is; a career of great public usefulness and utility has thus been cut short. This is not the time, nor the occasion, to enter on a

\* See *Builder*, August 7, 1886, p. 190.  
† See *Builder*, vol. for 1878, pp. 34, 89.

historical notice of his life or works; it will fall to abler hands than mine to do that,—but I should be sorry, if on this the first occasion on which we are met after the death of our friend, we did not express our appreciation of the character of him who has gone, and our deep regret at the loss the Institute has thus sustained. The Council, at their meeting to-day, passed a vote of condolence with Lady Jones, which will be duly communicated to her, and no doubt it will be the wish of the Institute to pass a similar vote that it may go not simply from the Council, but from the general body of the members. The career of Sir Horace Jones, especially to the younger members of the profession, offers the opportunity of drawing lessons of great utility. He was an example of determined perseverance and industry, showing what these accomplishments will produce without external aid. Commencing life at twenty-two he devoted the small patrimony to which he had succeeded to improving his professional knowledge by travelling abroad, in conjunction, I think, with Mr. Ewan Christian and Professor Hayter Lewis. I have often heard both these gentlemen speak of the great pleasure they experienced in the company of Sir Horace Jones on that occasion. On the completion of his travels, and on returning home, he entered for the competition for Cardiff Town-hall, which he won. That was his first work, and while engaged at Cardiff he made the acquaintance of Mr. Crawshaw, the great ironmaster, who, his house near Reading happening to be burnt shortly afterwards, applied to young Jones (as he then was) to meet him on the spot. He did so, and Mr. Crawshaw desired him to rebuild his mansion on an entirely new site. There and then Mr. Jones advised him to do nothing of the kind, but showed Mr. Crawshaw how he could save many thousands of pounds by rebuilding the house on its old foundations. He was appointed architect to carry on the work, which he did successfully, and this was the beginning of a career which to all of us has been so familiar. It is not necessary to refer to his later works. They are works of great utility, and it is much to be feared that the anxiety connected with some of his more recent works may have tended in some degree to expedite his death. I was favoured to-day with the sight of a letter addressed by an old friend of Sir Horace Jones to Mr. Octavius Hansard, another old friend, and by his permission I am allowed to make use of it, because it struck me as being so remarkably well expressed that I would venture to read it to you. The writer says:—

"His professional ability, his strong common sense, his humour, his social geniality, and his varied information, made him a charming companion. His high honour and manly character commanded entire respect, while his warm and loyal heart engaged the affection of those whom he honoured with his friendship. . . . He will leave a worthy monument of his professional honour in the public works he had designed and constructed, and of his personal character in the affectionate regrets of many friends. Personally, I incur most heartily in the expressions contained in that letter, and I am quite sure they will be reciprocated by every member of the Institute (hear, hear).  
Mr. Charles Fowler, who spoke with considerable emotion, said:—As a very old friend of Sir Horace Jones, I venture to propose that a letter of condolence be addressed not only from the Council, but from the Institute generally, to Lady Jones on this sad occasion. I do not wish to add much, for it is quite unnecessary that I should do so, to what the Hon. Secretary has said; indeed, I cannot trust myself to say anything further. I am quite sure that all the members of the Institute who had the pleasure of knowing our old friend appreciated thoroughly his straightforward, honourable, and honest character, his good nature, and his warm kindness in endeavouring to help forward the interests of any of the younger members of the profession who might apply to him. His death has created a vacancy which will not be very soon filled.  
Mr. Henry Dawson.—I think perhaps it may be considered appropriate that I should take the opportunity of seconding the proposition, as I was a strong competitor of our old friend at the time when he applied for the post of Architect to the Corporation of the City of London, inasmuch as I had the privilege of being third on the final list. I have always felt a very considerable satisfaction in my own mind that I did what I could,—seeing that I was not going to be the successful candidate,—to aid in the election of

the successful candidate,—to aid in the election of

our late friend to the post. Since that date, as an old practitioner in the City, and having on many occasions had the happiness of transacting business with Sir Horace Jones, I had the means of knowing him very intimately indeed, and I can therefore agree with what Mr. Anderson has said that his career is eminently one that is fitted to teach good lessons both to the old and young members of the profession, and more especially, of course, to the latter. Of all the energetic and industrious men I have known, I do not think any could surpass Sir Horace Jones, and I can say, from my own experience, that a more straightforward and honourable man I certainly never had had the privilege of knowing. Even when opposed to one, which on some questions he was to me, he was ever determined to do that which was right to both friend and opponent. I think he was a most estimable example, and I have had to express the feeling to many clients, who thought I was very partial towards my opponent, that their case would never be damaged by the admirable manner in which he treated it, always meeting, as he did, with a due regard to the real merits of the question, any representations on the part of the other side. I should like to second the vote of condolence with Lady Jones, and I take it that we shall record our sense of the estimable character of the man whom it has pleased God to take from us, and I trust that those who remain behind will strive to imitate the qualities which he so well displayed.

The President, in putting the vote to the meeting, intimated that he, with the Vice-presidents and members of the Council, had decided to attend the funeral, which was arranged to take place on Friday at Norwood Cemetery, at half-past eleven (leaving 30, Devonshire-place, W., at ten o'clock). The vote was then passed by the meeting.

#### OBITUARY.

*Mr. John Green Hall, F.R.I.B.A.*—We bear with much regret of the death of this gentleman, who had filled the office of City Surveyor of Canterbury for the last twenty-one years. He was about 52 years of age. According to the *Canterbury Press*, he recently underwent an operation for fistula, which was successfully performed, and, although it was followed by extreme prostration, it was thought that the patient was likely to recover. Subsequent complications, however, arose, and resulted finally in blood poisoning, from which, on the 17th inst., death ensued. Mr. Hall was a native of Hampshire, and went to Canterbury on receiving the appointment of City Surveyor in 1866, when he was elected out of over sixty candidates. He was a Fellow of the Royal Institute of British Architects and a Civil Engineer. His chief architectural works in Canterbury were the cemetery buildings, the Roman Catholic Chapel, the Presbyterian Chapel, and the London and County Bank. The new bank buildings now being erected for Messrs. Hammond & Co. from his designs and plans are spoken of as being probably his most important architectural effort in the neighbourhood of Canterbury. He had, however, been architect of churches and other buildings in Yorkshire and elsewhere. His plans for the sewage works at Canterbury, and the system of filtration which he adopted possessed marked originality; and although the site of the works presented many difficulties, the sewage farm has more than realised the expectations formed of it. Mr. Hall always looked upon this as his best professional achievement. He was incessant in his attention to the works until the experience of the first years had proved the success of the system. In his private capacity he was respected and esteemed by a wide circle of friends. The interment took place in the Canterbury Cemetery on the 20th inst., the funeral being attended by the members of the Corporation and a large number of the leading citizens.

*Mr. John Davis.*—One of the oldest of the Birmingham architects, Mr. John Davis, departed this life on the 15th inst., after a somewhat protracted illness. Mr. Davis was articles to Messrs. Drury & Bateman, of Birmingham, and commenced practice at Chester at an early age. For some time he was in partnership with Mr. Hornblower—now of Liverpool. Not meeting with much encouragement at Chester he settled in Birmingham, where at one period he had a somewhat

extensive practice. He was architect of several churches and schools at Birmingham and Kidderminster, several mansions near Birmingham, and numerous smaller works. He was enthusiastically fond of Gothic architecture. Many years ago he made, for publication, some beautiful measured drawings of Temple-Balsall Chapel, Warwickshire. Mr. Davis was verging on his seventieth year. He leaves a widow and large family, and was highly esteemed by all who knew him. Two of his sons are established as architects, viz. Mr. J. Statham Davis and Mr. James Davis, at Birmingham and Walsall respectively.

#### THE ARTISTS' BENEVOLENT FUND.

The twenty-eighth anniversary festival of this Fund was held at the Freemasons' Tavern on Wednesday night, Mr. L. Alma-Tadema, R.A., presiding. The Fund was established in 1810, received in 1827 a charter of incorporation from George IV., and now enjoys the patronage and support of the Queen. It consists of two divisions,—the Artists' Annuity Fund, raised and wholly supported by the contributions of its members, for their own relief in sickness and old age, and which neither asks for nor receives public support; and secondly the Artists' Benevolent Fund, which is purely charitable, having for its object exclusively the relief of the widows and orphans of members of the Annuity Fund who are left in need. The latter branch is supported by the donations and subscriptions of patrons of the fine arts, and annual subscriptions of the members of the Annuity Fund. During the past year forty-eight widows and seventeen orphans have received annuities amounting in the whole to 1,076*l.* Amongst the company, which included ladies, were:—Sir F. Leighton, P.R.A., Sir J. D. Linton, P.R.I., Sir Rutherford Alcock, Mr. Lumb Stocks, R.A., Mr. Marcus Stone, R.A., Mr. C. B. Birch, A.R.A., Mr. John Collier, Mr. John Absolom, R.I., Mr. W. Cave Thomas, Mr. Geo. Godwin, F.R.S., and Mr. C. Cattermole, R.I.

The Chairman, in proposing "Prosperity to the Artists' Benevolent Fund," said that it was the duty of those in a position to do so to help their poor and distressed brethren in art, and then made an appeal to all who had the interest of the Fund at heart to avail themselves of this annual opportunity of helping it and maintaining its prosperity.

Mr. George Godwin, F.R.S., Vice-President, who responded, said it was a mistake to suppose that this was merely a benefit society, for it assisted widows and orphans, and enabled young artists starting on a most precarious profession to provide for a rainy day. In conclusion, Mr. Godwin proposed the health of the Chairman.

The Chairman briefly replied, and next proposed "The Royal Academy," coupled with the name of the President.

Sir F. Leighton, in responding, said that he fully appreciated the excellent work done by Artists' Benevolent Fund. It was impossible that an artist should fail to regard with respect and esteem the work of a body which, while it administered to wants of which only an artist could measure the full extent and the bitterness, at the same time succoured only the provident and the survivors of the provident, and by that means offered an incentive to prudence and thrift. A distinctive feature of the Artists' Benevolent Fund was that in dispensing aid to widows and orphans it recognised only the survivors of those who, during their life time, had, in however small a degree, contributed to the fund; so that it might be said that a moral influence as well as material aid emanated from the Institution (hear).

The Hon. John Collier proposed "The Royal Society of Painters in Water-Colours and the Royal Institute of Painters in Water-Colours," the toast being acknowledged by Sir J. D. Linton, who, in return, gave "The President and Members of the Artists' Annuity Fund," for which Mr. T. H. Maguire responded.

Other toasts followed, and subscriptions and donations amounting to about 500*l.* were announced.

**The National Liberal Club.**—Referring to our description of the new Clubhouse for the National Liberal Club in last week's *Builder*, we are asked to mention that the Westmoreland Green slates used were supplied from the Tilberthwaite Green Slate Quarries, Coniston.

## Illustrations.

### AMERICAN HOUSE ARCHITECTURE.

**M**E give three examples from photographs of modern street and house architecture in the States. The residence, designed by Messrs. Cobb & Frost, for the lake shore at Chicago, is a house that in regard to its general style and architectural treatment might as well have been met with in England, and perhaps is not what would command very great admiration on whichever side of the water it was met with; the style is rather coarse and heavy, but it is a large and important dwelling-house, with a certain dignity and massiveness about it. The front of the Club-house at St. Louis, by Messrs. Peabody & Stearns, is an example of the Richardsonian order of architecture, Mr. Richardson having apparently succeeded in creating a style which others are willing to follow, just as Mr. Norman Shaw has done in England. The business premises designed by Messrs. Cabot & Chandler show something resembling recent architectural fashion in England, in the treatment of the projecting bays, but with a difference of detail.

### SUNNINGDALE CHURCH.

This church seems to have been built about fifty years ago. It consisted of a plain oblong with some excrescence at the east end. A new chancel was added by Mr. Street some time since, together with a north chancel aisle and a vestry.

The church is now to be completed by the erection of a nave, aisles, and transepts, with a central tower and spire, at a cost of about 7,000*l.*

Mr. J. Oldrid Scott, F.S.A., is the architect, and Messrs. Norris & Son, of Sunningdale, the contractors. The work has just been begun, and it is expected that the first stone will be laid by the Prince of Wales early in June.

### SKETCHES IN SHROPSHIRE.

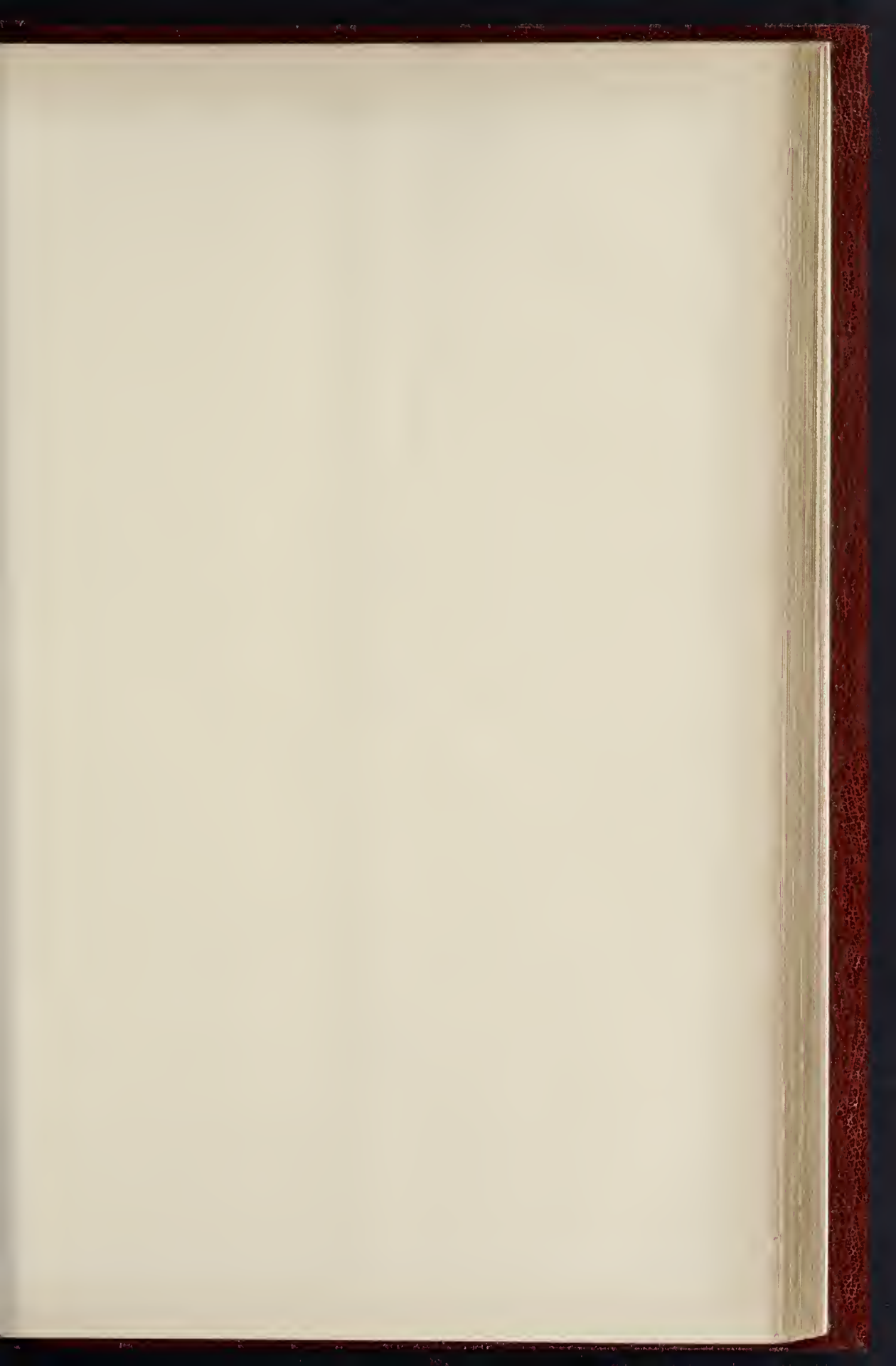
For the seeker after English Domestic work in all its developments, from Norman Border keeps to fantastic timber houses of the sixteenth century, there is no happier hunting-ground than Shropshire. Remoteness from any of the busy centres has kept it out of reach of the tide of "modern improvements." The examples illustrated this week are all from the Welsh Border district.

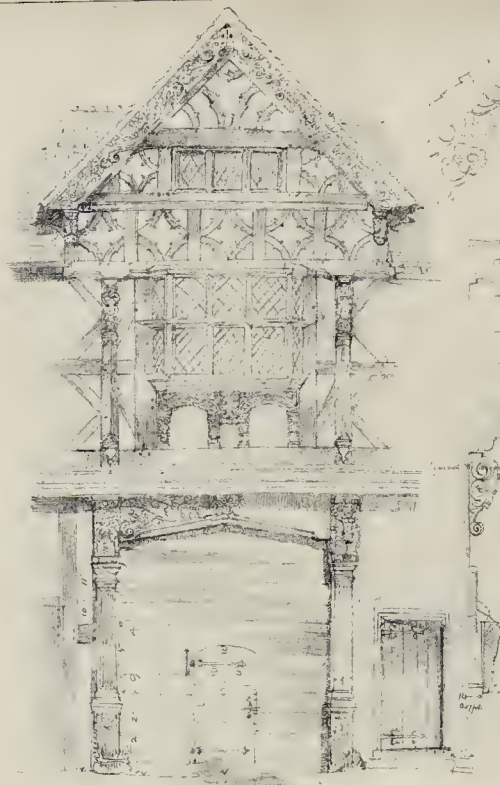
Stokesay Castle, of which a north-west view and the interior of the great hall are given, is the most complete thirteenth-century dwelling-house left in England. Originally simply a moated residence, it was later on made more defensible by the addition of two towers, one still remaining, the other pulled down and replaced by the projecting half-timber solar room seen at the further end on the sketch. The tracery windows, with gables over, light the great hall. Those on the courtyard side are similar. One of the rooms has a beautiful oak chimney-piece and wall panelling of the sixteenth century. At that time the lodge also was added, and a sketch is given of its central gateway on the side next the courtyard. Another similar gateway, from the Guildhall at Shrewsbury, illustrated, is interesting as showing the different treatment of the same subject, evidently, from the likeness of detail, by the same designer.

Park Hall, near Oswestry, is a fine example of a late sixteenth-century manor-house. It is U-shaped on plan, the porch and gables shown occupying the centre. The end wings have wider gables of the same pitch, and similarly treated to those at the porch, and the same ornamental pilasters and diapering are continuous along the whole front.

HENRY D. WALTON.

**Cart Horse Parade.**—This year the parade of cart horses, which was very successful last year, will be held at Olympia, Kensington, on Whit-Monday. In the great arena all the selected teams will march past in procession, and eventually receive their prizes at the hands of the Baroness Burdett-Coutts, together with diplomas from the Royal Society for the Prevention of Cruelty to Animals. There will also be a show of tradesmen's horses. Shows such as these no doubt tend to make carters and vanmen take a kind and intelligent interest in their animals.





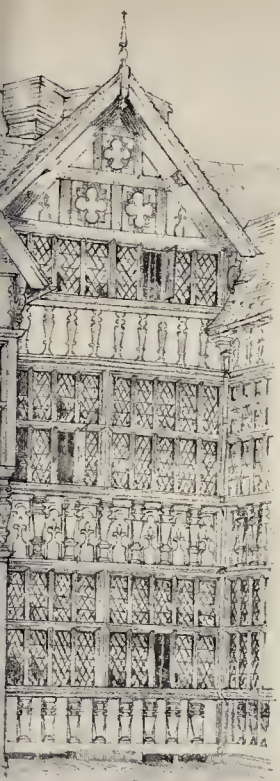
ENTRANCE TO THE COURTYARD, STOKESAY CASTLE.



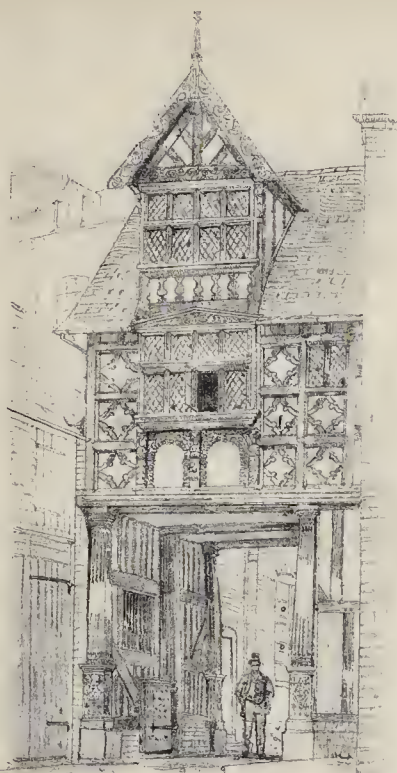
Stokesay Castle  
Shropshire

west





I, PARK HALL.



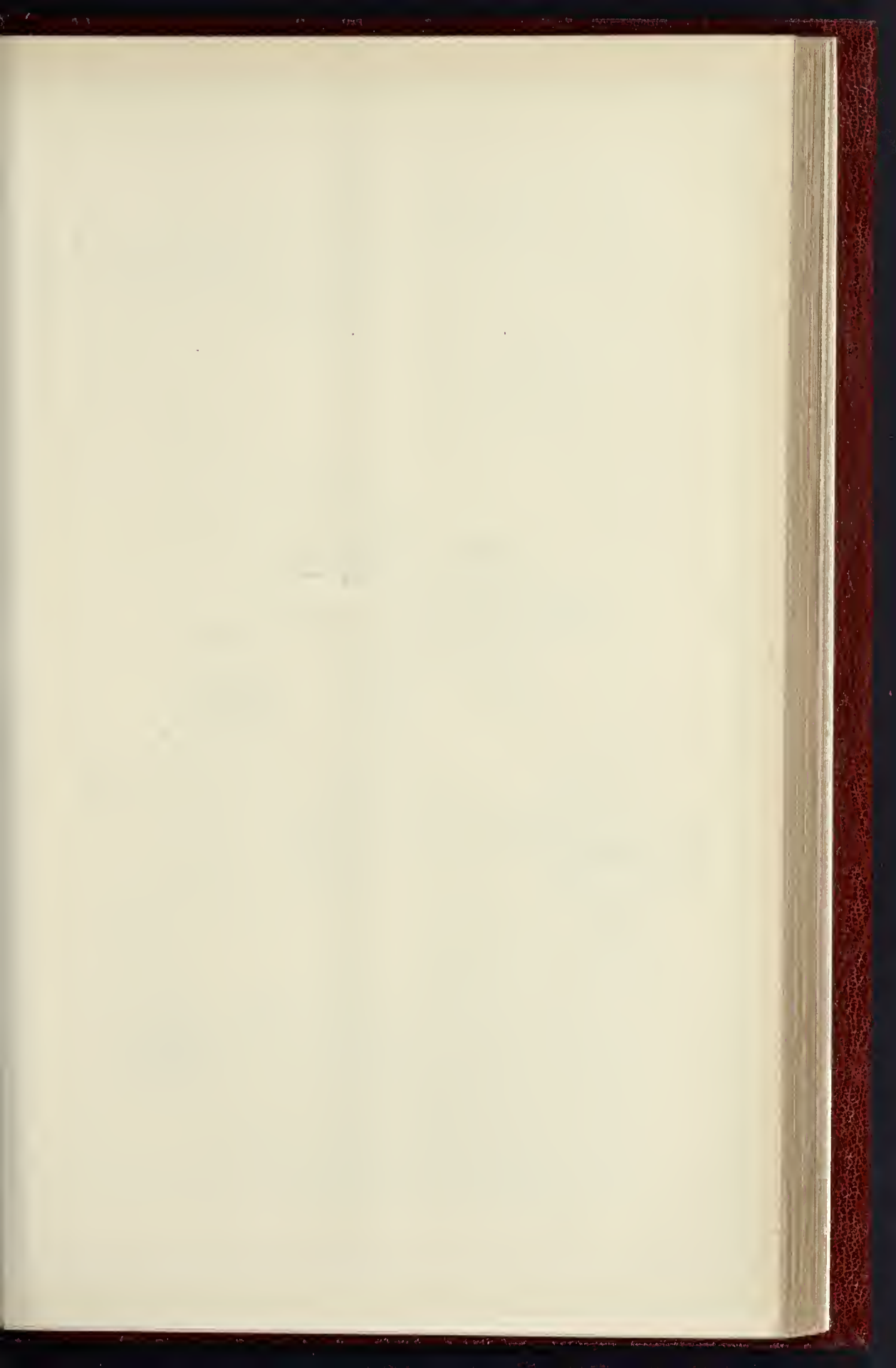
ENTRANCE TO THE OLD GUILDHALL, SHREWSBURY.



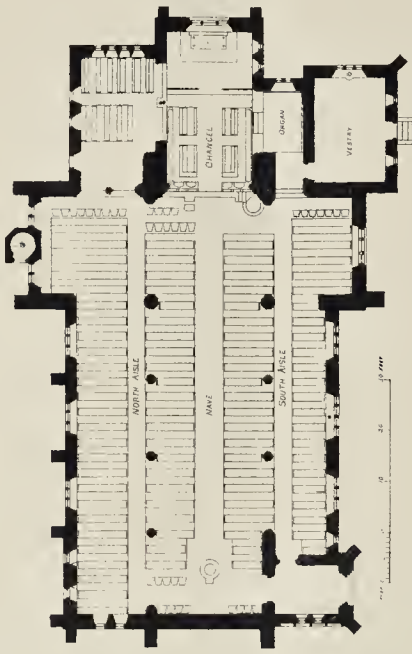
INTERIOR OF THE HALL, STOKESAY CASTLE.

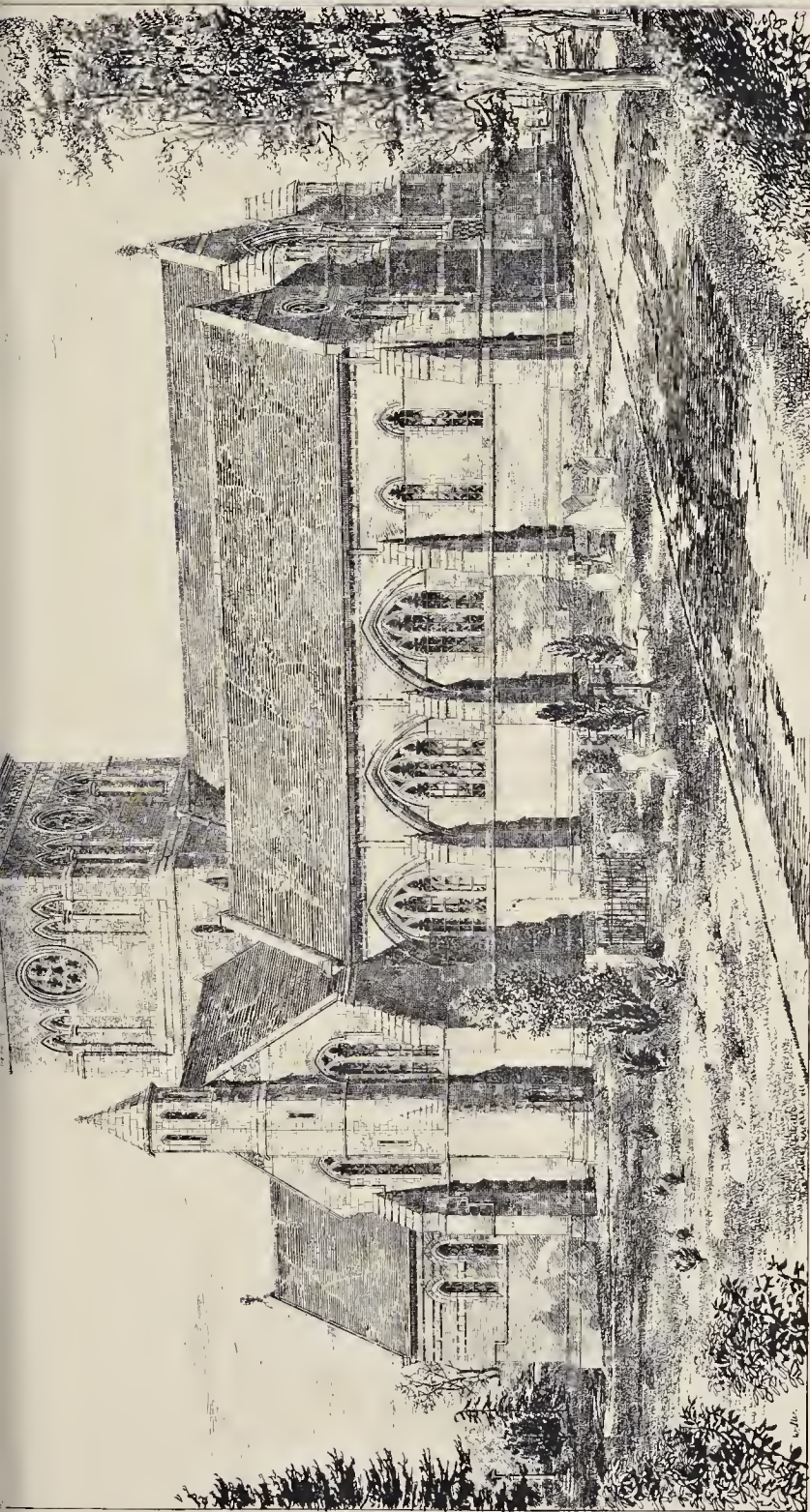
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THE BUILDER, MAY 26, 1887.





C. F. Bell Photo Lith & Printer

SUNNINGDALE CHURCH.—Mr. J. Oldrid Scott, F.R.I.B.A., ARCHITECT.

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THE UNIVERSITY OF CHICAGO

## CHAINS.

At a recent meeting of the Civil and Mechanical Engineers' Society, Mr. Henry Adams, M. Inst. C. E., read a paper, of some interest to builders and contractors, on "The Use and Care of Chains for Lifting and Hauling." He divided chains into two classes, those with oval links and those formed of flat bars or plates; the former were again subdivided into "common" and "short-linked" chains. The latter, being of the most importance, received the principal attention; it was pointed out that the links being well rounded, each one acts as a spring when the load surges, and hence their universal adoption for lifting purposes. The dimensions of the links are for the extreme length and breadth  $\frac{1}{2}$ " and  $3\frac{1}{2}$ " times respectively the diameter of the iron of which the link is made. In repairing or joining a chain the new link has to be made a little longer, to give room for welding, as there are two others in it instead of one, as in making a new chain. The various modes of welding were then described, and the peculiar tendency of some chains to twist while in use. The different heaves in use according to circumstances were shown upon the diagrams, the diameter in any case being not less than thirty times that of the chain-iron. The loose end of the chain should have a swivel, either separate or as part of the hook, and all cranes, except coal cranes, should have counterweights. In these cases, as the tubs have to be pulled from under the hatchway coamings, no counterweight is admissible. Several illustrations of chain-fastenings were shown and described, and the modern forms of hooks and shackles were contrasted with those thought to be "nice" some years ago. Lookeye sheaves and other supports, chain oxes for cylinder ends, and the best position of the machinery for cranes and hoists, were described, and reference was made to Mr. Vestmacott's patent cupped drum-gearing for ranes, captains, and gate engines. Turning hains next came under review, and the various methods of connecting them to the rane. Stud-link chains, being used only on ships' cables and mooring purposes, were passed over with only one remark, that as the nose of the stud was to prevent the chain getting kinked, and that it added slightly to the strength for a steady pull by keeping the link in shape. The strength of chains received very little notice. It was shown that with Crown C iron of B B quality, equal to an average tensile stress of 26 tons per square inch, an elongation of 15 per cent., and a contraction of 20 per cent., the chain would have a strength of double this, because two sides are acting, or one side with a leverage 2 to 1; but there is usually a loss of 25 per cent. from imperfect welding and other causes. Several defects in welding were explained, and specimens of an interesting collection of defective links were handed round. From a large table of results we select the following,  $d$  being the diameter of iron in  $\frac{1}{2}$  in.—Breaking weight in tons short-linked crane chain =  $\frac{1}{2}d^2$ ; Admiralty roof strain in tons =  $\frac{1}{2}d^2$ ; safe load for ordinary cranes in cwts. =  $\frac{1}{2}d^2$ ; safe load for all cranes in cwts. =  $\frac{1}{2}d^2$ ; weight in lb. per fathom =  $d^2$ . The proof test is made upon lengths of 15 fathoms each, the breaking stress upon 4 ft. lengths. The author then described in detail the system adopted for the care and maintenance of the chains at Messrs. Cory & Son's coaling establishments, where he has been responsible for chains which have lifted upwards of 15 million tons of coal in the last ten years, and during that period only one fatal accident occurred on a chain breaking, although the machinery is at work day and night, and the men necessarily work under the cranes. The inspection and lubrication are very thorough, and the chain will make about 100,000 lifts before it is worn out for lifting purposes, it is then cut into sling chains, large moorings, &c., as there are still many years of useful life in it. In hotels, warehouses, and large offices, much damage is done by the servants sweeping the dirt off each floor into the hoistway, the dirting the chain like emery. Coal dust is very detrimental to chains, but coke dust is ideally bad. Sling and fall chains used in the erection of machinery and buildings are always used dry, for various reasons. They should be put through a wood fire, and annealed on every large contract, or, say, every two or three, and carefully examined by a skilled man

before being taken into use again. In summarizing the points of economy in the maintenance of chains, the author said the testing should be moderate, the annealing frequent, the lubrication thorough, and when the wearing is not uniform throughout the length, the chains should be cut and pieced when partially worn, so that when finally discarded, each link shall have done its full share of work without overstepping the limits of perfect safety.

An animated discussion took place, in which the President and several members and visitors joined, and the proceedings closed with a vote of thanks to the author for his excellent paper, and for the large collection of diagrams and specimens by which it was illustrated.

## CIRCULAR AND BAND SAWS.

In a very interesting paper read at a recent meeting of the Institution of Civil Engineers by Mr. Lewis H. Ransome, of the firm of Allan Ransome & Co., the author gave the results of his observations during a recent visit to the chief timber-producing districts of the United States. He dealt chiefly with the pine-growing forests of the Saginaw Valley in Michigan, and after describing the general arrangement of the saw-mills, went on to consider the merits of hand-saws as against circular saws for the conversion of timber.

Mr. Ransome discussed the question from four points of view, viz.—1. Rapidity of Production. 2. Quality of Work. 3. Power Consumed. 4. Waste of Wood.

In rapidity of production the circular saw has at present a decided advantage, producing on an average in white pine 50,000 square feet of lumber, 1 in. thick, in a day of ten hours, while the hand-saw in the same time turns out on an average about 35,000 ft. It should, however, be borne in mind that the circular saw, having been in use for so many years, has probably reached its utmost limit of production, while, on the other hand, the band-saw, having been but recently introduced for this purpose, is capable of considerable further development. This assumption is confirmed by the fact that a band-saw mill of the most improved construction has been known to produce as much as 52,000 ft. in a day of ten hours, the produce of 102 logs.

As regards quality of work, this advantage is undoubtedly on the side of the hand-saw, for whereas it is practically impossible to run a large circular saw at a high velocity without a certain amount of vibration, which naturally produces a somewhat rough surface, a hand-saw, being packed immediately above and below the cut, passes through the log in a straight line; and, moreover, as the teeth of a band-saw are considerably finer than those of a circular saw, they produce a smoother surface.

Owing to the question of power being so little considered in America, and to the fact that the application of the hand-saw for logs is comparatively new, no authentic tests as to the power required by the latter machine have as yet been made with the indicator; but by comparing the engines usually employed to drive both the hand and circular mills, an approximate idea on this point may be arrived at. To drive a circular-mill with a 6-ft. saw, an engine with a cylinder 18 in. in diameter, an engine-travel of 500 ft. per minute, and an average pressure on the piston of 40 lb. to the square inch, is generally employed. Such an engine develops 154 indicated h.p. To drive a full-sized band-mill, an engine with a cylinder 12 in. in diameter, working under similar conditions as to piston-speed and average pressure, is recommended. This would develop about 68 indicated h.p., or considerably less than one-half that required to drive a circular-mill.

The last, but certainly not the least, important point, is the question of waste of wood; and here again the band-saw gives by far the best results. The amount of wood lost in saw-dust per cut by a circular saw is  $\frac{1}{8}$  in.; therefore when producing boards 1 in. thick the waste is 24 per cent. A band-saw at most wastes  $\frac{1}{16}$  in. per cut, or, when cutting 1-in. boards, 11 per cent. Again, to make a board, cut by a circular saw, when planed on both sides, hold up to  $\frac{1}{8}$  in., it must be cut 1 in. thick; i.e.,  $\frac{1}{8}$  in. must be allowed on each side for planing; while, on the other hand, owing to the superior cutting of the band-saw, it is only necessary to allow  $\frac{1}{16}$  in. on each side for planing, showing an additional saving of  $\frac{1}{16}$  inch

per cent. This gives a total saving of  $\frac{1}{4}$  in. per cut by the use of the band-saw.

The foregoing calculations apply to timber of such a size as can be converted by a circular saw 6 ft. in diameter; but for larger logs it is necessary to employ an overhead-saw, and as the tracks of the two blades never exactly coincide, the hoards thus sawn show a joint, which necessitates a still further waste of wood. This objection does not apply to the hand-mill, which will saw through logs of any diameter.

From the above considerations the author concludes that for the conversion of pine logs "the balance of advantages lies distinctly with the hand-saw"; but in the case of harder, smaller, and more valuable timber, the benefits to be derived from its use would be very much increased, and he considers it to be the machine which will supersede the circular saw.

## BRITISH ARCHEOLOGICAL ASSOCIATION.

At the meeting of this Association on Wednesday, May 18th, Mr. W. H. Cops in the chair, it was announced that the President of the approaching Congress at Liverpool, Sir J. A. Picton, had fixed the date for commencement on August 15th.

Mr. Loftus Brock, F.S.A., reported the discovery of a portion of Old London wall, which had served partly as a foundation for the houses on the east side of Wormwood-street, Aldgate, now removed. The wall is of fine Roman work, having a chamfered plinth of dark brown ironstone, various bonding courses of bright red brick, and facework of squared Kentish rag-stone. Nearly opposite the Synagogue in Bovis Marks, the foundations of a circular bastion have been met with. It is not bonded into the wall, showing that it is of later date. It is formed almost entirely of worked freestone, evidently taken from other buildings, as if for its erection in haste. In the discussion which ensued, Mr. Thos. Blashill referred to other examples of additional defensive works being added to earlier Roman works, for strength in a military sense.

Mr. Howlett exhibited several fine heraldic paving tiles, bought at Croydon, and probably obtained from either the old Palace or the Church. One bears the date 1303, in Latin numerals.

A paper was read by Mr. Loftus Brock on certain sculptured stones of Pre-Norman date, in various churches which were inspected during the recent Durham Congress. After detailing the efforts made by the Association to direct attention to the remarkable class of monuments referred to, which have now been met with throughout Great Britain and Ireland, the lecturer passed in review the various examples inspected on the occasion referred to. Apart from the fine collection at Durham, the principal objects were seen at Gainford, Dinsdale, and at the neighbouring ruined church at Sockburn, although almost every church in the district appears to have some relic of the same kind. They consist of fragments of crosses, shafts, and panels filled with elaborate interlaced work of a class which was but little understood a few years ago, except to a few investigators. Some of the examples at Auckland resemble thirteenth-century work in the beauty of their elaborations, and many examples must have been executed by a chisel.

In the discussion which followed, Mr. de Gray Birch referred to the resemblance of their patterns to those of the Saxon MSS.

**Association of Municipal and Sanitary Engineers and Surveyors.**—A Home Counties District Meeting of this Association is to be held at Portsmouth on Saturday next, June 4th. Arriving at Portsmouth (Town Station), the members will proceed to the Council Chamber, High-street, kindly placed at the disposal of the Association by the Mayor, where, at 12½, Mr. Boulnois will read a short paper descriptive of the drainage works of Portsmouth recently carried out by Sir Frederick Bramwell. At 1-0, a visit will be made to the works, where the members will be entertained at luncheon by Messrs. Mowlem, the contractors. They will subsequently visit the Town-hall works, to be shortly described by Mr. Boulnois.

"A STUDENT'S NOTES ON GLOUCESTERSHIRE."\*

In these days, when the opportunities for travel are generally limited to a matter of a few weeks, it becomes an important question how the time can be used to the greatest advantage. It is no longer possible in most cases to do as our architectural predecessors used to do,—go abroad for two or three years after they had finished their time in an office, and so get an extended knowledge of the world before settling down finally; and so we have to be contented with shorter trips, and are forced, very fortunately I venture to think, to turn more to our own country. No doubt the Continent possesses great attractions, especially as regards colour, but some of our own architectural districts, although they may be surpassed in scale, are not to be equalled in many respects by the more pretentious foreign examples.

Of the many portions of England which are worthy of a visit, some are well known, such as Northamptonshire, Lincolnshire, Yorkshire, &c. Others are comparatively unknown, and the county of Gloucester is, I think, one of these. I say "county" advisedly, because no one will deny that Tewkesbury Abbey and Gloucester Cathedral are quite household words to the student. When I had the honour and good fortune to be elected the Travelling Student of the Association last year, it occurred to me that there was an opportunity to explore a fresh field. I had long had a wish to see Evesham and Pershore, and to refresh my slight knowledge of Tewkesbury Abbey, and finding in a little handbook of ecclesiology that Gloucestershire was "remarkable for the fine architectural features of its churches, and exhibits excellent specimens of every style, from Norman to Third-pointed," I came to the conclusion that I could not do better than take Gloucestershire as the field for my six weeks' study. And, looking back now at the end of a year, I feel I could not have chosen a much better place. With almost uninterrupted fine weather, some of the prettiest rural scenery in the country, and the endeavour of all whom I came across to give every facility for making my stay successful, I can truly say that it was the most delightful experience I have ever had, and my only regret is that I cannot transmit more of it to you this evening.

Having settled the part in which I was going to travel, the next thing was to find out from various sources all the particulars I could. In a comparatively short time I had brought together a sufficiently large list to make me certain that the whole could not be done in the six or seven weeks at my disposal: so, as the time could not be lengthened, the list had to be shortened. I therefore endeavoured to choose those places which would give me the best idea of the architecture, both ecclesiastical and domestic, of the county. Fortunately there was only one cathedral town, and that I decided to avoid. I say fortunately, because cathedral towns are so fascinating generally that one is tempted to spend time on them which is often better spent on places of smaller size. Gloucester, in fact, is the centre of a good district of its own, and requires almost a special trip. In the end, I settled on the scheme to be followed. I generally made use of the railway lines, only going across country in one or two places where necessary.

Leaving London, I went direct to Chipping Campden, where I made my head-quarters for a week, and found the time all too short. Under the influences of the bracing air on the spur of the Cotswold Hills on which this old town stands, and the wealth of architecture, chiefly domestic, which is to be found there, my first impression of Gloucestershire realised all my expectations. From Campden I went to Evesham, and from hence until I reached Tewkesbury, my travels were chiefly in Worcestershire, and I went over some of the ground which the Association visited in 1881. I will not dwell upon that part of my trip now, leaving one or two points which I wish to notice until later on, but will pass on to Tewkesbury, where I stayed a fortnight. From hence I visited Deerhurst, Bredon, Cleve, and other places. Then from Tewkesbury to Cheltenham, and afterwards to Stow-in-the-Wold, having completed a rough circle. My object, as I said before,

\* A paper by Mr. Roland W. Paul. Read before the Architectural Association on the 20th inst., as elsewhere mentioned.

was to avoid Gloucester; so, instead of going back to Cheltenham, I drove across the back of the Cotswolds to Northleach, and afterwards on to Cirencester. On leaving Cirencester I found that both time and money were getting short, so I left Fairford and its stained glass for a future occasion, and recrossed the county to Berkeley. After Berkeley came Chipping Sodbury, and this was my last centre, and after seeing some of the places of interest round it, I left for Bristol, and so came out of the county at the opposite end to that at which I had entered it, and having visited, I think, most of the important places, although, of course, there was a vast deal more to see if I had had time to spend over it. Such, gentlemen, is a rough outline of my tour, and I will now endeavour, as well as I am able, to describe some of the places more in detail, with the aid of the drawings and plans exhibited on the walls.

I must now ask you to go back to the beginning again, namely, to Chipping Campden. I said before that it came fully up to my expectations, and I certainly was lucky in choosing it as my first stopping-place. It has every attribute of a good centre,—a comfortable inn, a good church, a town chiefly composed of one long broad street flanked by houses dating from the fifteenth to the seventeenth century, with a few modern ones, a fine situation on high ground, many places of interest within easy reach, and last, but not least, people who are hospitality personified, including the vicar, to whom my thanks are due for lending me the embroidery I am able to show you to-night. The first thing one generally does is to inquire "Which is my nearest way to the church?"—not that it was at all necessary here, as the church stands boldly up at one end of the main street and possesses one of the finest western towers in Gloucestershire. The church is entirely of fifteenth-century date, with the exception of the inner south door and a portion of the south aisle wall, which are Early English. The only other relic of the earlier church is a portion of a very beautiful font, which at some period has been cut in two and the surviving half has been built into a pier in the south aisle. Other objects of interest are the brass lectern, dated 1618 (and a very good specimen of the kind), a Jacobean pulpit, and, what is decidedly the most interesting, some very fine embroidery, which I am able to show you. It is probably an altar frontal, and measures 12 ft. by 3 ft. 10 in., the ground being of cream brocaded silk powdered with pomegranates, and with an elaborate representation of the Assumption of the Virgin in the centre. Two other pieces having the same patterns are still at the rectory. The western tower of this church bears some slight resemblance to the tower of Gloucester Cathedral, and is chiefly remarkable for the curious way in which the centre pinnacle is hrought down and forms the finial of the western doorway.

But the student visiting Campden will probably be most interested in the Domestic work in which it is so rich. This, as I said before, includes examples dating from the fifteenth century. Of this date is a very fine old house in the main street, which possesses, almost in its original state, a very good two-storied bay-window, the whole house being very similar to many to be seen in Somersetshire. There are one or two other remains of the same date in the town, but the larger number of houses date from the seventeenth century, and seem principally to owe their existence to the building propensities of a Lord Campden. Of these there is, firstly, the manor-house, now in ruins. One or two angles of the main building remain above ground, and on its south front ran a raised terrace with a pavilion at each end. These pavilions remain in a very perfect state, and are well worth a lengthened study,—larger than I was, unfortunately, able to give them. Inside are some good plaster cornices and oak panelling. Besides these pavilions, the entrance gate to the mansion is still standing, but though the lodges are picturesque, the central part, with the entrance, cannot be called happy in design. A little distance from the lodges are twelve almshouses, making with them and the church one of the most picturesque groups I have anywhere seen. They are remarkable for their good proportion and for an entire absence of unmeaning ornament, and the details are all very good and effective. Another building of the same date,—1624,—is the old market-house, which stands in the centre of the main street. It is a rectangular building with open

arcades, and a row of octagonal pillars down the centre, supporting an open-timber roof.

We will now pass on from Campden to Evesham and Pershore. I shall not attempt to describe these places, as it would occupy too much time, and they are both known to many of you. But there are one or two places near them to which I would call attention. Firstly, in the neighbourhood of Evesham, is the village of Hampton,—only, in fact, about a quarter of an hour's walk from the town. The church here is worthy of notice, as being a perfect specimen of a small fifteenth-century church. It consists of a nave, central tower, and chancel, and its plan at first sight is very suggestive of its having been built on Norman foundations. However, nothing earlier than the Perpendicular period is visible. The south porch of the nave has a stone-ribbed ceiling of plain but effective work. Inside we find the central tower has stone vaulting, and there are traces of where the roof-screen existed on the tower piers. These piers have immense chamfer stops, about 4 ft. from the ground, and are the only features which strike one as being out of proportion to the rest of the building. There are here in the windows, and again at Wyre, near Pershore, some bits of contemporary stained glass, and it always strikes one on seeing these bits how very easy it is to get a satisfactory effect by simple means, instead of that elaboration with which we so often see the upper portion of a modern window treated, and generally with such unsatisfactory results.

Another church, a little further from Evesham, is Sedgeborough. This, like the one at Hampton, is all in one style,—in this instance that of the fourteenth century. Its plan is a simple rectangle, without any mark externally of the division between nave and chancel, and instead of a square tower it has at the west end a very elegant octagonal turret crowned with a spire. The window tracery of this church is very beautiful, and there is one piece of stained glass which is said to represent the founder, and as he is holding a church, the suggestion seems probable. Before its restoration the church possessed the lower part of a roof-screen, but this has been replaced by a modern screen, which strikes one as being much too high for the church. There is still lying in the churchyard a fine gable cross, which has been replaced by one of modern work,—a change not altogether for the better.

The only object I would draw your attention to at Pershore is a piece of screen-work now in the south transept. It consists of a piece of woodwork, having four traceried panels with elaborately-carved spandrels and cusps, and over it is a curious inscription.

Near Pershore is Besford, which possesses a curious little church entirely of wood (with the exception of the chancel, which has been rebuilt in stone). Inside is a portion of the roof-screen, the pannelled front retaining its old colouring. About three miles distant, across the river Avon, is another village, Strensham, which possesses a painted roof-screen, which should on no account be missed.

We now come into Gloucestershire again at Tewkesbury. The abbey, as I have before said, requires no description from me. I shall again draw your attention more particularly to two or three villages which you ought to see if you make Tewkesbury a centre at any time. The nearest of these places is Deerhurst, well known on account of its recently-discovered Saxon chapel. There was a priory here, of which some traces still exist near the church in a farm-house. The church itself has been mutilated, the chancel having been destroyed, but it possesses some very beautiful arcades of Transitional Early English work, with an interesting series of carved caps, illustrating very completely the gradual growth of the Early English foliage out of the Norman cushioned form. Besides the arcades are some fine decorated windows, a very fine Saxon font covered entirely with cable ornament, and some bits of stained glass, of which the St. Catherine is perhaps the best. Attached to the Saxon chapel, which is at some little distance south-west of the church, is a very elegant specimen of half-timbered work known as Abbot's Court, and as this kind of work is not very prevalent in the county, this specimen is particularly interesting.

A few miles north of Tewkesbury is Bredon Church, which is perhaps one of the most interesting of the places I visited. It is, strictly speaking, in Worcestershire, but only



just over the border. The ground-plan of this church is very curious, and at the same time is useful as showing how a church could be added to at random without affecting the ritual, as compared with the present more general use and planning for congregational purposes. We have here the old Norman central tower, and the walls of the nave, left. The side walls were pierced in the thirteenth century on the south side for a chapel, and again in the fourteenth century for a north aisle, and at the same time the chancel was reconstructed and the tower raised. This was crowned with a lofty spire in the fifteenth century. Perhaps transepts were meant to be added, but they were not built, and this has left the ground-plan of the building very much in the shape of a tadpole, excluding the people who sit in the aisles from a view of the chancel. The chancel is probably the most interesting part of the church. The first object that strikes the visitor is a large number of armorial tiles, which no doubt were formerly in the floor, but are now placed in the risers of the steps,—a very good way of preserving them from the constant wear, but rendering it rather a difficult matter to take accurate copies of them. I think these tiles are generally considered to be one of the finest collections in England, and they are interesting as dating from before the foundation of the College of Heralds. They are probably of early fourteenth-century date, and include the arms of a great number of the principal families of that time. In all I was able to find thirty-four shields, of which I exhibit a few. Besides the tiles is a curious monumental stone on the south side of the chancel, an Easter sepulchre on the north side, and a piscina with a window immediately behind it, not glazed, but only separated from it by a shutter, which still remains. The tower arches are Transitional from Norman to Early English, and there are three fine Norman doorways on the north-west and south sides of the nave. The west front is very imposing, and is flanked by large square turrets crowned with spires and arcaded. The west window is later in date. Not far from the church is a very fine tithe-barn, with a chimney worth noticing on one of the entrances.

Another church, which is, however, nearer Cheltenham, is Cleve. Going from Tewkesbury you pass Ashchurch, where there is a fine wood-screen of good preservation. I had here the first experience, and the only one, of being prevented from sketching. The clergyman was, unfortunately, away, and the man in charge offered to show me round, but declined to allow me to sketch, and, moreover, the thought that it might be "squared" had to be abandoned. However, I have no doubt that at some future time I may be able to get a drawing of the screen, which is a very fine specimen of its kind.

Cleve, or Bishop's Cleve, is an extensive village about four miles from Cheltenham, the nearest way being, however, to go to Cleve Railway Station on the Midland line, from which it is distant about two miles. The church here is considered one of the finest in the county, and is still unrestored. It is a very long church (144 ft.), and, although not at first apparent, has many points of resemblance with Bredon Church, which we noticed just now. To begin with, it has considerable remains of Norman work, its west front being, like that of Bredon, of Transitional character, but the earlier of the two, and having rich arcading on the flanking turrets. The porch, with the aisle eastward and a broad aisle opposite, and a long Decorated chancel, are all points similar to its northern neighbour. In fact, if you remove the transepts, which Bredon never seems to have had, you have an almost identical plan on a somewhat larger scale. You will, no doubt, see that the arcades of the nave are of very wide span,—20 ft. from centre to centre. The clergyman, when I was there, had a theory that at some later date the intermediate columns of the arcade had been removed. This is possible, certainly; but a far more likely thing, I think, is that when the central tower fell in the seventeenth century, it demolished a considerable part of the nave arcades, and they were rebuilt rather with a view to increase the chance of seeing the altar, than with any idea for artistic effect. The east window of the chancel has been a very fine one, but has been much pulled about. There are considerable traces of altars and reredoses, and a large number of monuments, the earliest being one

in the south transept, with a Norman pillar piscina close at hand. At the west end of the nave is a very elaborate Jacobean gallery, which will probably be removed when the church is restored. It is very worm-eaten and is considered unsafe, but the front is well worth preserving, and it is to be hoped that the architect who may have this building to restore will take proper care that it is preserved. You should also notice particularly the south porch, which is Norman, with interlacing wall arcading and a vaulted roof. The room over is of large size, and,—what I have not seen before,—extends over the south aisle as well as over the porch itself, and there is a curious piece of ceiling underneath it. There are in the village some good bits of domestic work, and a large tithe-barn was in process of demolition when I was there.

Passing on to Cheltenham, you will find that St. Mary's Church has been a good deal restored, but the church is worth a visit. I only stayed in Cheltenham one clear day. In the morning I went to Southam House, and in the afternoon to Leckhampton, both of which you should see. Southam House is a manor-house of the fifteenth century, with some interesting windows, but I was somewhat startled on arriving at the entrance to find myself confronted by a "Norman" keep. This, I need scarcely say, is modern, and is part of the extensive addition which the late Lord Ellenborough made to the house, and is more remarkable for quantity than quality. In fact, the original fifteenth-century house is so dwarfed by the Norman additions that it is some little time before one fully realises its existence at all. The owners were away when I went there, but I was allowed to make two slight sketches of the outside of the mansion. The other place of interest,—Leckhampton,—is south of Cheltenham. The church here is interesting from its possessing a chancel of two stories. The only remains of the old church are the said chancel and the tower,—the rest having been rebuilt. The tower is about 14 ft. square, and is crowned with a long tapering spire, of curious proportions. Another similar spire occurs at Shurdington, in the same district. The chancel is 14 ft. in length and 12 ft. wide. The room over the chancel is approached by the same staircase which leads to the ringing-chamber of the tower. The east window seems to have been raised, for the upper part is concealed by the vanling. There is no record saying for what purpose this room was used. There is an interesting tomb in this church, with two recumbent effigies commemorating St. John and Lady Giffard.

Stow-in-the-Wold is very finely situated on the summit of a hill, standing by itself apart from the Cotswold Hills, and is seen for many miles around. The church here is Early, and the tower is at the east end of the south aisle. It is, I think, one of the most satisfactory towers I saw during my trip. It is very plain in character, the only enrichment being an embattled and panelled parapet. Stow was connected with the abbey of Evesham, and the tower seems to have been finished by the same hand that built the famous bell-tower there.

Near Stow is Icomb or Iocomb, and here is to be seen a very picturesque Early English church, and an equally good fifteenth-century manor-house, known as Icomb place.

Northleach is one of the most inaccessible places in the county, being eleven miles from Cirencester, and nine from Stow, and lies in a very secluded valley at the back of the Cotswolds. But the church here is worth the journey from London to see. Although not covering so much ground as some of the other churches, it is very lofty, and gives one an idea of its being much larger than it really is. Its south porch is very elaborate, and inside will be found a good stone pulpit (like those to be found in Somerset), the remains of two or three altars, fine stained glass, and many other details of interest.

Again, at Cirencester is a fine church, and this is remarkable for the number of chapels which have been added. On the south side is a porch of very large dimensions,—so large, in fact, that at one time it was used as a town-hall. The bulk of this church is of fifteenth-century work, but there is in one of the south chapels a fine Early English cap, and some of the walls are also of the same date. There is another stone pulpit here, and some very fine screenwork.

There is a very interesting district between Cirencester and Stroud, round Minchinhampton, but I cannot say anything of the places in it, as I passed by them, and went on to Berkeley and Sodbury.

In Berkeley Castle you should particularly notice the interior of the chapel, with its gallery of wood at one end, richly carved. The church is a large Early English building, with a curious chapel of the Berkeleys on the south side of the chancel. There is a stone rood-screen in this church, the peculiar design being owing to a failure of the impost of the chancel arch. A second stone screen occurs in the Berkeley Chapel, and there is a curious series of squints,—one from the church to command the side altar in the chapel, and another in the chapel wall to command the high altar.

About a mile and a half from Berkeley is Wanswell Court, which is a very perfect house of fifteenth-century date, with its hall, 25 ft. by 22 ft., solar, kitchen, and bedrooms, and an addition made later by the family of Thorpe, who resided here in the time of Elizabeth. The solar has a window in each of the two front angles, one commanding the entrance, and the other the eastern approach. There are one or two fine fireplaces, and a good roof over the hall.

At Chipping Sodbury you will find a church which might have been transported from Devon or Cornwall. It is long and low, with the centre and side aisles of equal length, and a lofty tower at the west end, quite plain except the belfry windows at the top. The church was restored by the late Mr. Street. Inside is a pulpit approached by a staircase in the thickness of the wall, and there is a very elegant remnant of an altar at the east end of the north aisle, which could easily be missed, as the organ fills nearly the whole of the space in front of it. Chipping Sodbury resembles Campden in the fact that it consists chiefly of one broad street, and has a great many old houses on both sides.

About two miles east is Little Sodbury, and here is to be seen another fine old fifteenth-century house with a splendid hall, 32 ft. by 23 ft. Near Sodbury, westward, are Yate and Iron Acton. Yate has a very fine west tower, something like that of the Temple Church at Bristol, and the church itself consists of three long aisles without any chancel arch, like Chipping Sodbury. At Iron Acton is another fine church, with tombs, good stained glass, a Jacobean pulpit, and in the churchyard a curious preaching-cross. In the same district is Thornbury Castle, which, I am sorry to say, I missed, but it is no doubt well known to you in Pugin's book of "Examples."

This gentlemen, completes these rough notes on Gloucestershire, and you, perhaps, will ask which of all these places are the best worth seeing, to which I would reply "All." I feel myself that I could thoroughly enjoy going over the same ground again, as I had to bury a good deal over some of the places, but to any one who wished to see the best I should feel inclined to recommend the following, both for centres and good work in the places themselves:—

For Church-work,—Cirencester, Northleach, Berkeley, and Tewkesbury;

For Domestic-work,—Chipping Sodbury, Icomb, Chipping Campden, and Berkeley.

A report of the discussion which followed will be found on another page.

**Baths and Lavatories.**—We have received from Messrs. Steven Bros. & Co., of Upper Thames-street, a copy of their New Illustrated List of Baths and Lavatories, which contains illustrations of the various patterns of cast-iron baths manufactured by the firm, and prices of the same, either plain, japanned, or in the various degrees of enamel. The book also contains a coloured illustration of one of their baths, fitted complete, in one of the mahogany casings which they supply. A variety of cast-iron lavatories are also shown, and a number of cabinet-stands. The catalogue also gives a section of a dwelling-house, showing method of the hot-water circulation, which will, no doubt, prove useful. We commend Messrs. Steven Bros.'s New Bath List to buyers of this class of goods, of which we have often previously spoken in terms commending their uniform good quality.

**Destruction of a Paris Theatre by Fire.**—On Wednesday night the Paris Opéra Comique was destroyed by fire, with a loss of (according to the latest reports) twenty lives.

THE ANNUAL CONGRESS OF FRENCH ARCHITECTS.

The following is the text of the programme for the Congress of this year, to be held at Paris next month:—

Lundi, 6 juin.

à 3 h.—Constitution du Bureau et ordre des travaux du Congrès.—Nomination des Commissions sur les questions suivantes: *Concours publics Honoraires, Hygiène, Voirie, Industrie du Bâtiement, Propriété artistique, Responsabilité, &c.*—L'Architecture au Salon de 1887, par M. Loviot, architecte, membre de la Société.—Notice sur la vie et les œuvres de M. Ruprich-Robert, architecte du gouvernement, inspecteur-général des monuments historiques, membre de la Société.—De la circulaire de M. le Ministre de l'Instruction publique et des Beaux-Arts relative aux honoraires et à la responsabilité des architectes attachés au service des Bâtiements civils (Officiel du 2 avril, 1887).—Communications diverses.

Mardi, 7 juin.

à 9½ h.—Visite du Val-de-Grâce.  
à 3 h.—*Les Eglises et les Mosquées de Constantinople*, par M. A. Gosset, architecte à Reims, membre de la Société.  
à 4½ h.—Visite de l'atelier et des travaux de M. Victor Galland, rue Fontaine-Saint-Georges, 25.

Mercredi, 8 juin.

à 10 h.—Visite du Palais du Luxembourg.  
à 3 h.—*Les Dernières fouilles en Egypte et le déblaiement du Temple de Louqsor*, par M. Maspéro, membre de l'Académie des Inscriptions et Belles-Lettres.—*De la Décoration théâtrale*, par M. J.-B. Lavastre, peintre-décorateur de l'Opéra.

Jeudi, 9 juin.

Excursion au château de Dampierre, aux Vaux de Cernay et à Chevreuse.

Départ de Paris pour Versailles:—

Gare Saint-Lazare, à 8 h. 25. Gare Montparnasse, à 8 h. 05.

Des voitures pour l'excursion attendront à Versailles à la gare de la rive droite d'où elles partiront à 9 h. 15 m. précises.

Retour: Départ de Ver-  
{ Rive droite, 6 b. 55,  
  arrivé 7 h. 30.  
  Rive gauche, 6 b. 35,  
  arrivé 7 h. 15.

Vendredi, 10 juin.

Matinée réservée à la *Caisse de Défense Mutuelle*.  
à 3 h.—Distribution des médailles décernées par la *Société Centrale des Architectes* à l'Architecture privée, à l'École des Beaux-Arts, aux École privée, aux industries d'Art, au Cercle des Maçons, au personnel du Bâtiement, MM. PAUL SÉDILLE, Vice-Président, et PAUL WALLON, Secrétaire principal de la Société, rapporteurs.—Notice sur la vie et les œuvres de M. Le Souffache, censeur de la Société, par M. Ch. QUESTEL, membre de l'Institut, censeur de la Société.

Samedi, 11 juin.

à 9½ h.—Visite des travaux de l'Exposition universelle de 1889—Rendez-vous, pavillon Happ.  
à 3 h.—Compte rendu du Congrès des Sociétés savantes, par M. Ch. LUCAS, architecte, membre de la Société. Communications diverses, rapports des Commissions nommées le 6 juin.—Clôture du Congrès.

à 7 h. très précises.—Banquet confraternel, à l'Hôtel Continental.

NOTA.—Tout membre du Congrès devra prévenir à l'avance le Bureau pour être autorisé à traiter une question relative à l'Architecture ou à l'Archéologie, en dehors de celles indiquées ci-dessus. Pour toute demande d'invitation ou tout autre renseignement, écrire au *Secrétaire du Congrès*, au siège de la Société Centrale des Architectes, boulevard Saint-Germain, 168.

**The Recent General Conference of Architects.**—The number of the "Journal of Proceedings" of the R.I.B.A. issued this week says,—"Following the usual custom, the Royal Institute has not claimed the copyright of any of the papers read at the meetings of the recent Conference. The *Builder*, in two special supplements of sixteen pages each (issued 7th and 14th inst.), has printed them *in extenso*, giving at the same time a very full and careful report of the discussions which followed,—a work attempted by no other journal. This, undoubtedly, involved considerable extra expense, to say nothing of extra editorial labour; and the enterprise thus shown is worthy of hearty recognition from the Royal Institute. A separate pamphlet, to contain all the papers read on the Education question, with notes and appendices referring thereto, is also in course of preparation, under the charge of Mr. Arthur Cates, the Chairman of the Education Meeting, and it will be printed and privately circulated at his expense."

THE ARCHITECTURAL ASSOCIATION.

ELECTION OF OFFICERS FOR SESSION 1887-88.

The closing ordinary meeting of this Association for the present session was held at 9, Conduit-street, on the 20th inst., Mr. J. A. Gotch (President) in the chair.

Votes of thanks were passed to Mr. A. Waterhouse, R.A., for permitting the Association to visit the National Liberal Club, and to Mr. Thomas Warburton, the clerk of works, for conducting the visitors over the building.

The Chairman intimated that the judges of the Prize Committee had sent in their award with regard to the travelling studentship, which had been gained by Mr. Alfred Henry Hart. They further recommended that Mr. Henry Philip Burke Downing should receive a second prize of 5l.

Mr. H. D. Appleton (Hon. Sec.) announced that the date for sending in the drawings for the Aldwinckle Travelling Studentship had been extended to the 15th of July next.

The Chairman added that the preliminary conditions of the Aldwinckle Studentship were so simple and easily fulfilled that it would be a great pity if it were not adequately competed for. The prize consisted of 20l. for travelling in a place to be decided upon by the winner.

It was announced that the first vacation visit would take place on Saturday, the 28th inst., when the members would inspect the fine house built by Messrs. George & Peto for Mr. Henry Doulton, called "Woolpits," near Cranleigh, Surrey. A visit had also been arranged for the 11th prox. to a house by Mr. Norman Shaw, at Banstead Park; and on the 18th prox. there would be a day visit to Cambridge.

Messrs. Fleming and Paterson were appointed scrutineers to count the voting papers for the election of office bearers.

Mr. Burrell (Hon. Librarian) announced a donation by Mr. W. W. Pocock of a historical account of the Worshipful Company of Carpenters, and another by Mr. Florence, consisting of fourteen volumes of the *Builder*, from 1851 to 1864 inclusive. Votes of thanks were passed to the donors.

The following new members were elected, viz., Messrs. W. B. Parry, W. A. D. Fern, H. E. Ayling, and H. A. Saul.

Mr. R. W. Paul then read a paper entitled, "A Travelling Student's Notes in Gloucestershire," which we print on another page.

The Chairman, in opening the discussion, said he had listened with much interest to Mr. Paul's paper because he had gone to that special quarter of England with great enthusiasm, and seemed to have explored it thoroughly. It was extremely satisfactory to find that a Travelling Student of the Association should come and give the members the results of his labours. A glance round the walls showed them that Mr. Paul had made good use of his time, and when it was borne in mind that he had only been away six weeks, such a show of plans, sketches, perspective views, and full-sized details was a most creditable result. The nature of the paper precluded discussion in detail, and he (the speaker) could not throw much light on the question, as he was not thoroughly cognisant with the district. He had been to Gloucester, but the cathedral had not much interest for him with the exception of the fine Lady-chapel and the most complete cloisters, perhaps, to be found in England. Tewkesbury and Pershore had been visited by the Association, but they had not gone so far south as Mr. Paul had been. There was an interesting place north of Tewkesbury, called Severn End, a mixture of red brick and half timber. He could fully endorse Mr. Paul's suggestion that in England was to be found work of as great value and interest as any that could be found abroad.

Mr. H. O. Cresswell, in proposing a vote of thanks to Mr. Paul, complimented him on his charming set of sketches, and the good use he had made of his time. A point in the paper had struck him, as one which all the younger students of the Association would do well to note, viz., that Mr. Paul appeared to have studied the smaller buildings more than the larger ones. There was little doubt that young students, and older ones too, would often get a more complete idea of buildings by studying small ones thoroughly than by studying big ones imperfectly. He was afraid they ran too much to cathedral cities, and although Mr. Paul might have spent a great deal of his time

in Gloucester, Worcester, Hereford, and Tewkesbury, he had been wise in devoting his attention to smaller places. From the smaller churches, which could be thoroughly seen, and probably sketched, in a day, ideas could be got which were more likely to be useful to young men than the study of the grand and magnificent cathedral arrangements. He (the speaker) had seen several of the places where Mr. Paul commenced his tour, and they had struck him as containing a great deal that was interesting both from the point of view of ecclesiastical and domestic architecture.

Mr. Leonard Stokes seconded the vote of thanks, adding that Mr. Paul had shown a good example of industry and rapidity in his work. One very good point in his work was that he had taken so many plans, and especially of the churches, a course which was of great assistance in recalling the design; for all design was based upon plan, and out of it the details grew to a very great extent. It was, therefore, a most valuable thing to study plans. Mr. Paul's domestic work was also very good, and he hoped that the editor of the "A. A. Notes" might give a list of the several places visited by Mr. Paul which might be useful to the members.

The Chairman thought that Mr. Paul might add to the list of places, some of the chief features and dates for publication in "A. A. Notes."

The vote of thanks was then put and carried.

Mr. Paul, in replying, said that though most of the plans had been drawn on the spot, they had had to be enlarged for the purpose of illustrating his paper, and the labour of doing that could not, of course, be included in the six weeks' work. On visiting a church his first duty, as a rule, was to make a ground-plan. At Tewkesbury he spent the first day in walking round the building, for in dealing with such a large place one did not know at first where to turn, or to see what was best deserving of study. A good deal of time could be saved in making a plan if it were done on scale-paper. This was divided into squares, enabling the student to draw out a plan in a third of the time that would otherwise be taken. By estimating so many feet to the square, and going round with a 5 ft. rod, a big plan could be done in half an hour or three-quarters. He took with him a 10 ft. rod in two parts, the 5 ft. rod not being always sufficient, as there were certain heights that could not be easily reached, especially in out-of-the-way churches, where there were no ladders. As to the information for the "A. A. Notes," he would be only too glad to supply the editor with any additional information that might be desired, and also with a sketch map as an illustration of the route.

Election of Officers.

The scrutineers then presented their report on the voting for new officers, and the results were announced as follows:—

President.—Mr. John Slater, B.A., F.R.I.B.A. Vice-Presidents.—Messrs. H. D. Appleton, F.R.I.B.A., and L. A. S. Stokes, A.R.I.B.A.

Committee.—Messrs. Cole A. Adams, F.R.I.B.A.; F. T. Bagrallay, A.R.I.B.A.; R. L. Cox, A.R.I.B.A.; H. O. Cresswell, A.R.I.B.A.; E. Guy Dawber, Arthur J. Gale, A.R.I.B.A.; J. A. Gotch, F.R.I.B.A.; E. J. May, A.R.I.B.A.; C. R. Pink, F.R.I.B.A.; and G. G. Woodward.

Hon. Treasurer.—Mr. J. Douglas Mathews, F.R.I.B.A.

Assistant Treasurer.—Mr. H. W. Pratt, A.R.I.B.A.

Librarian.—Mr. W. Burrell.

Hon. Secs.—Messrs. Thomas Edward Pryce, A.R.I.B.A., and F. R. Farrow, A.R.I.B.A.

Auditors.—Messrs. A. C. Bulmer Booth, A.R.I.B.A., and F. E. Eales, F.R.I.B.A.

Mr. G. Richards Julian said that before the meeting closed he thought the members ought to pass a vote of thanks to the retiring President for the manner in which he had discharged the duties of his office. The Architectural Association had been very fortunate in its selection of presidents, and he believed that in Mr. Gotch the high standard attained had been well kept up (applause).

Mr. Leonard Stokes seconded the motion, adding that, although Mr. Gotch resided in the country, he had not missed a single meeting, and few if any of the committees. Mr. Gotch was hearty and soul with the Association, and would remain so, he believed, for many years to come (applause).

Mr. H. D. Appleton, in putting the resolution

to the meeting, remarked that Mr. Cotch had been elected a member of the Council of the Royal Institute of British Architects, to represent the Architectural Association during the next Session (applause).

The vote of thanks was then passed by acclamation.

The Chairman said he was exceedingly obliged for the kind and flattering way in which the proposition had been received. When he had the honour of being elected as President he made up his mind to discharge the duties as well as he could, and no special credit was due to him for attending the meetings. Living in the country did make a certain difference, and he was afraid that as he had now been elected to represent the Association on the Institute Council, which would entail a visit to London once a fortnight on the Monday, he might not be able to put in an appearance at the Association meetings on Fridays so frequently as he had done in the past. At the same time, if he were not working so much for the Association in its own rooms he would be forwarding its interests to the best of his ability upstairs (applause). It had been a matter of very great pride to him to be the President of the Association, and he should always look back with pleasure to the time when he occupied the chair and to the kind way in which he had been supported by the members (applause).

Mr. H. O. Cresswell next proposed a vote of thanks to Mr. Herbert D. Appleton, who was now retiring from his arduous duties as Hon. Secretary, and passing to the more honoured and dignified position of a Vice-President. No one who had had anything to do with the Architectural Association for a good many years could have failed to notice the extremely energetic manner in which Mr. Appleton had carried out his duties. He had been the life and soul of every thing, and on his retiring from the Secretaryship the members ought to tender him a very hearty vote of thanks (applause).

Mr. W. Burrell seconded the motion. The President, in putting the resolution, remarked that those who had not served on the Committee could have no idea of the amount of labour the Secretaries had to undertake. He had been perfectly astounded at the ease with which Mr. Appleton had attended to his multifarious duties.

The resolution was then put, and most cordially received.

Mr. Appleton, in reply, said it was with very mingled feelings that he gave up his position of Honorary Secretary that evening. At the same time, as it had been in the past, so in the future it would be his humble endeavour to do the best he could for the Association (applause).

The proceedings then terminated.

|                                               |   |   |        |
|-----------------------------------------------|---|---|--------|
| 7,722 cubic feet of sewage 11 ft. 6 in. high. |   |   |        |
| 3,565                                         | " | " | 23 0 " |
| 2,291                                         | " | " | 34 6 " |
| 1,821                                         | " | " | 46 0 " |
| 1,141                                         | " | " | 57 6 " |
| 808                                           | " | " | 69 0 " |

As the above particulars have been deduced from actual facts and practical experience, they may be confidently relied on as data for calculations, and the British Gas Engine Company guarantee their engines and compressors to produce the quantities of compressed air as described.

There are many towns, villages, and mansions, both inland and at the seaside, and especially in flat low-lying districts, where the sewage, as it is produced, deposits and stagnates in the drains, sewers, and water-courses. This is caused partly by their bad shape, excessive size, and insufficient fall to make them self-cleansing; and partly by their outlets being drowned in some instances, and tide-locked in others, and so prevented from freely and constantly discharging as they should do. Wherever these conditions exist, the inevitable result is that noxious gases, which often contain the germs of contagious diseases, escape from the decomposing and fermenting sewage deposit into and around the towns, the villages, and the mansions, and the infected air the inhabitants continually breathe. It is owing to these bad conditions that excessive sickness, epidemics, and high death-rates occur; and it was owing to the same conditions, only of a more intensified character than now obtains, that plagues formerly broke out and killed half the populations. Wherever there are stagnant drains and sewers of deposit, whether in a town, a village, or a mansion, facilities are now afforded for easily, economically, and effectually remedying this state of things by the adoption of one or more of Shone's automatic sewage ejectors in combination with one or more of Atkinson's differential air-compression gas engines. The first cost and working expenses of these highly effective and scientific machines are much less than, and far superior to, the old sumptuous process of steam-boilers, steam-engines, and pumps for lifting the sewage. By means of the ejectors and gas-engines as described, which may be seen in full working action at the Palace of Westminster and elsewhere, the sewage, as fast as it is produced, may be lifted to any altitude, whence it would quickly flow by gravitation on to prepared agricultural land for utilisation and purification there; or be discharged above the level of high water down into the sea below the level of low water. If local sanitary authorities would only wisely devote their attention to this subject, the sanitary improvement of their districts may be readily accomplished.

Putney. JOHN PHILLIPS, C.E.

ST. MICHAEL'S, COVENTRY.

Sir,—Will you allow me to point out, with reference to a paragraph which I have observed in the *Builder* about St. Michael's, Coventry [p. 760, May 21st, 1887], that it is not correct to say that the tower and spire have been taken down and built up again from the base? The foundations have been underpinned, the tower is being cased and otherwise strengthened, and the upper part of the spire, some 70 ft., has been taken down, and will be rebuilt. I think the drawing of the tower and spire is by Mr. Webster, the clerk of works. I. S.

\*.\* We never implied that the tower had been rebuilt; only the spire. We are obliged to our correspondent for giving the precise extent of the work done.

NELSON COLUMN.

Sir,—The information asked for by one of your correspondents, in the issue of 14th inst., may be found in the *Builder* of April, 1850; at least, a lengthy description of the column, together with one section and a few details. J. L.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

5,189, Imparting Surface Designs to Bricks, Tiles, &c. W. Benson and L. Gunning.

This invention consists in the employment of a rotating roller with the design impressed on its surface. This roller is placed near the mouth of the pugmill, whence the clay in a plastic state issues. The roller is adjustable in its bearings, and cuts as well as stamps the mass of clay as it issues from the mill before being fired.

5,969, Ventilator and Chimney Cowl. J. Rainer.

This invention relates to a cowl or chimney-top fitted with deflector plates in such wise that when the wind strikes the main shaft the air is deflected upwards, carrying with it the smoke. The greater the force of wind the stronger is the upcurrent in the shaft.

6,196, Chimney Cowl. J. B. Fryer.

The cowl which is the subject of this patent has a circular revolving head fixed at the top of the chimney shaft. This revolving head has an inner lining, and also an outer cover or jacket. These parts are so arranged that air can enter the mouth of the chimney and pass between the jacket and the lining, producing a vacuum and causing a strong updraught for the smoke.

6,476, Water Taps. E. Budge.

This invention relates to an apparatus which may be fixed over the seat of any tap, for the purpose of regrinding or refacing it, so that the valve of the tap will fit tightly thereto. Many varieties of cutters may be used, and the little machine is easy of manipulation and quick in its effect.

6,930, Fireplaces, &c. H. Heim.

The object of this invention is to obtain an almost perfect combustion, and consumption of smoke. The fireplace is fitted with a filling channel, closed by a cover, with which the fire space in the rear communicates. Over or around the fireplace, tubes are fitted for the purpose of conveying the heated air to and from the room in which the fireplace is fixed.

7,630, Sliding Window Sashes. J. H. Beteley.

The object of this invention is retaining the window-sashes in any position, and consists in fixing a rack or series of serrations at the side of the window-sash, and a catch on the window frame which fits into the notches, and will fix the window at any required height. The improvement is also applicable to screens, blinds, &c.

NEW APPLICATIONS FOR PATENTS.

May 13.—7,014, R. Russell, Water-ways Preventers for Flushing Cisterns.—7,027, G. Bateman, Attaching Knobs to Spindles.—7,036, F. Trier, Stoneworking Machines.

May 14.—7,057, T. Boothroyd and S. Brooke, Ventilator.

May 15.—7,113, J. Horne and S. Hollyman, Warming and Ventilating Houses, &c.—7,124, H. Snell, Glazing Windows, &c.

May 17.—7,178, J. Corbett and R. Hardy, Manufacture of Cement.

May 18.—7,217, J. Clarkson and S. Wilkinson, Water-closets.—7,236, J. Warwick, Construction of Water-pipes exposed to the action of frost.—7,243, L. Knemeyer, Cement for Artificial Stonework, Coating Walls, &c.—7,251, H. Lake, Window-sash Fastener.

May 19.—7,275, J. Bird, Automatic Weather-bar.—7,311, R. Livingston, Opening and Closing Casements and Ventilators.

PROVISIONAL SPECIFICATIONS ACCEPTED.

4,623, J. Frith, Opening and Closing Window Casements, Fanlights, &c., and Retaining same in any Position.—4,937, F. Pontifex, Doors and Windows for Preventing Draughts.—5,201, C. Heston, Ornamental Cloussonné Mosaic Work.—5,220, H. Waddington, Ventilation.—5,346, G. Gregory, Window Fasteners.—5,349, W. Macavitis, Window Fastenings.—5,351, G. Williamson, Window Sash Fastener.—5,374, J. Shepherd, Water tight Doors.—5,471, J. Dedicat, Fasteners for Window Sashes, &c.—5,475, D. Burns, Manufacture of Bricks and Tiles from Waste Products.—5,571, W. Roberts, Joints of Drain-pipes.—5,702, J. Armstrong, Glazing.—5,825, J. Rowland, Air, Water, and Fire-proof Doors.—6,108, J. Shoebridge, Window Sashes.—6,187, H. Longston, Step Ladders and Trestles.—4,261, J. Millar, Construction of Wood Window Sashes.—4,634, T. Fawcett, Machinery for Making and Pressing Bricks and Tiles.—6,309, E. Marston, Fittings for Baths and Lavatories.—5,432, J. Rawlinson, Increasing the Humidity of Air in Buildings.—6,605, J. Tucker, Cisterns.—6,769, G. Shephard, Timber-drying Chambers, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

8,731, E. Abate, Stoves.—9,150, O. Gilbert, Latch Operating Devices.—9,581, J. Hannay and E. Pape, White Paint.—13,205, J. Deuny, Terracotta Building Blocks.—2,843, T. Kemp, Water-closet Apparatus.—4,701, H. Lake, Drain Traps.—4,937, A. Boul, Drain Traps.—5,048, G. Emery, Brick Machines.—5,429, F. Wallbrecht, Manufacture of Bricks, Tiles, &c.—8,613, H. Heim, Fireplaces or Stoves.—9,378, R. Guest, Combined Edging Tile and Gutter.—9,520, J. Rawlings, Exhauster for Taking away the Dust and Shavings from Wood-planing Machines, &c.—5,331, R. Haddan, Saw-setting Apparatus.

The Hotel Victoria, Northumberland-avenue.—In reference to our recent notice of this building, the Coalbrookdale Company were there mentioned only as makers of the covered way. We are informed that they also supplied the whole of the grates throughout the building.

SEWERAGE OF TOWNS, VILLAGES, AND MANSIONS.

Sir,—The following notes on the mechanical removal of sewage, which was referred to recently in connexion with the visit of the Architectural Conference to the drainage works of the Houses of Parliament, may be of use to some of your readers:—

With a consumption of 50 cubic feet of gas per hour, a 2-h.p. Atkinson's differential air-compressor engine produces per hour,—

|                                                                  |   |   |      |
|------------------------------------------------------------------|---|---|------|
| 3,510 cubic feet of compressed air at 5 lb. pressure per sq. in. |   |   |      |
| 1,596                                                            | " | " | 10 " |
| 948                                                              | " | " | 15 " |
| 690                                                              | " | " | 20 " |
| 518                                                              | " | " | 25 " |
| 360                                                              | " | " | 30 " |

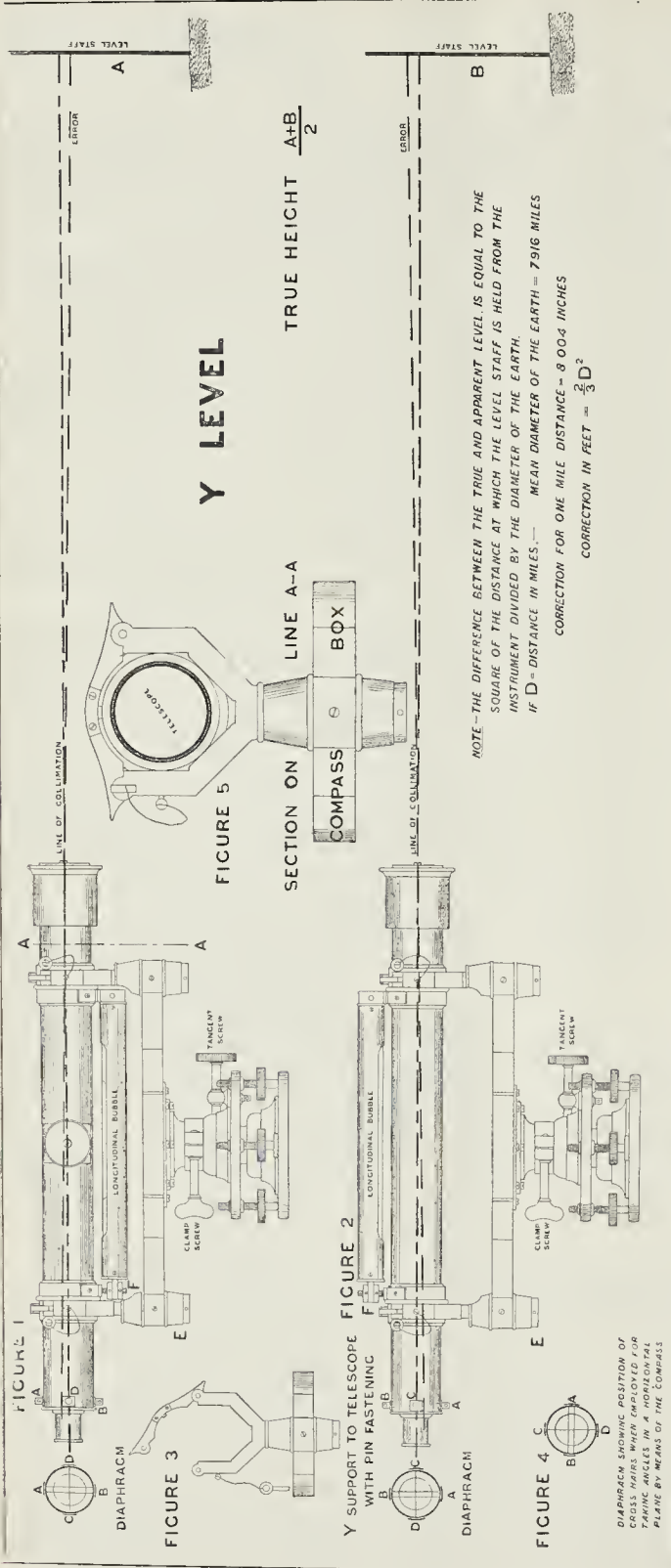
With the above quantities and pressures of compressed air respectively (after deducting for friction, slip, and loss at joints) a Shone's automatic ejector discharges per hour,—

|                                               |   |   |        |
|-----------------------------------------------|---|---|--------|
| 3,475 cubic feet of sewage 11 ft. 6 in. high. |   |   |        |
| 1,480                                         | " | " | 23 0 " |
| 938                                           | " | " | 34 6 " |
| 693                                           | " | " | 46 0 " |
| 511                                           | " | " | 57 6 " |
| 356                                           | " | " | 69 0 " |

Also, with a consumption of 90 cubic feet of gas per hour, a 4-h.p. Atkinson's engine produces per hour,—

|                                                                  |   |   |      |
|------------------------------------------------------------------|---|---|------|
| 7,800 cubic feet of compressed air at 5 lb. pressure per sq. in. |   |   |      |
| 3,540                                                            | " | " | 10 " |
| 2,112                                                            | " | " | 15 " |
| 1,536                                                            | " | " | 20 " |
| 1,152                                                            | " | " | 25 " |
| 816                                                              | " | " | 30 " |

With the latter quantities and pressures of compressed air respectively (after deducting for friction, slip, and loss at joints) a Shone's ejector discharges per hour,—



The Student's Column.

FIELD WORK AND INSTRUMENTS.—XXII.

Levelling Instruments.

VI.—THE Y LEVEL.

THE telescope is reversible in its Y supports, end for end, so that it is immaterial in which Y the object-glass end or the eye-piece end is held. The accuracy of the instrument depends upon the line of collimation being coincident with the axis of the telescope and upon the collars being both vertically and horizontally parallel to the telescopic tubes. Fig. 3 illustrates an end view of the Y support, open ready to receive the telescope. Fig. 4 gives an enlarged view of the Y support, showing one of the collars which surround the outer tube of the telescope. In order to test the accuracy of the line of collimation the instrument is set up approximately level and a well-defined distant point observed. If a level staff is held at as great a distance from the instrument as may be found convenient for clearly reading the divisions upon the face of the staff, the height read with the telescope in the position shown in fig. 1 should be the same as the height read when the telescope is revolved vertically round in its bearings 180 degrees, to the position shown in fig. 2. If any difference exists the diaphragm plate must be adjusted by moving the vertical capstan-headed screws near the eye-piece marked A and B in figs. 1 and 2, until the staff reads the same with the telescope in both positions. Before revolving the telescope upon its axis from the position shown in fig. 1 to the position shown in fig. 2, the clamp-screw attached to the body of the instrument should be tightened, and while revolving the telescope let it be observed whether the centre point between the two vertical cross-hairs diverges to the right or left hand of the distant point chosen for observation. Place the telescope, as shown in fig. 4, with the single cross-hair vertical, and observe a distant point. Revolve it 180°, as before, and the total divergence horizontally will then be apparent. Half this amount must then be taken up by working the same capstan-headed screws, A and B, which are now in a horizontal position, in order to correct any error that exists in this direction. The adjustment of the parallel cross-hairs with reference to the single cross-hair is effected by the capstan-headed screws marked C and D.

Next, to make the run of the longitudinal bubble parallel to the axis of the telescope, so that when the longitudinal bubble properly reverses, the line of collimation within the telescope may be set level by it. Unfasten the Y clips and place the telescope exactly over two opposite parallel plate screws. Tighten the clamp screw and set the longitudinal bubble in the centre of its run by the parallel plate screws. Lift the telescope out of the Ys and replace it with the ends reversed, so that the object-glass end would be removed to the left-hand side, and the eye-piece end to the right-hand side in fig. 1. Then adjust any error that may appear in the level of the longitudinal bubble, half by the two parallel plate screws over which the telescope has been placed, and half by the capstan-headed nut and lock nut marked F, which raise or lower one end of the bubble tube, as required upon its vertical screw-attachment to the telescope. Having done this, we have in the third place to set the axis of the telescope at right angles to the vertical axis of the instrument, so that the line of collimation may traverse in a horizontal plane. This is effected with the telescope fixed in the Ys, as shown in fig. 1. The clamp screw is slack, and the longitudinal bubble set level with the telescope placed over two opposite parallel plate screws. The instrument is then turned half round upon its vertical axis, so that the contrary ends of the telescope and the Y supports have changed places over the same two parallel plate screws. If the bubble is not found to settle in the centre of its run after traversing half round horizontally, half the error must be corrected by the two parallel plate screws over which the telescope has been placed, and the remaining half by the capstan-headed nut marked E attached to the Y shown in the illustration under the horizontal bar next the eye-piece. This adjustment determines the relation of the bubble to the Y supports in one direction. The operation should also be performed over the other two parallel plate screws with the telescope horizontally at right

DIAPHRAGM SHOWING POSITION OF SCREW NUTS WHEN EMPLOYED FOR CORRECTING THE LINE OF COLLIMATION PLANE BY MEANS OF THE COMBES

angles to the last direction, and repeated over both directions, until the bubble remains in the centre of its run during a complete traverse of the telescope. When once in order the instrument will remain in adjustment, unless shaken by severe handling in transit by carriage from one place to another.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

Table listing real estate transactions with columns for property description, agent, and price. Includes entries like 'Bethnal Green-23, Patriot-square, freehold' and 'Goswell-road-18, 19, and 20, Geo-street, freehold'.

Table listing real estate transactions with columns for property description, agent, and price. Includes entries like 'Bethnal Green-23, Patriot-square, freehold' and 'Goswell-road-18, 19, and 20, Geo-street, freehold'.

MEETINGS.

SATURDAY, MAY 28.
Architectural Association.—The first Vacation Visit will be made to Woolpit, the residence of Mr. Henry Doulton. (See Advertisement on p. xvi.)
Association of Public Sanitary Inspectors.—Meeting at Town-hall, Eastbourne. 11 a.m. During the day addresses and papers will be given by Mr. Edwin Channick, C.B., Dr. Alfred Carpenter, and others, and visits will be made to the water-works, sewage-works, &c.
WEDNESDAY, JUNE 1.
British Archaeological Association.—(1) Mr. J. Romilly Allen, F.S.A. (Sec.), on 'The Antiquity of Fountains.' (2) The Rev. Dr. Hoepffel on 'The Excavations at Vinovia.' Part II. 8 p.m.
THURSDAY, JUNE 2.
Royal Archeological Institute.—(1) Mr. G. L. Gomme, F.S.A., on 'Evidence of a one Village Community at Aston in Oxfordshire.' (2) The Rev. A. H. Sayce of 'A Hitite Cylinder and Seal.' (3) Mr. E. Peacock, F.S.A., on 'Court Rolls of the Manor of Hildbalstow.' 4 p.m.
SUNDAY, JUNE 4.
Association of Municipal and Sanitary Engineers and Surveyors.—Home Counties District Meeting at Portsmouth. Paper by Mr. Boulton on the Drainage Works of Portsmouth, recently carried out by Sir Frederick Brunwall.

Miscellaneous.

Royal Meteorological Society.—At the last monthly meeting of this Society, held last week, at the Institution of Civil Engineers, 25, Great George-street, Mr. W. Ellis, F.R.A.S., President, in the chair, Mr. W. Marriott read a paper giving the 'Results of Thermometrical Observations made at 4 ft., 170 ft., and 260 ft. above the ground at Boston, Lincolnshire, 1882-86,' by Mr. W. Marriott, F.R.Met.Soc. These observations were made on Boston Church-tower, which rises quite free from any obstructions, in a very flat country, to the height of 273 ft. A Stevenson screen, with a full set of thermometers, was placed 4 ft. above the ground in the churchyard; a similar screen and thermometers were fixed above the belfry, at 170 ft. above the ground; while a Siemens electrical thermometer was placed near the top of the tower, the cable being brought down inside, and attached to a galvanometer on the floor of the church, where the indications were read off. The results showed that the mean maximum temperature at 4 ft. exceeds that at 170 ft. in every month of the year, the difference in the summer months amounting to 3°; while the mean minimum temperature at 4 ft. differs but little from that at 170 ft.; the tendency, however, being for the former to be slightly higher in the winter and lower in the summer than the latter. As the electrical thermometer was read usually in the daytime, the results naturally showed that the temperature at 4 ft. during the day hours was considerably warmer than at 260 ft. The author, however, detailed several sets of readings which had been made during the night as well as the day, the results from which were of a very interesting character. During the evening the President made a presentation to Dr. J. W. Tripe of a silver tea and coffee service, which had been subscribed for by the Fellows in acknowledgment of the many services which he had rendered to the Society during a period of over thirty years.

A New Lunatic Asylum for Middlesex.—A limited competition has been held for the erection of a fourth lunatic asylum for the county of Middlesex, the architects invited to compete having been Messrs. Giles & Gough (London), Griffiths (Stafford), G. T. Hine (Nottingham), Littler (Manchester), and Martin & Chamberlain (Birmingham). A committee, formed from the Managing Committees of Hanwell, Colney Hatch, and Banstead Asylums, six from each committee, and presided over by Mr. Gaddesden (the Chairman of the Banstead Asylum Committee) gave full consideration to the plans, and selected that by Mr. G. T. Hine. The hospital, which is exceedingly well planned for its purpose, furnishes accommodation for patients under four main groups:—Infirmary patients, 240 males, 291 females; acute cases, 150 males, 252 females; epileptic cases, 161 males, 180 females; chronic cases, 251 males, 360 females. The buildings, as may be supposed, are of great extent; the central block includes administration chapel, recreation-room, cooking and laundry departments, the main corridors run out obliquely on either side, the wards for infirmary and acute cases opening en echelon from the outer sides of the corridors, and the wards for chronic and epileptic cases being between the outer corridors and the centre block. Each of these departments has its own airing-court.

Railway and Canal Traders' Association.

At a special meeting of the Council of the Railway and Canal Traders' Association, held at the offices of the Association, Eastcheap, on the 23rd inst., it was decided to hold the annual general meeting of the Association at the Cannon-street Hotel, on Monday, the 13th of June, at half-past two p.m. The Railway and Canal Traffic Bill as sent down from the House of Lords was considered, and it was resolved:—That the Council of this Association fully concur with Sir Bernhard Samuelson's motion, to the effect that no Bill for the better regulation of railway and canal traffic will be satisfactory which does not afford adequate protection to traders and agriculturists against undue charges for terminals, and undue preferences, and will give the same their best interest support.

**Civil and Mechanical Engineers' Society.**—The Annual Dinner of this Society was held at the Holborn Restaurant on the 18th inst. The President, Mr. E. H. G. Brewster, A.M.I.C.E., occupied the chair, and a large number of members and visitors were present, among whom were Professor Henry Robinson (President of the Society of Engineers), Mr. S. H. Terry (of the Local Government Board), and Mr. Worby Beaumont (of the Engineer). The usual loyal toasts having been duly honoured, Mr. S. H. Terry proposed "Success to the Civil and Mechanical Engineers' Society," coupled with the health of the President. The President responded, and in the course of his remarks referred to one of the main features of the Society, viz: the cultivation of the spirit of friendship amongst the members one with another, each new member being taken in hand by the older members and introduced to all those he might be unacquainted with. Other toasts followed, and a very pleasant evening was spent.

**The County Grant and Wood Paving on Main Roads.**—The Chiswick Local Board some time ago intimated to the County Authorities for Middlesex that it had passed a resolution in favour of laying the Chiswick Highway, from Young's-corner to Kew Bridge, with wood paving, and asking the Authorities to make the usual grant in aid of the expenses of maintenance and repair of the road proposed to be laid with wood paving. At a recent meeting of the Local Board it was reported that the County Authorities had declined to accede to the application of the Chiswick Board, not on the ground, it is believed, of any unfavourable opinion with regard to the character of wood paving for main road purposes, but because the Justices are of opinion that the Highways Act does not enable them to contribute to the expenses of maintenance where part of these expenses are in the shape of interest on a loan borrowed for the complete re-laying of the road with wood. Such interest, the County Authorities contend, is not "current expenses." The Chiswick Board, in order to get over this difficulty, advertised for tenders on the basis of paying to the contractor a lump sum annually for construction at the beginning of the period, and maintenance afterwards for a certain number of years, so that the Board could obviate the necessity of borrowing to meet at once the cost of construction. The County Authorities even then regard the transaction as tantamount to borrowing money, for they would be paying a grant every half-year of something like 1,000l., when for the first two or three years of the contract term the current expenses incurred on the road would be comparatively trifling. The Chiswick Board, however, have appointed a deputation to wait on the Local Government Board to protest against the decision.

**London Sewage.**—At the meeting of the Metropolitan Board of Works, on the 13th inst., some further information was vouchsafed to the public in regard to the system of sewage disposal to which the Board has at last committed itself. The proposed system cannot produce a proper purification of the river. Even if it turns out that this is the best of all possible purification schemes, that the effluent is "fairly clear," and that the sludge and cake will produce no local nuisance, it still remains a fact that the situation of the works is utterly unsuitable. It seems to us doubtful, to say the least of it, whether chemical and mechanical operations upon the sewage of four million persons can be conducted without serious local injury, or at least annoyance; and we are certain that the effluent water, although much less objectionable than raw sewage, is unfit to be thrown into the Thames at the existing outfalls. At present, according to the Royal Commissioners, who had ample evidence before them, the river is polluted with sewage almost up to Teddington. The pollution will now be of a less disgusting character, but still it will remain a disgraceful pollution, to which the people of London ought not to submit. We have always maintained that the proper place for the treatment of London sewage is in Sea Reach, where there are large tracts of land for sewage irrigation, low lands to be raised, no houses to be incommoded, a large volume of water, and close proximity to the sea. To this remedy we shall surely come sooner or later, and then it will be found that the vast expenditure for works and steamers now lightly incurred by the Metropolitan Board of Works will have been absolutely thrown away.—*Lancet.*

**Liverpool Engineering Society.**—On Saturday last the members of this Society, by permission of Mr. W. King, M.Inst.C.E., visited the United Gas Light Company's Works at Linacre. Arriving at the works at about 2:30 p.m., the party were met by Mr. King, who took them to the office, where he showed them the plans and gave a short history of the growth of the works. He then pointed out the extensions in progress, and those contemplated, and stated that the capacity of the works when completed would be equal to a supply of about 17 millions of cubic feet of gas per day. The party then proceeded, under the guidance of Mr. King, to inspect the works, where the various operations of retorting the coal and purifying and testing the gas were examined with much interest. The members then returned to the office, where they were entertained to luncheon by Mr. King. A hearty vote of thanks to Mr. King brought the visit to a close.

**PRICES CURRENT OF MATERIALS.**

| TIMBER.                             | £. s. d. | £. s. d. |
|-------------------------------------|----------|----------|
| Greenheart, B.G. .... ton           | 6 10 0   | 7 10 0   |
| Teak, E.I. .... do                  | 8 0 0    | 13 0 0   |
| Sequoia, U.S. .... foot cuba        | 0 2 3    | 0 3 0    |
| Ash, Canada .... load               | 3 0 0    | 4 10 0   |
| Birch " " " " " " " "               | 2 0 0    | 3 10 0   |
| Elm " " " " " " " "                 | 3 10 0   | 4 10 0   |
| Fir, Dantsio, &c. .... do           | 1 10 0   | 4 0 0    |
| Oak " " " " " " " "                 | 2 10 0   | 4 10 0   |
| Canada " " " " " " " "              | 3 0 0    | 6 0 0    |
| Pine, Canada red " " " "            | 2 0 0    | 7 0 0    |
| " " yellow " " " "                  | 2 10 0   | 4 10 0   |
| Lath, Dantsio " " " "               | 3 0 0    | 5 0 0    |
| St. Petersburg " " " "              | 4 0 0    | 5 10 0   |
| Walnut, Riga " " " "                | 8 0 0    | 10 0 0   |
| " " Odessa, crow " " " "            | 2 15 0   | 3 0 0    |
| Deals, Finland, 2nd and 1st " " " " | 5 10 0   | 8 0 0    |
| " " 4th and 3rd " " " "             | 5 10 0   | 8 10 0   |
| Rigs " " " " " " " "                | 6 0 0    | 9 0 0    |
| St. Petersburg, 1st yellow " " " "  | 8 0 0    | 13 0 0   |
| " " 2nd " " " " " "                 | 7 0 0    | 8 0 0    |
| " " white " " " " " "               | 6 10 0   | 8 10 0   |
| Swedish " " " " " " " "             | 6 0 0    | 9 0 0    |
| White Sea " " " " " " " "           | 7 0 0    | 10 0 0   |
| Canada, Pine, 1st " " " "           | 16 0 0   | 24 0 0   |
| " " 2nd " " " " " "                 | 10 0 0   | 16 0 0   |
| " " 3rd, &c. " " " " " "            | 8 0 0    | 12 0 0   |
| " " Spruce, 1st " " " " " "         | 8 0 0    | 9 0 0    |
| " " 3rd and 2nd " " " " " "         | 5 0 0    | 7 0 0    |
| Deals—New Brunswick, &c. .... do    | 5 0 0    | 8 10 0   |
| Battens, all kinds " " " " " "      | 4 0 0    | 10 10 0  |

**TIMBER (continued).**

|                                                   | £. s. d.  | £. s. d.  |
|---------------------------------------------------|-----------|-----------|
| Flooring Boards, eq, 1 in., prepared, First ..... | 0 8 0     | 0 11 0    |
| Second " " " " " "                                | 0 6 0     | 0 7 6     |
| Other qualities " " " " " "                       | 0 5 0     | 0 6 0     |
| Cedar, Cuba " " " " " "                           | 0 3 0     | 0 3 3/4   |
| Honduras, &c. .... do                             | 0 0 2 1/2 | 0 0 3 3/4 |
| Australian " " " " " "                            | 0 2 0     | 0 3 0     |
| Mahogany, Cuba " " " " " "                        | 0 0 2 0   | 0 0 4     |
| St. Domingo, cargo average .....                  | 0 0 4 0   | 0 0 6     |
| Mahogany, Mexican, cargo av. ....                 | 0 0 3 1/2 | 0 0 4 1/2 |
| Tobacco " " " " " "                               | 0 0 0     | 0 0 0     |
| Honduras " " " " " "                              | 0 0 3 1/2 | 0 0 5 1/2 |
| Maple, Bird's-eye " " " " " "                     | 0 0 0     | 0 0 8     |
| Rose, Rio " " " " " "                             | 0 0 0     | 0 0 0     |
| Bahia " " " " " "                                 | 0 0 0     | 0 0 0     |
| Bor, Turkey " " " " " "                           | 5 0 0     | 32 10 0   |
| Satin, St. Domingo " " " " " "                    | 0 0 5 0   | 0 10 0    |
| Porto Rico " " " " " "                            | 0 0 6 0   | 0 10 0    |
| Walnut, Italian " " " " " "                       | 0 0 4 0   | 0 0 5 0   |

**METALS.**

|                                  | £. s. d. | £. s. d. |
|----------------------------------|----------|----------|
| Iron—Bar, Welsh, in London ..... | 4 7 8    | 4 15 0   |
| " " " " " " " " " "              | 4 2 6    | 4 7 6    |
| " " Staffordshire, London .....  | 5 10 6   | 6 0 0    |
| Sheets, single, in London .....  | 6 15 0   | 8 10 0   |
| Hoops " " " " " " " "            | 6 0 0    | 7 0 0    |
| Nail-roads " " " " " " " "       | 5 15 0   | 6 10 0   |

**COPIERS.**

|                               | £. s. d. | £. s. d. |
|-------------------------------|----------|----------|
| British, cake and ingot ..... | 42 10 0  | 43 0 0   |
| Best selected " " " " " "     | 44 5 0   | 44 15 0  |
| Sheets, strong " " " " " "    | 50 0 0   | 0 0 0    |
| Chili, bar " " " " " "        | 5 0 0    | 32 10 0  |

**YELLOW METALS.**

|                                | £. s. d. | £. s. d. |
|--------------------------------|----------|----------|
| LEAD—                          |          |          |
| Eng, Spanish " " " " " "       | 12 2 6   | 0 0 0    |
| English, common brands " " " " | 7 6 0    | 0 0 0    |
| Sheet, English " " " " " "     | 13 7 6   | 13 12 6  |

**SPELTZES.**

|                               | £. s. d. | £. s. d. |
|-------------------------------|----------|----------|
| Silesian, special " " " " " " | 14 7 6   | 14 10 0  |
| Ordinary brands " " " " " "   | 14 5 0   | 14 7 6   |

**TIN.**

|                            | £. s. d. | £. s. d. |
|----------------------------|----------|----------|
| Straits " " " " " " " "    | 103 0 0  | 0 0 0    |
| Australian " " " " " " " " | 103 0 0  | 0 0 0    |
| English ingots " " " " " " | 105 5 0  | 0 0 0    |

**ZINC.**

|                           | £. s. d. | £. s. d. |
|---------------------------|----------|----------|
| English sheet " " " " " " | 0 0 0    | 0 0 0    |

**OILS.**

|                                 | £. s. d. | £. s. d. |
|---------------------------------|----------|----------|
| Linseed " " " " " " " "         | 21 10 0  | 21 15 0  |
| Cocoonut, Cochin " " " " " "    | 31 0 0   | 33 0 0   |
| Ceylon " " " " " " " "          | 23 10 6  | 0 0 0    |
| Palm, Lagos " " " " " " " "     | 21 0 0   | 21 10 0  |
| Rapeseed, English pale " " " "  | 22 5 0   | 23 10 0  |
| " " brown " " " " " "           | 21 0 0   | 0 0 0    |
| Cottonseed, refined " " " " " " | 19 10 0  | 20 10 0  |
| Tallow and Oleine " " " " " "   | 25 0 0   | 45 0 0   |
| Lubricating, U.S. " " " " " "   | 5 0 0    | 0 0 0    |
| " " refined " " " " " "         | 5 0 0    | 12 0 0   |

**TUNBRICKS.**

|                                | £. s. d. | £. s. d. |
|--------------------------------|----------|----------|
| American, in casks " " " " " " | 1 8 0    | 0 0 0    |

**TAB.**

|                           | £. s. d. | £. s. d. |
|---------------------------|----------|----------|
| Stockholm " " " " " " " " | 0 15 0   | 0 0 0    |
| Archangel " " " " " " " " | 0 12 0   | 0 0 0    |

**COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.**

*Epitome of Advertisements in this Number.*

**COMPETITIONS.**

| Nature of Work.                        | By whom required.         | Framinn.             | Designs to be delivered. | Page. |
|----------------------------------------|---------------------------|----------------------|--------------------------|-------|
| Town-hall, Downham Market .....        | The Committee .....       | 5l.                  | June 14th                | i.    |
| New Market Hall " " " " " "            | Ludlow Town Council ..... | 20l., 15l., and 10l. | June 30th                | i.    |
| Laying-out Cemetery, &c., Oldham ..... | Cemeteries Com. ....      | 80 gs. and 30 gs.    | July 2nd                 | i.    |
| Cottage Hospital " " " " " "           | " " " " " " " "           | Not stated           | Not stated               | ii.   |
| Monument " " " " " " " "               | St. Anne's-on-Sea L. Bd   | Gratuities           | do.                      | i.    |

**CONTRACTS.**

| Nature of Work, or Materials.                     | By whom required.                             | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|---------------------------------------------------|-----------------------------------------------|-----------------------------------|--------------------------|-------|
| Rebuilding Royal Infirmary, Liverpool .....       | The Committee .....                           | A. Waterhouse .....               | May 30th                 | i.    |
| Supply of Road Materials " " " "                  | Lewisham Bd. of Works                         | Official .....                    | May 31st                 | ix.   |
| Waterworks " " " " " " " "                        | Northwich Local Board                         | H. Bancroft .....                 | do.                      | ii.   |
| Tanks for Laundry " " " " " "                     | Lambeth Guardians .....                       | Official .....                    | June 1st                 | ii.   |
| Additions and Alterations .....                   | Dumb Institution .....                        | B. Corser .....                   | June 4th                 | ii.   |
| Alterations, &c., to Cator Estate Office .....    | Quilford School Board                         | S. Welman .....                   | do.                      | ii.   |
| Kerbing and Brick Paving .....                    | Beckenham Local Bd.                           | G. B. Carlton .....               | June 6th                 | ii.   |
| Oak Cleft Fencing and Dwarf Wall .....            | do.                                           | do.                               | do.                      | ii.   |
| Main Drainage Works .....                         | Finchley Local Board                          | O. W. Bramell .....               | do.                      | ii.   |
| Erection of Markets, &c. ....                     | Carlisle Cor. ....                            | Cavston & Graham .....            | do.                      | ii.   |
| Cleaning and Whitewashing .....                   | Horseley Local Board .....                    | T. De Courcy Meade .....          | do.                      | ii.   |
| Supply of Broken Granite and Kentish Flints ..... | Walsby Guardians .....                        | Official .....                    | do.                      | ii.   |
| Supply of Broken Granite and Kentish Flints ..... | Wandsworth Bd. of Wks                         | do.                               | June 7th                 | ix.   |
| Supply and Erection of Tank, &c. ....             | Acton Local Board .....                       | do.                               | do.                      | ix.   |
| Paving " " " " " " " "                            | Beconton Local Board .....                    | — Lacey .....                     | do.                      | ix.   |
| Drainage Works " " " " " " " "                    | Wickham Local Board                           | T. Bennett .....                  | June 8th                 | ii.   |
| Road-making and Paving Works .....                | Hammersmith Vestry .....                      | Official .....                    | do.                      | ix.   |
| Supply of Broken Granite and Kentish Flints ..... | Barking Town Local Bd                         | C. J. Dawson .....                | June 9th                 | ix.   |
| School for Boys " " " " " " " "                   | Governors, Williams's Schools, Carleton ..... | E. A. Lansdowne .....             | June 10th                | ix.   |
| Wood-Paving and Patent Glazing .....              | Huddersfield Cor. ....                        | R. S. Dugdale .....               | June 11th                | ii.   |
| Kerbing Footpaths " " " " " "                     | Chelmsford Local Bd. ....                     | C. Pertwee .....                  | June 13th                | ii.   |
| Leveling, Kerbing, and Surface Draining .....     | Kings-ton-upon-Thames Corporation .....       | Official .....                    | do.                      | ix.   |
| Repairing and Painting Fencing, &c. ....          | Metro. Board of Works                         | do.                               | June 14th                | ix.   |
| Widening, &c., of Glasgow Bridge .....            | City of Glasgow .....                         | Miller & Ball .....               | June 15th                | ii.   |
| Laundry and Receiving Wards .....                 | Paddington Guardians .....                    | A. & C. Harston .....             | June 21st                | ix.   |
| Painting, &c., Works, Portsmouth .....            | Schl. Board for London                        | Official .....                    | Not stated               | ii.   |
| Erection of a House " " " " " "                   | War Department .....                          | do.                               | do.                      | ii.   |
| " " " " " " " " " "                               | F. L. Pither .....                            | do.                               | do.                      | ix.   |

**PUBLIC APPOINTMENTS.**

| Nature of Appointment.     | By whom Advertised.      | Salary.         | Applications to be in. | Page. |
|----------------------------|--------------------------|-----------------|------------------------|-------|
| Borough Surveyor .....     | King's Lynn Cor. ....    | 250l., &c. .... | May 30th               | xvi.  |
| Head Master " " " " " "    | Londonderry Sch. of Art  | Not stated      | June 4th               | xvi.  |
| Clerk of Works " " " " " " | Sancti Spiritus Sch. Bd. | do.             | June 8th               | xvi.  |
| Surveyor " " " " " " " "   | Cor. of Gravesend .....  | 200l. per annum | June 8th               | xvi.  |

TENDERS

ANGLESEY.—For work on Holyhead and Shrewsbury-road. Mr. W. E. Jones, C.E., County Surveyor:— High Moor, Malttrath (accepted). £107 0 0

CAMBERWELL.—For the erection of thirty-three houses, Colbourn-road, for Messrs. R. White & Sons. Mr. C. W. Lovett, architect:— Higgs & Hill £18,640 0 0 A. Gillet, Penkridge 17,757 0 0 Burman & Son 17,757 0 0 C. Cox 17,480 0 0 Nightingale 17,432 0 0 Howell & Son 16,933 0 0 Keady 16,848 0 0 Heathfield 16,818 0 0 Rider & Son 15,920 0 0 Downs 15,742 0 0 H. T. Holloway 15,573 0 0 W. & F. Croaker (accepted) 15,534 0 0

CANNOK (Staffordshire).—For additions to Hoard School, Wash-road, Cannock, for 23 boys. Mr. Fred. W. Evans, architect, 83, High-street, Birmingham. Quantities by the architect:—

C. Linford, Cannock £1,690 0 0 W. Smith 1,643 0 0 John Roberts, Cannock 1,635 0 0 T. H. Kent, Cannock 1,620 0 0 Wm. Ingram, Cannock 1,616 0 0 J. Reynolds, Cannock 1,513 0 0 Bradys & Co., Wolverhampton 1,485 0 0 Robert Barton, Hedgesford 1,490 0 0 A. F. Whitmore, Stafford 1,489 0 0 J. Wood, Malvern 1,460 0 0 Samuel Wotton, Blowick 1,453 0 0 Jones & Son, Wolverhampton 1,453 0 0 W. D. Anderson, Cannock 1,427 0 0 Harcourt Bros., 1,363 0 0 J. H. Bate, Dudley 1,361 0 0 Dorse & Son, Cradley Heath 1,195 0 0 \* Accepted.

CHELSEA.—For pulling down and re-erecting the covered playground for girls and infants at Park-walk School (Chelsea O), for the School Board for London. Mr. T. J. Bailey, architect:—

C. Wall £988 0 0 C. F. Kearley 847 0 0 W. Oldrey & Co. 650 0 0 J. Garth 600 0 0 T. Bendon 593 0 0 W. Johnson 590 0 0 \* Recommended by the Works Committee for acceptance.

CHELSEA.—For the enlargement of the Everington-street School (Chelsea T), by 200 places, for the School Board for London. Mr. T. J. Bailey, architect:—

G. L. Holloway £2,700 0 0 C. Wall 2,605 0 0 J. Garlick 2,604 0 0 J. Garth 2,593 0 0 H. Hart 2,573 0 0 Leslie & Knight 2,567 0 0 W. Johnson 2,494 0 0 \* Recommended by the Works Committee for acceptance.

CHELSEA.—For alterations and additions to the Stanley Arms, King's-road, Chelsea, for Mr. Rhein. Mr. J. W. Brodie, architect:—

Smith & Son £1,369 0 0 W. Downs 1,247 0 0 Mark 1,239 0 0 Jackall & Todd 1,029 0 0 Crocker 1,176 0 0 Batley 1,098 0 0 W. Royal & Co. (accepted) 1,040 0 0

CHISLEHURST.—For the conversion of the premises known as the Coffee Tavern, Chislehurst, Kent, into two separate dwellings, with shops, for Mr. Owen Edwards. Mr. G. W. Higgs, architect, 44, Finsbury-circuit, E.C.4:—

J. W. A. Grubb, Bromley £490 0 0 J. Otway, Chislehurst 890 0 0 M. Marsland, Chislehurst 763 0 0 D. Payne, Bromley 665 0 0 F. Wood, Chislehurst 643 0 0 B. J. White & Son, Chislehurst 632 0 0 \* Accepted.

EALING.—For public offices, &c., for the Ealing Local B. ard. Mr. Charles Jones, architect. Quantities supplied:—

Prestige & Co. £25,200 0 0 Priestley & Gurney 24,494 0 0 Scrivener & Co. 23,991 0 0 B. E. Nightingale 23,930 0 0 Brass & Son 23,500 0 0 F. & H. Higgs 23,500 0 0 H. Haynes 23,000 0 0 Martin Wells & Co. 23,000 0 0 C. Wall 22,501 0 0 T. Turner & Co. 22,500 0 0 C. Claridge 22,345 0 0 J. Marsland 22,345 0 0 Adams & Son 22,034 0 0 Howell & Son 21,843 0 0 W. H. Waters 21,822 0 0 A. & E. Braid 21,675 0 0 J. T. Chappell 21,285 0 0 S. R. Turdie 21,131 0 0 W. Shephard 20,498 0 0 H. Knight (accepted) 20,420 0 0

FINSBURY.—For enclosing, draining, and tar-paving the additional land recently acquired by the School Board for London, for the Montem-street School (Finsbury B). Mr. J. Chappell, architect:—

Wall Bros. £1,125 0 0 T. Bendon 890 0 0 C. Wall 890 0 0 W. Oldrey 870 0 0 G. S. Pritchard 789 0 0 \* Recommended by the Works Committee for acceptance.

FOREST GATE.—For new Wesleyan schools, Forest Gate, E. Mr. F. Boreham, architect, Finsbury Pavement. Quantities by Mr. C. W. Brooks:—

G. J. Young £3,289 0 0 Perry & Co. 3,198 0 0 T. W. Haylock 3,053 0 0 J. Grover & Son 3,040 0 0 L. H. & R. Roberts 2,997 0 0 J. Woodward 3,015 0 0 Dove Bros. 2,985 0 0 J. Catley 2,973 0 0 F. Hunt 2,955 0 0 J. Morter 2,931 0 0 R. J. Battley 2,915 0 0 J. Holloway 2,910 0 0 H. Chessum 2,900 0 0 J. Allen & Sons 2,860 0 0 G. Sharp 2,850 0 0 E. Palmer 2,832 0 0 A. Eaton & Co. 2,738 0 0 W. Gregr (accepted) 2,746 0 0

HAMMERSMITH.—For alterations and additions to the Royal Sussex Hotel, Broadway, Hammersmith, for Mr. E. A. Young, Messrs. Alexander & Gibson, architects, 40, Great James-street, Bedford-row:—

Patman & Fotheringham £2,500 0 0 [No competition.]

HIGHBURY.—For the erection of a stable and coach-house, &c., at the rear of No. 35, Compton-terrace, for Mr. J. Davis. Mr. John Hudson, architect, Leman-street:—

J. Green £320 0 0 L. Griffin 309 0 0 W. Gladding 289 0 0 Bishop & Webb 278 0 0 Coulsell Bros, Bethnal Green 274 0 0 \* Accepted.

HOXTON.—For adapting the schoolkeeper's existing rooms in connection with the Central-road School, Hoxton, as an additional class-room for forty-seven infants, enclosing, draining, and tar-paving the additional land acquired by the Board, for erecting a new house for the schoolkeeper, with a coker's room underneath, and carrying out the additions and improvements to the existing school, for the School Board for London. Mr. T. J. Bailey, architect:—

J. Derry £4,004 0 0 W. M. Dabbs 3,942 0 0 T. Taylor 3,740 0 0 E. S. Fritchard & Son 3,719 0 0 C. Wall 3,659 0 0 J. Holland 3,632 0 0 Wall Bros. 3,486 0 0 H. L. Holloway 3,473 0 0 W. Oldrey & Co. 3,448 0 0 H. Hart 3,377 0 0 W. Johnson 3,362 0 0 \* Recommended by the Works Committee for acceptance.

HUDDESFIELD.—For ironwork for the Wholesale Market, for the Corporation of Huddersfield. Drawings and specifications prepared by Mr. R. S. Dngdale, M. Inst. C.E., Borough Surveyor:—

Dyne, Steel, & Co., Newport £7,055 0 0 Arrol Bros., Glasgow 6,685 17 4 R. Donpster & Sons, Glasgow 6,110 0 0 Tyne Boiler Works Co., Newcastle-on-Tyne 6,005 16 10 Robertson & Co., Workington 6,000 0 0 James & McMillan, Glasgow 5,930 0 0 Municipal Appliances Co., Bamber-bridge 5,620 16 2 Morewood & Co., Birmingham 5,420 4 8 Teas Side Iron and Engine Works Co., Middlesbrough 5,315 17 7 Pearson & Knowles, Coal and Iron Co., Warrington 4,990 0 0 E. Fraby & Co., Glasgow 4,941 0 0 Head, Wrightson, & Co., Stockton-on-Tees 4,895 0 0 South Staffordshire Iron Roof and Bridge Co., Darlington 4,800 10 0 A. Handyside & Co., Derby 4,762 16 0 Cleveland Bridge and Eng. Co., Darlington 4,677 4 1 F. Silvester & Co., Newcastle (Staff.) 4,468 10 0 Jesse Tildesley, Willenhall 4,622 0 0 C. Williams & Co., London 4,554 2 4 Buttery Co., Alfreton 4,540 15 9 Phoenix Foundry Co., Derby 4,462 0 0 W. C. Holmes & Co., Huddersfield 4,391 10 7 J. F. Hewell & Co., Darlington 4,391 12 10 Matthew Pitts, Leeds 4,319 0 0 Taylor & Parsons, Bradford 4,284 8 3 J. Butler & Co., Leeds 4,268 12 8 J. Crowther & Co., Huddersfield 4,262 16 9 Thom. Woodall, Dudley 4,262 12 10 Wm. Teall, Wakefield 4,215 0 0 Ashbury Railway Carriage and Iron Co., Manchester 4,110 0 0 Braithwaite & Kirk, Wakefield 4,090 0 0 Clayton, Son, & Co., Hunslet 4,084 5 3 J. Bagshaw & Sons, Batley 4,080 0 0 R. & J. Dempster, Newton Heath 5,010 7 0 H. Taylor & Sons, Marsden 3,924 2 1 Newton Chambers & Co., Thorncliffe 3,880 12 11 John Lysaght, Limited, London 3,860 0 0 W. Richards & Sons, Leicester 3,835 4 7 Charlton Foundry and Ironworks Co., Charlestown 3,603 0 0 Owners of the Whessoe Foundry, Darlington 3,590 0 0

ISLINGTON.—For various fittings, &c., to premises, Upper-street, Islington, for Mr. T. R. Roberts. Mr. T. Kingwell Cole, architect. Messrs. Battam & Co., surveyors:—

Drew & Cadman, Holborn £193 0 0 Sage, Gray's Inn-road 154 0 0 Wall Bros., Kentish Town (accepted) 147 0 0 \* Accepted.

LONDON.—For carrying up party-wall, 90, Park-street, Grosvenor-square, for Mr. G. Eram. Mr. T. Kingwell Cole, architect. Messrs. Battam & Co., surveyors:—

Wall Bros., Kentish Town £124 0 0 Tuten & Son, South Kensington 100 0 0 \* Accepted.

LEICESTER.—For the construction of about 790 lineal yards of 12-in. stoneware pipe-sewers, together with man-holes, lamp-holes, and other works in connection therewith, in the West Leigh and Ash Leigh roads, for the Corporation of Leicester. Drawings, specifications, and quantities by Mr. J. Gordon, M. Inst. C.E., Borough Surveyor:—

Innes & Wood, Birmingham £500 11 0 J. Smith, Belgrave, Leice. terr. 4 4 0 H. Black, Barrow by Soar 391 5 2 J. Dickson, St. Albans 389 14 4 A. Turner & Sons, Bilston 377 15 9 S. & E. Bentley, London (accepted) 313 3 3

LONDON.—For new Wesleyan Methodist chapel and schools, Amhurst Park, N. Mr. Fred. Boreham, architect, Finsbury Pavement. Quantities by Mr. C. H. Love:—

W. M. Dabbs £7,018 0 0 Dove Bros. 6,880 0 0 Williams & Son 6,976 0 0 J. Woodward 6,898 0 0 L. H. & R. Roberts 6,862 0 0 Hill Bros. 6,731 0 0 J. Anley 6,689 0 0 G. Jarvis Smith 6,638 0 0 J. Groter & Son 6,583 0 0 R. & E. Evans 6,462 0 0 C. Wall 6,353 0 0 Lawrence & Son 6,343 0 0 J. Holloway 6,185 0 0 J. Green 6,180 0 0 J. Chessum (accepted) 6,963 5 0 J. Allen & Sons (withdrawn) 5,052 0 0

LONDON.—For works at Nos. 268 and 270, Edgware-road, W., for the Home and Colonial Trading Association (Limited). Mr. Robert Willey, architect, 66, Ludgate-hill:—

Alterations to Shop Front, &c. Burman & Sons, Kennington £185 0 0 Larter & Sons, City 460 0 0 Ashby Bros., City 423 0 0 Jones Bros., Ealing (accepted) 300 0 0 Fitting up, Painting, &c., Part of the Stores. Jones Bros., Ealing (accepted) 513 0 0

LONDON.—For sundry works and decorations at No. 35, Avenue-road, St. John's Wood. Mr. Robert Willey, architect, 66, Ludgate-hill:—

Larter & Sons, City £625 0 0 Hayward & Sons, City 625 0 0 Ashby Bros., City 571 0 0 Burman & Sons, Kennington 535 0 0 \* Accepted.

LONDON.—For alteration to front of No. 6, White-street, Moorfields, E.C., for Messrs. G. D. Peters & Co.:—

J. O. Richardson (accepted) £119 0 0

LONDON.—For additions to six houses at Bowes-road, Bowes Park, for Mr. T. Sidney. Mr. W. Smith, architect, 1, Grosvenor-buildings:—

Mattock Bros. £515 0 0 Lark & Son 498 0 0 Dearing & Son 495 0 0 Wheeler 495 0 0 Clark Bros. 460 0 0 Ward & Lambie 427 0 0 Bay 360 0 0 Langham 329 0 0

LONDON.—For pulling down and rebuilding the Little Wonder, Lamb's-passage, Bunhill-row, for Mr. T. Sugden. Mr. W. Smith, architect, Grosvenor-buildings:—

Clark Bros. £1,730 0 0 Barnes 1,690 0 0 Ewins & Son 1,550 0 0 Dearing & Son 1,500 0 0 Hayworth 1,493 0 0 Langham 1,476 0 0 Lascelles 1,475 0 0 Baylie 1,460 0 0 Mattock 1,433 0 0 Ward 1,347 0 0 Lark & Son (accepted) 1,244 0 0

LONDON.—For Westwood and Portland stone front to 17, Coleman street. Mr. Delissa Joseph, architect, 17 and 19, Basinghall-street:—

F. Tomes £375 0 0 G. Herridge (accepted) 315 0 0

LONDON.—For alterations and additions to the Grapes-public-house, London-road, for Mr. A. Bryan. Mr. A. C. Olley, architect:—

Ansell £1,166 0 0 Balaam Bros. 1,100 0 0 Mower 1,085 0 0 Rider & Son 1,015 0 0 Jackson & Todd 892 0 0 W. & F. Croaker (accepted) 893 0 0

LOWER TOOTING.—For rebuilding the Angel Inn and two shops adjoining, for Mr. T. Booker. Mr. F. J. Eddie, architect:—

Rider & Son £6,628 0 0 Mills 6,340 0 0 Kirk & Randall 6,085 0 0 Anley 5,980 0 0 Spencer & Co. 5,732 0 0 Smith 5,666 0 0 Canning & Mullins 5,472 0 0 Jackson & Todd 5,438 0 0 W. & F. Croaker (accepted) 5,342 0 0

NORTHAMPTON.—For new Temperance Hall, &c., Northampton. Messrs. H. H. Dyer & Son, architects and surveyors:—

W. Claridge, Banbury £2,571 0 0 W. Heap, Northampton 2,490 0 0 Green Bros., Northampton 2,263 0 0 H. Martin, Northampton 2,243 0 0 W. Woodford & Son, Northampton 2,232 0 0 F. James, Banbury 2,206 0 0 D. Irons, Northampton 2,180 0 0 G. Fisher, Northampton 2,150 0 0 J. Wingrove, Northampton 2,138 0 0 A. Y. Hawkin, Northampton 2,098 0 0 W. B. Sonnet, Northampton 2,062 0 0 \* Accepted.

**NOTTING HILL.**—For general repairs to the house, No. 38, Ladbroke-square, for Mr. J. A. Cruickshank. Mr. John Hudson, architect, Leman-street.—  
 Eaton & Co. .... £161 0 0  
 W. Gladding ..... 149 0 0  
 Coussell Bros., Bethnal Green\* ..... 138 0 0  
 \* Accepted.

**PUTNEY.**—For a lodge and additions to stables, conservatory, &c., at Wildcroft, Putney, for Mr. Geo. Newnes, M.P. Mr. Theodore K. Green, architect:—  
 Mark Manley ..... £2,349 0 0  
 L. & H. Roberts ..... 2,290 0 0  
 John Woodward ..... 2,277 0 0  
 R. Ariss & Co. .... 2,198 0 0

**RATCLIFF.**—For the erection of a school-keeper's house at the new school in Broad-street, Ratcliff (Tower Hamlets L), for the School Board for London. Mr. T. J. Bailey, architect:—  
 W. Oldrey & Co. .... £890 0 0  
 C. V. Howard ..... 599 0 0  
 W. Johnson ..... 590 0 0  
 J. Holland ..... 583 0 0  
 G. Limb ..... 561 0 0  
 Norris & Luke\* ..... 492 0 0  
 \* Recommended by the Works Committee for acceptance.

**STRATFORD.**—For additions and alterations to No. 54, Rowford-road, for Mr. L. Josephs. Mr. John Hudson, architect, Leman-street.—  
 North Bros. .... £1,124 0 0  
 Eaton & Co. .... 1,115 0 0  
 Coussell Bros. .... 1,063 0 0  
 Norton & Son ..... 1,083 0 0  
 W. Gladding ..... 968 0 0  
 W. Watson, Ilford (accepted) ..... 875 0 0

**STRATFORD.**—For repairs to Byfield House, Forest Lane, for Mr. T. R. Roberts. Mr. T. Kingwell Cole, architect. Messrs. Batten & Co., surveyors.—  
 Osborne & Sons, Woodford ..... £118 14 0  
 Bishop & Webb, Stratford (accepted) ..... 118 0 0

**STRATFORD.**—For various alterations and fittings to 38, Broadway, Stratford, for Mr. T. R. Roberts. Mr. T. Kingwell Cole, architect. Messrs. Batten & Co., surveyors:—  
 Sage & Co., Gray's Inn-road ..... £159 0 0  
 Osborne & Sons, Woodford ..... 143 0 0  
 Wall Bros., Kenning Town (accepted) ..... 132 0 0

**STROUD GREEN (Horsely).**—For the erection of Holy Trinity Vicarage House. Mr. Edward Turner, architect, 21, Hart-street, Bloomsbury. Quantities by Mr. Chas. Granville Baker, 5, Bloomsbury-square.—  
 Smith & Lunn, Newark-on-Trent ..... £1,959 0 0  
 Mattock, London ..... 1,833 0 0

**WEST BROMWICH.**—For the erection of two villas, Beeches-road, West Bromwich (Staffs.), for Messrs. Mantell & Bunn. Messrs. Geo. Benj. Nichols & Son, architects, 59, Colmore-row, Birmingham.—  
 John Harley & Son, Smethwick ..... £1,150 0 0  
 Richard H-eils, West Bromwich ..... 1,009 0 0  
 C. A. Horton, Brierley Hill ..... 979 0 0  
 Walton Bros., Smethwick ..... 865 0 0  
 R. & E. Woodard, West Bromwich ..... 877 0 0  
 William Fisher, West Bromwich ..... 850 0 0  
 Arthur Wilkes, West Bromwich\* ..... 815 0 0  
 \* Accepted.

**WESTMINSTER.**—For new warehouses at Regency-street, Westminster, for Messrs. W. Sugg & Co., Limited. Messrs. Drury & Lovejoy, architects. Quantities by Mr. W. H. Strudwick:—  
 Lucas & Son ..... £4,992 0 0  
 Holland & Hannen ..... 4,960 0 0  
 Mowlem & Co. .... 4,815 0 0  
 Chappell ..... 4,568 0 0

**WHITECHAPEL.**—For alterations to the "East London" public-house, for Mr. Morris Abrahams. Mr. John Hudson, architect, Leman-street.—  
 Coussell Bros. .... £200 0 0  
 Faton & Co. .... 205 0 0  
 W. Gladding, Mile End (accepted) ... 188 0 0

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R. M. P.—T. G. W.—C. J. R.—W. S.—S. G. (should have sent amount).—E. & L. (ditto).—Parker Museum (too late, though a week old when sent).—H. A.—W. C. M. (your communication was illegible).—M. H. J. (too late; only received on Thursday morning).  
 All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.

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 Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.  
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**PICTOR & SONS, Box, Wilts. [ADVT.]**

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**Asphalte.**—The Seyssel and Metallo Lava Asphalte Company (Mr. H. Glenn), Office, 88, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.]

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### Arterial Drainage in Ireland.



WHEN the Chancellor of the Exchequer explained his Budget, he said he proposed to give a grant of 50,000*l.* this year towards the development of arterial drainage in Ireland, in accordance with the recommendation of the Royal Commission on that subject. This Commission has just issued its first Report. It was appointed in October, 1886, to inquire into the measures required for the completion and maintenance of the system of arterial drainage in Ireland, especially in the districts of the Shannon, the Barrow, and the Bann, having at the same time regard to the improvement or preservation of the present means of inland navigation; and also whether, in order to carry out any works which might be recommended, it would be necessary that the amounts which could be charged upon the localities in return for the advantages derived from them should be supplemented by the Imperial Exchequer. The objects of the Commission included an inquiry into railway and tramway extension and deep-sea fisheries, but their first Report deals only with those things we have named. The Commission consists of Sir James Joseph Allport, Mr. James Ahernethy, Mr. John Wolfe Barry, and Mr. Joseph Todhunter Pim. They examined fifty-three witnesses, some on the general question of drainage, others on the results of their experience of the subject in different points of view. They inspected the most important parts of these rivers, and visited works in progress elsewhere, and altogether made themselves acquainted, as they say, with the special circumstances of the country. The physiographical features of Ireland are peculiar. The great central plain is surrounded by high ground near the coast; the climate is humid; there are few outlets through which rivers can escape to the sea. These salient features are of themselves sufficient to suggest at once the need for artificial drainage, and the probability of difficulties in carrying it out. The inclination of the beds of the rivers, especially those of the larger rivers, are sufficiently steep near their outfalls, but they are exceptionally flat along the middle portions, whilst the upper parts of the rivers are often steep. Thus, with the considerable rainfall of Ireland, large quantities of water find their way rapidly to the middle parts of a catchment basin, but cannot find an easy exit, owing to want of fall in that part of the river course. With regard

to floods, in the case of low-lying meadow lands, the winter floods are not so injurious as the summer and autumn floods, but very competent judges hold that complete relief from these should be attained if arterial drainage is to be really successful. There are, we dare say, people who would think it a far-fetched idea that drainage could influence climate in any place, but the Commissioners gave some attention to this, and say that both general considerations and the evidence of experts go to show that large tracts of wet land tend to lower the summer temperature of the districts in which they are situated and to diminish the amount of sunshine. Both these results cannot fail to be injurious to agriculture in Ireland, where, owing to its geographical position, the summer temperature is relatively low and the sky is frequently clouded. The strongest proof of the effect of damp land on temperature is that the July temperature of the middle of Ireland is lower than that of either the northern or the southern part, and the greatest amount of wet land lies in the middle part of the country. These climatic conditions, while distinctly affecting the ripening of the crops, cannot fail, in the opinion of the Commissioners, to have effects prejudicial to health, though it would be hard to prove this statistically.\* The direct effects of the drainage of lands on adjacent towns, as regards both general improvement of sanitary conditions and improved outfalls for sewage, are more tangible, and are very considerable. The present condition of arterial drainage in Ireland has led the Commissioners to the conclusion that what the Committee of the House of Lords which sat in 1877 said about the condition of the rivers of England applies with at least equal force to Ireland. It was that "the constitution of a drainage Board in any district is not compulsory, so that in many cases districts urgently in need of such bodies are without them. The principle of rating exclusively according to the benefit accrued is difficult of application, and is frequently found to work unsatisfactorily in practice. Owing to the existence of several distinct authorities for the course of a single river, conflicts have arisen which are fatal to the adoption of any uniform and comprehensive scheme for the conservancy of the river as a whole, and there is, moreover, an absence of responsibility which may be held to account, in a great measure, for the present neglected state of several important streams." Confusion of authority in the proper drainage of the country reigns in Ireland as completely as it does in England. There is no system in Ireland for the conservancy of rivers, nor any

\* We draw attention to this subject in the *Builder* of July 10, 1886.

department of Government charged with the subject; and in many cases, where the proper regulation of a river is matter of public concern, it is under the control of no one, and is often obstructed and neglected. Drainage districts are formed without any regard to the interests of the larger river basins in which they lie, and so arranged as to escape their share of what should be a common responsibility. On the other hand, the boundaries of such districts are so arranged as to impose on their promoters responsibilities which ought to be shared by others, and to force these promoters to confer benefits on their neighbours towards the cost of which they contribute nothing. Instances occur in which some physical obstruction which is, in an engineering sense, the key to the position, is left outside the boundary of a district, the Board of which has no power to deal with it; and others, in which a district has been forced to execute expensive works below its own limits, actually conferring a benefit upon its neighbours without any power of imposing a corresponding charge. Some rivers, with no marked difference in their course, are in the charge of two Boards, each of which is naturally disposed to look with suspicion on any action taken by the other; while other rivers have been dealt with in short sections, separated by unimproved reaches. The drainage of a whole district may be stopped by a mill which cannot be bought out except on prohibitive terms, and which, perhaps, is not doing any appreciable amount of work, the vested interests in it being based on encroachments which a proper system of conservancy would have prevented; or, again, the lower section of a river may be overwhelmed by the water sent down it from the upper areas, which, being exempt from taxation, pay nothing towards the damage so caused. The first step to be taken for the improvement of the existing state of things is the adoption of the proposal made for England that the catchment area of every main river should be put in the charge of a separate body of conservators, representative of the various interests concerned, who should be responsible for the maintenance and improvement of the *main watercourses*, with the necessary powers for executing works and obtaining funds. These bodies would be Conservancy Boards. The area of jurisdiction of each such Board should comprise the whole catchment area of a river, down at least to the limit of tidal water. In the case of the Shannon, however, a district formed on these principles would be for several reasons undesirable, and in this case the principal tributaries down to the point of junction with the main river should each form a separate district, and Government should

continue to maintain the Shannon itself. The number of Conservancy Boards for the whole of Ireland would probably not exceed thirty, omitting the smaller basins. It would, the Commissioners say, be proper that Government should take steps to form these main districts without being set in motion by local initiation, and preliminary surveys for this purpose might be begun in the present year, without waiting for the legislation which would be required to bring the recommendations of the Commissioners into effect. In rating the different parts of each catchment basin of a river distinction should be made between lowlands, midlands, and uplands. A limit should be put upon the rate to be levied on the uplands, say one-tenth of that charged on the lowlands, and upon these it may be expedient to fix a maximum rate which may be levied, so as to guard against indefinite taxation. But besides such works as would fall within the province of the Conservancy Board, there are many cases where local works are required in order to free from floods particular tracts of land or to regulate tributary streams. The responsibility for the construction of such works, as well as the resulting pecuniary liability, should remain with those locally interested, subject, firstly, to Government advice, and, secondly, to the condition that one district should not injure others for its own benefit. Some tributary streams form naturally separate districts, and can advantageously be dealt with apart from the main river, and there are smaller rivers which do not lie in the larger basins and would not require a Conservancy Board, while yet they may require arterial drainage. For each area of these minor districts a District Drainage Board should be formed, its jurisdiction being confined to the lands directly benefited by drainage, and its duration limited to the period of construction, the duty of subsequent maintenance falling upon the Conservancy Board along with that of the main watercourses. This being the working organisation by which improvements of the arterial drainage would be carried out, a cognisance of the whole would be placed under a Government Drainage Department, which would take the place, for this purpose, of the present Board of Works, which would be relieved of so much of its multifarious duties as relates to arterial drainage. Such a department would be mainly an engineering one, but, in addition, the financial interests of the Government must be adequately represented. With respect to finances, drainage loans are at present repaid by a fixed annuity to cover interest and sinking fund, either of 6l. 10s. for twenty-two years or of 5l. for thirty-five years, for every 100l. advanced, the rate of interest being taken at 3½ per cent. Having regard to the rate at which Government can now borrow money, and in view of the greater control of expenditure recommended by the Commissioners, they consider that the rate of interest may properly be taken at 3 per cent., and that the maximum term for the loan may be extended to forty years.

There is no definition of arterial drainage in the Irish legislation on the subject, but in the Land Improvement and Arterial Drainage Bill introduced by Government in 1885 this omission is supplied, and is as follows:—

"Cleansing, repairing, and otherwise placing and maintaining in a due state of efficiency any watercourse or outfall for water, or any wall, bank, dam, or other defence against water.

Deepening, widening, straightening, and otherwise improving any watercourse or outfall for water, and removing any milldam or other dam, weir, or other obstruction to any watercourse or outfall for water, and raising, widening, and otherwise altering any of these.

Making any new watercourse or outfall for water, and erecting any new bank, dam, &c."

With regard to the recommendations of the Commission, we should be inclined to agree in all that relates to drainage, but a very unsatisfactory part of the Report is that which relates to the inland navigation of the country. We look at the constitution of the Commission and find in Sir James Allport a representative of the

railway interest; in Mr. Abernethy a dock and harbour engineer, but one who has declared that he is "not a canal engineer"; in Mr. Barry an engineer who, however eminent and admirable as his general practice is, would not occur to us as the most eminent in navigation works; so that if there is a member of the Commission who is inclined to look favourably upon inland navigation as a means of improvement along with arterial drainage, and to devise such works as would make these two requirements compatible, it must be Mr. Pim. The instruction to the Commission was to report "What measures are required, with due regard to the improvement or preservation of any necessary facilities for inland navigation, for the completion and maintenance of the system of arterial drainage, and whether increased facilities could be afforded to trade and commerce by any changes, legislative or otherwise, in the organisation and management of the Irish railway system, or by an extension of the Acts for aiding the construction of tramways or other cheap means of communication with existing lines"; and with the view to the extension of railways, the members of the Commission seem to have been well chosen. For the questions of fisheries and harbours Mr. Abernethy probably was specially chosen, but with regard to inland navigation, equally to be inquired into with fisheries, railways, and drainage, we should say that the Report of the Commissioners is inadequate. They were to inquire into the circumstances of three navigable rivers. In one, the Barrow, they recommend twelve out of forty-three miles to be improved for navigation; in another, the Shannon, they recommend the depth of water to be reduced 2 ft.; in the other, the Bann, that the navigation be abandoned altogether.

These attempts at destruction rather than improvement are based upon the fact that the income from inland navigation in Ireland has hitherto been small; but this, surely, is a very insufficient reason. The object is a general improvement in the prosperity of the country, as far as that can be obtained by engineering works, of whatever kind, within the means at command of the Government, and the way in which this can be done is to provide such means as may in the future contribute to that end, and not merely to strike a debtor and creditor balance of what has been, and so limit the possibilities of future improvement. It is this system of government which has earned for England the not altogether undeserved renown of being incapable of governing Ireland. A country which, according to the Commissioners' own showing, is so flat for such great distances, and which has an abundance of rainfall, is one where inland navigation is easy and inexpensive, and where it needs only excavation of the ground to produce waterways sufficient for all purposes of commerce, and which same waterways will, if cut, drain the low-lying land near and far.

The weak part of the Report of the Commission is as follows:—"Another most troublesome physical characteristic [the others being those we have named, viz., humidity of climate, few outlets of the rivers to the sea, inclinations of beds of rivers exceptionally slight along the middle portions] of Irish rivers, large and small, is that there are many obstructions in their beds, and that these are frequently of rock of the hardest character. Even where not rocky, the beds of many rivers consist of very hard gravel, almost a conglomerate, or of tenacious boulder clay. These conditions suggest the embankment of rivers rather than excavation, as the most economical method of confining the rivers within proper bounds and of protecting lands from floods."

"One reason why embanking has not been adopted has been an apprehended difficulty in some localities of effectually draining the flat lands behind embankments; but another more cogent reason has no doubt been the desire, in several important instances, to associate navigation with drainage, which, with an embanked river, would involve a permanent raising of the water level" (of the navigation). But the cropping up here and there of bard rock in

the course of a waterway, or the presence of tenacious boulder clay or of very hard gravel, are difficulties which could be easily surmounted were there the will, and when done the channel would drain the land and be a waterway for all purposes; and when the land is drained, and a way made for the removal of its produce, the population might earn their bread at home.

The flatness of the great central plain of Ireland is a feature favourable to the point in question. The more level a country the fewer the locks required on any given length of navigation, and the fewness of the locks is a great set-off against the greater expense of excavating hard ground, and fully compensates for the greater expense of an excavated channel over that of an embanked one. The embanked channel would be cheaper, but it would perpetuate a mistake in engineering.

#### "ANTIKE DENKMAELER": GERMAN ARCHÆOLOGICAL INSTITUTE.

THE appearance of the new *Denkmäler*\* has been eagerly looked for by archaeologists. Of all the new series of publications by the German Institute, it is issued last, and is in many respects the most important. It takes, it will be remembered, the place of the old *Monumenti*, which, after running an honourable course since 1829, has now ceased to exist. It takes the place of the *Monumenti*, but with a marked difference, or rather, to be accurate, two marked differences, which it may be well to note at the outset. First, the *Monumenti* was issued at Rome; the *Denkmäler* appears at Berlin. The *Monumenti* necessarily, though it did not close its doors to other countries, was chiefly concerned with the antiquities of Italy,—there was a natural bias in favour of art found on Italian soil. This resulted in a preponderance of Græco-Roman statues, Pompeian wall paintings, Italian terracottas, vases, and the like. Now the centre of gravity shifts to Berlin. As the antiquities of the Museum come from all parts of the ancient world, we shall hope for a future equilibrium. Dr. Fränkel, the editor, is just the man to rightly hold the scales.

The second point of difference between the old and new régime is, to our minds, an even more marked advance. The old *Monumenti*, it will be remembered, was a series of folio plates, accompanied by the issue of the *Annali*, an octavo volume uniformly made up of dissertations on the *Monumenti*. In no case was a monument published without this corresponding explanatory treatise. With the *Denkmäler* we have quite a new departure. The plates appear, and with them the briefest possible description, which confines itself strictly to noting matters of fact, e.g., place of discovery, explanation of plate, restorations, &c.; in fact, just what we should expect from a good catalogue. This at first sight may seem loss, not gain. It is, in fact, an innovation of the highest utility. Any one who knows the ins and outs of archaeological investigation, especially any one connected with a museum, knows how the science is kept back by delay in the publication of monuments. One reason of this delay is, of course, lack of funds, but an even more important practical reason is that a false tradition has sprung up as to the right moment for publication. A monument, be it statue, vase, or gem, is published now, be it in the *Hellenic Journal* or any foreign periodical, because some one has come to understand it, has a theory about it, and wants to utter his theory,—the monument waits for the man. The right method is quite otherwise. Publish the monument in order that it may be understood. Give it to the archaeological world; let it be the common property, the material of all students, and then let them all try their hands at interpreting it. The new plan has countless advantages. On the old system a monument never appeared unless it stood committed to a theory; compromised

\* Antike Denkmäler herausgegeben vom Kaiserlichen Deutschen Archäologischen Institut, Band I, Erstes Heft (1886). Berlin: Verlag von Georg Reimer, 1887.

from the very outset, it may be, by false opinion; it was almost impossible for a student to approach it with an unbiased mind. Now he starts clear,—the monument appears unaccompanied by So-and-so's monograph, which he felt bound to read. Further, we hold it an excellent discipline for those who actually publish the monument to be compelled to hold their hand,—to let the plates appear and reserve their opinion.

So much for the general principle, which will, we believe, go far to advance archaeological science, and improve its method. It remains to say a word as to the plates. We shall briefly describe their contents; as they are unaccompanied by theory, we shall be spared the necessity of criticism. The plates are twelve, and the Direction promises the same number each year. Naturally, in a first issue, the editor has tried to make his selection a representative one. For architecture, we have a plan by Dr. Dörpfeld of the newly-discovered Athens temple on the Acropolis; for sculpture, a marble head from Berlin, and the two notable bronze statues recently found at Rome,—the boxer and the portrait statue, to both of which at the time of discovery we drew attention. For the, so to speak, literary-monumental (if we may coin the expression) evidence of art, we have a fac-simile of Carrey's drawings of the Parthenon, and also those known as the Anonymous. As we shall not return to these, it may be said at once that the Institute has conferred the greatest boon on the educated world at large by publishing these fac-similes. Every discussion on the Parthenon marbles involves their consideration, and though each archaeologist studies the originals of the drawing, which are readily accessible in the Bibliothèque Nationale at Paris, still he cannot hold them in his eye, and constant careless reproductions have made the stock illustrations in handbooks of Greek art practically worthless. We should like to see fac-similes of these drawings framed and set up in the Elgin Marble room of the British Museum.

To continue, for terra-cottas we have a unique series of Corinthian votive tablets from Berlin; for vases, a *republikation*, much needed, of the Berlin Sosias vase; for wall-paintings, a beautiful fresco fac-similed in colour from the Villa of Livia; and for jewellery, a series of gold ornaments found for the most part in Ithaca. It will be seen that though Berlin is well represented, Italy is by no means neglected. We can note in detail only a selection of the more important plates, and first the head of Athens Parthenon (Tafel 3). The head belongs to Dr. von Kaufmann,—we presume of Berlin, but this is not stated. It is matter for congratulation that the Direction concerns itself with private collections; public collections are moderately secure for posterity; monuments of interest in private possession should at all costs be promptly secured for publication. The head is of fine-grained Greek marble, and was found in the garden of Sallust, at Rome. It is reproduced with the colouring in fac-simile, and the plate is a marvel of softness and delicate finish. Nevertheless, there is about the head a certain hard mechanical air which bespeaks late work. Its great interest consists in the fact that it is, undoubtedly, an echo of the chryselephantine Parthenon, though an echo far inferior to the well-known gold medallion of the Hermitage, with which, however, it should be carefully compared. The remains of colour on the head are of great interest. It is noticeable that the flesh parts not only have no colour now, but almost certainly never had, as the skin is worked to a high polish, whereas on the coloured parts it is left rough; the lips appear to be the only exception; they are left rough and no doubt bore colour. The helmet appears to have been painted gold colour, with the cheek-pieces brownish violet, the hair and eyebrows brown, the iris of the eye dark brown. The head only is published, but a few other unimportant fragments of the statue have been discovered, among them a fragment of a foot wearing a sandal and standing on a plinth. Rumour says that a portion of the torso of the

statue was found and fell into the possession of a collector in Austria or Hungary. Possibly some day the various fragments may be brought together.

Undoubtedly the most interesting of all the plates are Nos. 7 and 8, which are devoted to the Corinthian terra-cotta tablets. It has long been well known that the Berlin Museum possessed a unique series (about 1,000) of these curious monuments. With the single exception of the Louvre, we believe, no other Museum possesses any specimens; it was, therefore, of the first importance that they should be published, and it is remarkable that a Museum so energetic as that of Berlin should have left so obvious a duty so long unperformed. The tablets were all found (in 1879) near Pente Skuphia, a village about half an hour south of the Acrocorinthos. They are painted, some on one side, some on both, in the style of early black-figured vases. From the inscriptions, which are painted for the most part, they may be dated as of the seventh century B.C. They seem to have been for the most part votive offerings to Poseidon or Amphitrite hung up in their shrines. In many of the tablets the holes for suspension remain. There must have been at Corinth a regular *fabricque* for these anathemata. Anything quaint and more curious than the drawings of the designs on the tablets it would be hard to conceive; no description could give any idea of their formal delicacy. The most frequent inscription is just the name of the god and goddess, in Doric form,—Ποσειδάων, Ἀμφιτρίται. The name of Amphitrite seems to have been a crux to the potter, as the spelling fluctuates freely. Sometimes we have the name of the worshipper, e.g., "Eurymedes dedicated me" (Εὐρυμέδης μ' ἀνέθηκε), written "Boustopheodon." The representations are not, however, confined to the sea god and goddess; we have Athens and Herakles and Trojan heroes, Hermes, Centaurs,—in fact, a whole world of mythology. Naturally sea-monsters abound, but land scenes are not absent. We have a fox looking up into a tree, after the fashion of Æsop's fable, men labouring at a quarry, a sculptor and a potter at work, a vintage,—in fact, a whole series of scenes from Corinthian daily life. For the early history, not only of ceramography, but of mythology, and also manners and customs, these tablets will have henceforth to take a high place. We may add that many of the most important analogous tablets in the Louvre have been recently published in the "*Mouvements Grecs, publiés par l'Association des Études Grecques*," Nos. 11-13, with an interesting commentary by M. Collignon.

The plate of most sensational beauty is undoubtedly "*Tafel II, Wandbild aus Prima Porta*." Prima Porta owes its modern fame to the excavations begun in 1863, which resulted in the discovery of the Villa of Livia, "*ad Gallinas albas*," "*at White Hens*." Suetonius (Galba I.) tells the story of how when Livia was on a visit to her country estate an eagle fell into her lap a white hen with a laurel branch in its beak, and how from this hen a wonderful breed of white hens was reared, which gave the villa its name. It is in the largest room of this villa that the wonderful wall paintings, in part reproduced in the *Denkmäler*, are taken. The originals are still of marvellous freshness. The piece reproduced is from the north wall. The design represents an open-air garden. Above is a sky of intense blue. The garden is surrounded by a sort of palisade, on which perch delicately-drawn birds, one apparently a stork; within are tall trees, among which oranges, palms, and quinces are conspicuous, and about them is a thick undergrowth of flowers, red, yellow, and pale purple. Birds are everywhere perched, some in impossibly delicate balance, on the extreme end of delicate sprays; some, with a fair amount of naturalism, on the trunks and twigs of trees. The whole effect is very lovely, after the fashion of Pompeian loveliness. Probably only the great expense of a coloured reproduction has left this wonderful wall painting so long unpublished. The *Monumenti* have, of late years, been famous for the sumptuousness of their coloured plates. The *Denkmäler* shows certainly no signs of falling off. We

may add, in conclusion, that the *Denkmäler* very wisely is protected by a portfolio, which renders binding superfluous. The *Monumenti* only appeared with a quite inadequate paper covering.

NOTES

THE report of Professor Carnely, Mr. Haldane, and Dr. Anderson, on the carbonic acid and organic matter in the air of dwellings and schools, published in the Transactions of the Royal Society, gives a great deal of very valuable information, the result of carefully-conducted tests, in regard to the nature and degree of the impurity of the air in inhabited buildings under various circumstances, as compared with the normal condition of the external air. The statistics given, and the illustrations from microscopic examinations, are of interest to all who wish to get further and definite information as to what kind and what proportion of impurities are to be found in the air we breathe under various circumstances; but the most significant point for the consideration of architects is that the results are, in the great majority of cases, decidedly in favour of those schools which were mechanically ventilated. Out of about sixty rooms examined, the average of carbonic acid in naturally ventilated rooms, as compared with those mechanically ventilated, was as 18.6 to 12.3, the average of organic matter as 16.2 to 10.1, while at the same time the average temperature was 6½ degrees higher (62° as against 55°6 Fahrenheit) in the mechanically ventilated rooms. These figures speak for themselves; and while we have long recommended mechanical ventilation as always more sure, effectual, and manageable than what is called natural ventilation, we find here a decisive corroboration as to its superior chemical results on the atmosphere. The species of mechanical ventilation used in the schools examined (in Dundee) is described in the report as "air blown by fans over hot pipes." To have produced the same standard of purity in the air by the ordinary methods of opening windows, &c., the authors remark, "would have reduced the temperature to a very uncomfortable and dangerous degree." We draw attention to this point as specially bearing on the question of the ventilation of buildings, but the whole report, which is full of valuable information, should be read by all who are concerned about the sanitary condition of buildings.

JUDGING from the Annual Report of the Railway and Canal Traders' Association, which has just been published, that energetic body has had no small share in keeping the railway rates question prominently before Parliament and the public. We notice in the Report several recommendations for the amendment of the Government Bill which do not seem to have been adopted at present, but which would be very useful. For instance, the insertion of a clause providing for the disclosure of all rebates, drawbacks, and similar allowances made by railway companies, is advocated. These allowances answer to the special trade discounts enjoyed by favoured customers in commercial transactions, and, as the publication of rates is important, and, seeing that such publication would be of little value if there existed at the same time a secret list of special terms, it seems to follow that it is equally important that some such provision as that indicated should be made. In other quarters proposals have been made not so intimately connected with the principles of the measure, and which, perhaps, it would be unwise to persist in. Such, for example, as the resolution passed at a Kensington Vestry meeting:—"That this Vestry will endeavour to get a clause inserted in the Railway and Canal Traffic Bill to take town refuse for any distance not exceeding ten miles for one shilling per ton; for every additional mile one halfpenny per ton beyond that distance." However desirable this arrange-

may be, the expediency of endeavouring to attain such an end by means of the Government Bill is questionable. The supporters of railway reform find that there is a great deal to do in the House of Commons before the Bill, as it at present stands, will do much to advance their views.

THE names of eighty-five firms and individuals appear in the Edinburgh Post-office Directory under the designation of "Architects." Of that number thirty-six applied for copies of the instructions to be observed in the competition (which was confined to local architects) for the new Public Library. These instructions contained a stringent clause against the divulging of anything which might lead to the identification of any design with its author, and this condition appears to have been rigidly adhered to. The designs were to be received on the 1st of June, and are to be hung in the galleries of the Royal Scottish Academy. Mr. Alfred Waterhouse, R.A., has been appointed assessor, and after he has examined the plans they will be open to the public for a week.

THE case of Wigram v. Fryer, just decided by Mr. Justice North, does not carry the law of light in regard to the point decided much further than it was before the decision of the case. The action was brought to restrain the erection of buildings in Shaftesbury-avenue which were authorised to be made by certain Acts of Parliament, and the point at issue was whether the infringement of light in such a case was a matter to be dealt with by injunction or one for compensation under the Lands Clauses Acts. The decision of Mr. Justice North is a confirmation of the law as laid down in Roscoe's "Digest of the Law of Light," p. 46, which is to the effect that "a person, the light of whose house is disturbed by works in course of execution by a public body created by the Legislature, and to whose undertaking the provisions of the Lands Clauses Consolidation Act are applicable, cannot bring an ordinary action for damages, or proceed for an injunction, but must proceed under s. 68 of the Lands Clauses Act, 1845, to obtain compensation." The case of Wigram v. Fryer seems to confirm this, and to slightly enlarge it, putting a lessee under a public body in the same position as the body itself. When the case is reported at length in the Law Reports we may again have a word to say on it.

TO the last number of the *Bulletin de Correspondance Hellénique* (xi, 3), M. Holleaux contributes an interesting paper on the series of archaic "Apollo" statues found in the recent excavations on the site of the Temple of Apollo Ptoos, in Boeotia. From a careful analysis of the several specimens he deduces the following conclusions. The "Apollo" type, though found in other parts, was undoubtedly most prevalent in Northern Greece and in Boeotia. As regards Boeotia, one sanctuary alone, that of Perdico-Vrysi, has yielded eleven replicas. Further, the chronology of the series can, M. Holleaux thinks, be determined. The earliest specimens of a style contemporary with that of the Orchomenos Apollo belong, in all probability, to the seventh century B.C. The latest specimens are not earlier than the third quarter of the sixth century. Finally, the type was, he thinks, presumably brought by Dipencis and Scyllis to the Peloponnese, but received special development in Boeotia, and bears the stamp of local taste. We can, in fact, from this series of Apollo statues, in part venture to reconstruct the early Boeotian school of sculpture.

THE *Bulletino della Commissione Archeologica Comunale di Roma* (xv, 4) publishes in phototype two Greek grave reliefs recently found at Rome, which, from style and subject respectively, are specially interesting. The first is of Pentelic marble of the finest work, the style just touched with lingering archaism. It represents a seated woman and an attendant maiden. Tombstones of this date, when found in Rome, are, of course, valuable evidence as

to the archaising taste of Roman connoisseurs. The second relief is of late date, and the interest attaching to it is rather that of subject. In the upper part of the slab a horseman on a galloping horse is represented; below is the inscription to the dead man, whose name, it appears, was Menippus (the good horseman). We have here, Professor Gatti thinks, a fresh instance of the play on words which occurs not unfrequently on gravestones,—a sort of sculptured pun, in fact. Of these he collects a long and amusing list; for instance, a man of the name of Aper has on his tombstone a bear, with the inscription, "Innocuus Aper ecce jaces." Decimus Mus has two small moles; Felicia has a cat; and so on.

A GREAT deal has been written and said as to the restoration of the right arm of the Hermes of Praxiteles, and new evidence,—unhappily never decisive,—is always turning up. In the *Jahrbuch of the Russian Archaeological Institute* (1887, ii, 1), a Pompeian wall-painting is published, which is worth noting in connexion with the question. It represents a satyr holding the infant Dionysos in Praxitelean fashion, on the left arm; the right is upraised, and holds a bunch of grapes. A general analogy to the Hermes no one will deny; but we cannot agree with Dr. von Rohden that the question of the restoration of the statue is in any way settled by the Pompeian painting. What is appropriate in an Alexandrian pictorial translation might be quite unimaginable in a sculptured original. We do not deny the interest of the fresco, but we object to its evidence being regarded as conclusive. Why more conclusive than the seventeen instances (collected by Mr. A. H. Smith, "Journal Hell. Studies," iii, 90), in which the Hermes holds a caduceus? The Pompeian child carried is not even a Hermes.

UNDER direction of the late Mr. Octavius E. Coope's executors, the freehold Berechurch Hall estate, Essex, is to be put up for sale at auction on the 13th of June. This property includes a park, woods, and land both arable and pasture, with good shooting, covering in all about 3,300 acres, situated two miles southwards of Colchester. The total rent-roll, comprising the annual value of the house, is estimated to yield 3,700*l.* per annum. To this property appertain the advowsons of Berechurch and of Layer-de-la-Hay, together with the Blind Knights' manor or lordship in the latter parish. The land lies in sundry parishes about the port of Wyvenhoe, on the Colne estuary, whose names testify to the early settlements of the Danes in that locality.

AT eight o'clock in the morning of Whitsun Day last the Pitt dote of sixty loaves was duly distributed in the schoolroom, St. Botolph's, Bishopsgate Without. Before the building of the North London Railway terminus, at the end of Broad-street, the recipients of the bequest used to attend in a private garden which had been an ancient graveyard, being, as is not commonly known, the burial-ground appertaining to Bethlehem Hospital. A priory of canons, with brethren and sisters, was founded here in 1246, by Symon Fitz-Mary, who was a sheriff for that year, and endowed it with all his lands in the parish. Within 100 years of its establishment the priory, dedicated to St. Mary, of Bethlehem, is named as a hospital (1330); in 1346 it passed under Civic protection; and in 1546 the Corporation bought the patronage, property, and buildings, with money left, *ad hoc*, by Stephen Gennings, citizen and Merchant Taylor. At what epoch the hospital first became appropriated to that particular use with which its style is most generally connected cannot be easily determined. This, however, is known: the canons (distinguished by the star of Bethlehem on their gowns) were required to supply lodging and entertainment for the Bishop of Bethlehem whenever he visited London. Moreover, we read in Butler's "Lives of the Saints" that to the monastery which St. Theodosius set up near to Bethlehem in Judæa, circa 520 A.D., were

annexed three infirmaries: one for the sick, another for the aged and feeble, and a third for the mentally afflicted. It was certainly known as an asylum for lunatics by the beginning of the fifteenth century, when, as Stow tells us, "a King of England not liking such a kind of people to remain so near his palace," had caused certain lunatics to be removed from Charing-cross to Bethlehem in Bishopsgate Without. The original site, indeed, in St. Martin-in-the-Fields parish, continued to belong to the Hospital until 1830, when it was exchanged with the Crown and thrown into the ground which was required for improvements at Charing-cross and in West Strand. But after the Dissolution, when Henry VIII. confirmed the City's purchase, Bethlehem became the "Bedlam" which it has been ever since. In 1675-6 a new hospital was erected in Coleman-street Ward, outside of the wall, on a plot of two acres and a half that was leased to the Governors by the Corporation for 999 years at a rent of 1*l.* per annum. Designed by Robert Hooke, the celebrated mathematician, in his capacity of City Surveyor, and having cost 17,000*l.*, the new buildings, being 540 ft. by 40 ft., abutted against the northern side of the London-wall. The open ground which appears in the views by White, J. Bowles, T. Maurer, and others, is Moorfields, now covered by Finsbury-circus. The two wings for incurable patients were added in 1733. A good picture of the entrance-gates, bearing Cibber's two sculptured figures, may be seen at the Foundling Hospital; it was painted by Hayley in 1746. Cibber's handiwork, as restored by Bacon, we last saw in the South Kensington Museum. Despite Pope's oft-quoted couplet, these "brazen brainless brothers" are carved in Portland stone, stained and painted. This is the hospital delineated by Hogarth in his closing scene of his "Rake's Progress." The present site of 11 acres in St. George's-Fields, Southwark, which includes the once famous Dog and Duck Gardens, was taken in 1810, and the hospital built in 1812-5 at a cost of 122,572*l.* 8*s.*, most of which was provided by grants of public money and subscriptions made by various public bodies and private individuals. The wings and rear premises were added fifty years ago by Sydney Smirke; the dome in 1845. We should add that in 1866 the Great Eastern Railway Company paid to the Hospital Governors a sum of 61,000*l.* for their property in Bishopsgate Ward Without whereon to build their Liverpool-street terminus.

A BUILDING fund is opened for the projected new premises in Shaftesbury-avenue of the French Hospital and Dispensary. Her Majesty has consented to become patron of this charity, and has sent a donation of 50*l.* to the fund. Mainly by the exertions of the chief physician, Dr. Vintras, and the late M. Eugene Rimmel, the existing hospital in Leicester-place was established twenty years ago for the benefit of all foreigners speaking the French tongue. With room for but thirty-five inmates, it has relieved, since 1867, as many as 4,400 in-patients, and over 100,000 out-patients, representing some thirty diverse nationalities. Shaftesbury-avenue is being rapidly appropriated for institutions of a public or quasi-public character. To the inevitable new theatre, for Mr. Hollingshead, we have already adverted. On the afternoon of Tuesday, May 23rd, were laid three memorial-stones for the Baptist chapel which, at a total cost of 5,600*l.*, is designed to accommodate, on the floor and in the galleries, 500 persons.

THE ancient palace of the Archbishops of Canterbury at Maidstone has been purchased by the town for the very moderate sum of 2,000*l.*, and will be devoted to some purpose in connexion with the town; but what that purpose shall be is not yet decided, but it will be in all probability a public library. Maidstone already possesses a museum and a respectable collection of antiquities. The palace was begun, it is said, in 1348 by Archbishop Uford, and completed by Simon Islip. The present structure is late

fifteenth-century work, and bears a remarkable resemblance, as regards style, to some of the Scottish baronial castles. The plan and general features are Gothic, but there are Italian details in some parts which show the influence of the Renaissance; these Italian details are used sparingly, and with an evident preference for the older style. The palace, which is at present empty, is divided into two portions, which were until recently used as dwelling-houses. Some additions have been made to adapt the building to modern uses, but its main characteristics remain unimpaired, and it will not be difficult to restore it to something like its original condition. There is a fine central hall, measuring 36 ft. by 24 ft., with the original fireplace and fine oak panelling, and a Jacobean staircase of unusual design.

**F**ORMING a conspicuous feature on the left hand of one walking along the main road from Brixton to Streatham Hill, stand the buildings recently vacated by the Royal Asylum of St. Ann's Society. The Society, having removed to their new schools by the Junction Station at Redhill, Surrey, have put these premises up for sale. The entire property, which is freehold, covers more than 2½ acres, and includes the principal block, a master's house, an entrance-lodge, gardens, and playground. There is room here for a college, or the like thereto, of nearly 400 inmates.

**T**HE opening of the Terrace Gardens at Richmond by H.R.H. the Duchess of Teck the other day was an event fully justifying the local rejoicings,—rejoicings which were no doubt shared by some of those "economical" ratepayers who were at first opposed to the purchase of the property by the Vestry. To have allowed so lovely a spot, commanding such charming views, to be sacrificed to bricks and mortar would have been a sad blunder. With all that has been done in adapting them to the purposes of a pleasure-garden there is little to express disapproval, if we except the very commonplace, we may even say ugly, east-iron fountain on the upper plateau. This fountain, we hear, is only a temporary one. The *Thames Valley Times* of the 25th ult. gave an admirable illustrated account of the gardens. We wish we had good grounds for hoping that the example of the Richmond Vestry in saving these gardens would be emulated by the Corporation of London and the Metropolitan Board of Works in securing such valuable breathing spaces as Clissold Park (Stoke Newington) in the North of London, Brockwell Park (Herne Hill) in the South, and Ravenscourt Park (Hammersmith) in the West. If anything could justify the retention of the Coal and Wine Dues for a few years longer, the acquisition of these large and finely-wooded spaces, fast becoming hemmed in by bricks and mortar, would do so.

**A** COMMITTEE, whereof Mr. H. R. Williams, of Hornsey, is chairman, has been appointed for effecting the purchase of Alexandra Park and Palace as a Jubilee Memorial for the public benefit. We hear that there is fair expectation of the project being accomplished. Meanwhile the Palace, having remained closed for a period of nearly two years, will, until the end of July next, form the scene of a series of popular fêtes and exhibitions, under the management of Mr. H. W. Hayward.

**T**HE exhibition of paintings at the Albert Hall contains, among a good deal of uninteresting matter, some clever paintings which are new to us, and some, such as Mr. H. Moore's "Outside the Harbour," which are none the less welcome for not being new. One bay is occupied entirely by landscapes by Mr. A. MacCallum, a painter whose style of landscape is hard and artificial, but whose works when seen together produce an impression of more ability and originality than has always been credited to them; the "Pass of St. Gothard after a Storm" is a fine and effective work, and "Golden Moments," though very artificial, is, at all events, a powerful scenic

effect. One bay is devoted to architectural drawings, and the quality of these is certainly high. The selection includes eight of the best of Mr. Aitchison's designs for coloured decoration which have been seen in the Academy in various years, and which students of this kind of work will find worth studying collectively.

**I**N referring last week to the report of Mr. Walter Crane's lecture at the Society of Arts, we expressed a doubt whether there were really any such thing as a "system of designing" among us at present. From a letter of Mr. Crane's in the *Times* of May 30, it appears that he is of the same mind, and that the condensed report of his lecture misinterpreted his meaning in representing otherwise.

ARCHITECTURE AT THE ROYAL ACADEMY.—VI.

1677, "Design for Stained Glass: Presentation of Infant Saviour in the Temple," Mr. G. Parlbey. A small design for a Renaissance stained-glass window, with an architectural canopy of the kind unfortunately usual in modern windows designed in Renaissance style, viz., a kind of tradition of Renaissance details into a shape suitable for decorative treatment,—very elongated wavy columns, &c.; but otherwise this is a very good design, harmonious in colour except for the yellows (also apparently inevitable in design of this class) in which part of the architecture is shown, and the figure of the Virgin is a very pleasing one, above the usual average of stained-glass figures.

1678, "The High School, Stirling: New Wing," Mr. J. M. MacLaren. A bold application of Scotch castellated architecture to an educational building; the massive square tower, with its circular attached turret, is, at all events, very picturesque; and the drawing should be noted as a good specimen of architectural pen sketching, broad in effect and with plenty of whites left in it, but marked by precision of line where required.

1684, "Lower Luce Church, Wigan," Messrs. Paley & Austin. A careful pen interior of a church in pure Early English style. A plan is wanted to make it quite intelligible. The two lofty arches on the left, rising nearly to the roof-springing, convey the idea that there is a double transept; at all events, there is apparently ample space given in floor area and in height for the organ, which is partly shown, and this is in itself a good point: we are always glad to see a practical protest against organ-chambers. The church is of very solid construction, as everything of the kind by its architects usually is; the heavy and unadorned collar-beam, however, cuts very awkwardly across the lines of the wooden wagon ceiling; the two, in fact, seem in no way to belong to each other, and the impression is as if the collar-beam were an old piece of work, and a new ceiling had been put irrespective of it.

1685, "Constitutional Club, Northumberland-avenue," Mr. R. W. Edis. The drawing is by Mr. Raffles Davison, and shows the whole of the long lines of cornice moldings, &c., conscientiously lined in by hand. The general effect of the drawing is very satisfactory; there is a fine texture about it, but a little want of force and finish in the details, and a little too much of hatching and scratching of shading in the lower portion, which always, to our thinking, takes away from the firmness and solidity which ought to characterise an architectural drawing as a representation of a new building. The drawing is a picture in pen and ink, in fact, rather than an architectural draughtsman's drawing: all the better, some will say; but we confess we like to see detail thoroughly shown in an architectural drawing. Of the building itself we have spoken before, and it is familiar enough to every one as one of the finest and most picturesque of the recent great blocks of building which have been erected as clubs, and which, in matter of size at all events, quite throw the old-established London clubs into the shade; and certainly such a building as this has more of colour and interest than the cold and correct fronts of the "Reform" and the "Conservative."

1688, "Design for an Entrance to a Public Park," Mr. E. H. Sedding. This was a design in competition for one of the Royal Academy prizes, and we commented on it when it was

exhibited with the other designs sent for the various medals and prizes; it is a highly original design, and deserved a place here, though we cannot say we think it very beautiful. It is consoling, however, to look at a design which is not a copy of something else.

1687, "Rheims Cathedral," Mr. Arnold B. Mitchell. A careful and very refined drawing of the front, in line, and with shadows put in with washes of Indian ink tone. The effect is very delicate, but a little artificial. It is neither an architectural drawing pure and simple, nor is it a representation of the actual effect of the building. It looks very nice, however, which is its best defence.

1689, "Braenose College, Oxford; new Front and Gateway Tower in High-street," Mr. T. G. Jackson. Published, as it happens, among our illustrations of this week, though not by any deliberate purpose. The fact, however, saves the trouble of description, and we may refer the reader to the lithograph on another page. The style of drawing employed does not do the best for the design. It is a sepia drawing, rather flat in effect; the brush has been used too heavily and uniformly over the shadowed portions, and the whole, consequently, wants surface and relief. The style is a hard type of Late Gothic, which we love not; the tower, with its lantern carried on flying buttresses, is an effective feature. We must confess, however, that its architect has exhibited in this gallery a good many things that we have liked better than this.

1692, "St. Bride's Vicarage," Mr. Basil Champneys: a sepia drawing of this new vicarage in the old London eighteenth-century style, with the steeple of St. Bride's rising in the background. We should have thought Wren's steeple might have suggested a little more varied and picturesque treatment of the vicarage attached to it. The latter is, however, an exceedingly good house of its kind, and very well planned in its limited space; plans will be found in the *Builder* of May 22, 1886 (p. 759), together with a reproduction of this same drawing, which was, in fact, a drawing made for this journal from a photograph, the photograph having distorted the stages of the steeple in the background too much to be available as an illustration.

1695, "Proposed Church of St. Michael," Mr. P. J. Marvin. Where? We suspect this is a church in the air; but it is an excellent pen-drawing, at all events, showing an exterior view of a large and lofty church of Early Decorated type, with transepts and Lady-chapel, and a lofty tower and spire at the crossing. The design looks out of date with recent ideas and tastes. It is the kind of church Sir Gilbert Scott liked to build when funds were forthcoming.

1698, "House at Palace Court, Kensington," Messrs. Harvey & Bernard Smith. The entrance is effectively managed, under a large and deep archway. The strongly-marked rustication and quoins are too pronouncedly "Classical" for the general style of the building, just as the strong-ruled shadow-lines on them are out of keeping with the freer touch of some of the other portions. They look as if they had been filled in by a pupil preparatory to the completion of the drawing by another hand.

1697, "Chimney-corner in Dining-room, Stonelands, Sussex," Mr. E. W. Mountford. An artistic little pen-drawing, though there is certainly not very much in the design.

1699, "Graythwaite Hall, Windermerer," Mr. R. Knill Freeman. A well-executed pen perspective of a Jacobean house of some extent, shown with a very high sight-line, almost a bird's-eye view. A plan would have added greatly to the interest of the drawing. In many points this seems an exceptionally pleasing and picturesque design of its kind, especially in the broad treatment of the spaces of wall between the pilasters on the garden front, where windows and wall panellings together form a combined design extending over the whole wall-area, framed in by the pilasters running from plinth to cornice. It is a kind of treatment not uncommon in old houses of the date of this architecture; but it has been very happily applied here.

1702, "Lodge at Flete, Devon," Mr. J. D. Sedding. Charming. A very nice pen drawing, and the lodge is quite a little bit of the poetry of building; it is a kind of thing one would certainly sketch if one came across it as an old bit of building; but there is no affectation of looking old about it; and the plan, shown in

the corner, shows that the picturesque outline of the house arises naturally from the picturesque disposition of the plan. The deep shadowed recess for the bench is very effective, and at the same time a useful feature in a lodge, where people may have to wait occasionally.

1703, "House at Tunbridge Wells," Mr. Jas. Neale. Another view of the house shown in No. 1673, already noticed; both are very good drawings, but considering the limited space at disposal for architectural designs, it might be thought that one illustration of this house would have been adequate; and our conclusion from finding both hung, would be that whoever selected the drawings did not look at them with sufficient care to see that these two represented the same building, and that favour simply goes by the general execution of the drawing, with little reference to the design.

1704, "Board School, Woodland-road, Lower Norwood," Mr. M. S. Bailey. Hung high; a boldly-designed block of building, and the architect has made the most of the now prevalent practice of building the ground-story of a Board school as an open arcade; the piers are deep and massive, and the arcaded-ground story gives a great deal of picturesque and effective expression to the whole. The contrast of windowed walls and blank walls is, we presume, the architectural expression of the practical duty of lighting from the side; it gives additional effect to the structure, at any rate; a good instance of effect growing out of the mere observance of practical conditions.

1705, "Memorial Window for St. James's Church, Piccadilly," Messrs Ward & Hughes. Hung too high to see the detail well, it looks a good window of average Renaissance pattern; the wide decorative border has a good effect in itself, but it wants something to stop it,—or, rather, to commence it,—at the foot.

1706, "Stonelands, Sussex," Mr. E. W. Mountford. A nice pen drawing of a very pretty, homelike house, with low, mullioned windows; it looks, however, much more like a drawing of an old house than a design for a new one; but it suits the country it is in, at all events.

1707, "St. John's Church, Hampstead: new stalls, organ-case, and painted decoration on walls and ceiling," Mr. T. G. Jackson. The "painted decoration" can hardly be shown in a pen-line drawing; the general effect, the disposition and style of the decoration are shown, and we can imagine that, as executed in colour, it would be rich and effective; the methods of covering the various surfaces seem to be well balanced and contrasted. The organ-case has some richly-carved open-work brackets; the usual mistake is made, which nearly all designers of organ-cases make, of placing the larger front pipes in the centre and the smaller ones at the sides, thereby contradicting the necessary arrangement of the pipes on the sound-board. The drawing is a very clean, precise, and well-executed piece of pen-and-ink perspective.

1708, "St. Mary Star of the Sea Church, Hastings," Mr. Basil Champneys. The principal drawing shows an interior of a Gothic vaulted church, shown in the old fashion, with bare stone floor, leaving the piers all visible clear of seating. The work aims apparently at being simply a correct piece of Gothic, and calls for no special remark; the reredos, with its double tier of open work, is unusual and effective. The drawing, a pen line one, is signed by Mr. Raffles Davison, who, we fear, must have suffered from want of time to do himself justice; it is far too scribbly in execution, and nothing like the way he used to draw. The two small exterior perspectives show both architect and draughtsman to better advantage. The exterior north-east view, with the small circular turret and open lantern at the top, is decidedly original, and so is the treatment of the west end in the other exterior view, with a broad tripartite window divided up the centre by a solid compartment with niches and statues. A plan of the church is added.

1710, "Mansfield College, Oxford: Corner of Quadrangle," by the same architect as the last-named. A pleasant bit of Collegiate Gothic; without a plan and section it is not easy to understand the meaning of the expanse of blank wall between the lower windows and the dormers, on the right; it is picturesque in effect, and let us hope it has a reference to the practical arrangement of the building.

1712, "Decorative Painting for Ceiling of Drawing-room," and 1713, "Decorative Paint-

ing for Cove of Concert-room," both by Mr. J. M. Boekbinder. Clever work in a very faulty and vulgar style. The ceiling decoration is *di sotto in su*, showing, as we look up, a painted balustrade rising up above the modelled cornice of the room, over which is the open sky, with clouds and a number of pink genii kicking about in it with all the correggiosity of Correggio. It is well enough done, and (to parody a celebrated literary criticism) "for those who like this sort of thing, it is just the sort of thing they would like." The concert-room cove is in a more orthodox decorative style, being a flat composition representing a series of classical players on the sackbut, psaltery, dulcimer, and all kinds of music, in various degrees of nudity. In the centre is a winged Apollo (?) enthroned, and beneath him a draped seated female figure, fine in action and somewhat recalling the manner and feeling of Delacroix in this type of work. There are other good figures in the composition, which is bright in colour effect, and has a good deal of spirit; but somehow we cannot look at it without thinking what piquant variations Mr. Harry Furniss could play on it.

#### LETTER FROM PARIS.

PARIS is still in a kind of stupefaction from the shock caused by the Opéra Comique disaster, which has had the effect of again bringing under consideration the various precautionary measures, often before discussed, against such disasters in theatres.

It is melancholy to reflect, now that it is too late, that the disaster was foreseen and almost predicted. It is barely a month since a Deputy called attention in Parliament to the defective construction of the building, the insufficiency of its exits, and the absolutely abnormal accommodation for the actors and *employés* in two blocks of buildings seven stories high, and connected above the proscenium by narrow wooden bridges. On his side, the Minister of Fine Arts declared that, according to statistical precedent, the Opéra Comique was bound to be burned, and that if the fire took place during a performance there would be a dreadful catastrophe. This plain statement was received with laughter by a Chamber which attached no importance to it, and preferred turning the ministerial prophecy into a joke rather than voting funds to enlarge and alter the theatre.

A heavy responsibility rests with the Government for not having insisted on the regulations called for by public opinion, after the disastrous fires at the theatres of Vienna and Nice, and which should have been strictly observed everywhere without paying any attention to the complaints made on the score of expense; and the neglect of the Government is the more culpable in the case of a theatre which enjoys a State subvention, and is thus to some degree an official establishment.

It is not sufficient, however, to insist on a fireproof iron curtain to cut off the stage from the house, which, in the confusion accompanying an alarm of fire, always somehow fails to act; nor to open some new doors, or establish oil-lamps in the corridors. Security must lie in the construction itself, and it is to the architect that appeal must be made to build with un-inflammable materials, to multiply the means of access and render them easily accessible, to replace gas by electricity, isolating the engines in vaulted cellars.

This is not the first time that the Opéra Comique has been burned. It was first built from the designs of Heurtier, architect also of the theatre of Versailles. The works were commenced in 1781 and completed in 1783. This house having been burned down in 1838, M. Carpentier was commissioned to rebuild it, and the new theatre was inaugurated on May 16th, 1840, by the first representation of the "Pré aux Clercs." This house, which seated about 2,000 persons, was esteemed one of the most elegant in Paris internally. The exterior façades, which the fire has spared, are very sober in regard to decorative treatment. Towards the Place Boieldieu there is an Ionic portico.

The Opéra Comique, it is expected, will rise from its ashes completely transformed in its arrangements, in accordance with the demands of modern science. But what is to be done to safeguard the other Paris theatres which present the same dangers? Some of these, too, as the Bouffes Parisiens and the Palais Royal,

are so closely hemmed round by other buildings that a fire in them would be a danger to their whole neighbourhood also.

We have another misfortune to lament in the death, at Cannes, of Ruprich-Robert, one of the most active and learned members of the Commission des Monuments Historiques, of which he was Inspector-General. It was for the Commission that he made the splendid drawings so justly admired in the *Salons* of 1844, 1855, 1858, and 1878, among which we may specially mention that of the Templars' Church at Montsaunès, the Cathedral of Séz, the Church of St. Saurant at Dinan, the Church of Bemères, and that of Fresno-Camilly.

Victor Marie Charles Ruprich-Robert was born at Paris on February 18th, 1820, and, after studying in the *atelier* of Constant Dufeux, he entered the École des Beaux Arts in 1838. Appointed first as architect to the dioceses of L'Orne and Calvados, he became successively professor of ornament in the École Nationale de Dessin, and subsequently was appointed "Dessinateur du Mobilier" to the Crown, and designed for Napoleon III, among other things, the corona chandelier given by him to the Abbey of Einsiedlen in Switzerland. He obtained successively a "seconde médaille" in 1855, a Chevalier's cross in 1861, a "première médaille" in 1878, and the cross of Officer of the Legion of Honour in 1879. The Government had appointed him to direct the excavations of the "Arènes de Lutèce." An assiduous worker, and with a facile pen, he contributed extensively to the *Revue Générale de l'Architecture*, and in spite of his multiplicity of occupations, found time to bring out numerous publications, among the most important of which were the "Flore Monumentale," published in 1866, and the interesting monograph of the Church and Monastery of Val de Grâce, published in 1875. To his great work on Norman architecture in Normandy and England, which was hardly complete at the time of his death, reference has already been made. Among his practical works may be mentioned the construction of the Church of Flers, the important work for the restoration of the Château d'Amboise, the Church of Ste. Trinité at Caen, and the Church of Oustréham in the Calvados diocese. Ruprich-Robert was what might be termed an *archéologue passionné*. As a man, he was much liked, and has been generally regretted.

We hear also of the death of M. Emile Vernier, a landscape-painter of great merit, who received medals in the *Salons* of 1869, '70, '79, and '81. He made a long stay in England in recent years. He had exhibited in the *Salon* of 1853 a view on the Thames; in 1855 a view on the coast of Cornwall; and last year a view at St. Ives. The present *Salon* includes two works by him: "L'Île Bouin, Vendée," and "Vieux Maisons au Croisic." Vernier died at the age of fifty-eight.

While the *Salon* continues to attract its crowds, three other exhibitions have opened during the month of May. There is first, in the Galerie Petit, the sixth "International" exhibition of painting and sculpture, in which Impressionist art takes a very prominent place. Why do MM. Sisley, Pissaro, Claude Monet, &c., always see nature through a violet veil? Trees, houses, sea, and mountains are all informed with that colour, apparently a symptom of that peculiar malady of the vision called Daltonism. M. Besnard's "Panneaux Décoratifs," again, are really too eccentric. M. J. Lewis Brown exhibits some clever works, and M. Casin some splendid landscapes; but then M. Casin is a good deal more than an impressionist. Among other things to be mentioned are a scene in a cabaret by M. Kroyer, a pretty picture of the Luxembourg Gardens by M. Edelfeld, two good portraits by M. Eguisquiza, and the cattle of M. Vervé.

The second exhibition referred to is that of the works of Théodule Ribot, works in black and white, etchings, effects of light and shadow, &c. The exhibition in Rue Laflitte includes about 100 pictures and sketches, figures, portraits, still life, all showing the same marked originality, and the same search after truth and nature.

Most interesting of all, however, is certainly the exhibition of the works of Millet at the École des Beaux Arts. Millet, whose life was nothing but a hard struggle defiantly endured, is now, after his death, universally hailed with a full recognition of the greatness of his genius. There are only sixty-seven pictures, 175 drawings, and a few etchings, but this small

exhibition reveals at every step the powerful genius of this great painter of rustic life, who had not always bread for his children, and whose paintings command showers of gold now. Among those exhibited is the celebrated "Angelus," which at a recent sale brought 228,000 francs, having been sold by the artist for 500. Among others are the "Gardense de Montons," the "Vanneur," the "Dénichers d'Oiseaux," the "Glaneuses," exhibited in 1857, and popularised by engraving; the "Baigneuse Rustique," the "Tonte des Montons," &c. Among the pastels, the "Récolte des Foins" is admirable in movement and life. Space alone forbids us to notice in detail this splendid collection, the proceeds from which are to go towards the erection of a monument which the town of Cherbourg is to erect to her great citizen, unrecognised while with her.

We mentioned lately that M. François Bonvin, the painter, had fallen under the calamity of blindness, and that a sale of his works had been organised to assist him. The sale has produced 35,000 francs, and thanks to the generous confraternity of painters, the aged artist, more fortunate than Miller, can end his days free from the cares of poverty.

The voting at the Palais d'Industrie for the "Médailles d'Honneur" has rather surprised the public. In the section of painting it was expected that M. Roll would obtain the majority of votes, but the medal has been decreed to 122 votes to the "Vanqueurs de Salamine" of M. Cornon, as against only 57 votes to M. Roll. M. Tattetgrain has obtained 36 votes, M. Henner 29, M. Benjamin Constant 27, M. Vollon 19, and M. Harpignies 10. In sculpture, M. Fremiet, whose "Héran d'Armes" was illustrated in the *Builder* some time ago, has obtained the medal by fifty-six votes for his group, "Gorille important une Femme" (a pleasant subject, truly! though the talent shown in the work cannot be denied). In the section of engraving M. Courty, a pupil of M. Gauchard and M. Flameng, has obtained the medal. His exhibits this year are "La Famille du Menuisier," after Rembrandt, and a portrait after Vandyck. In architecture M. Wable has obtained the medal for his design for an "Algerian Palace" or pavilion, prepared with a view to the Great Exhibition, and second medals have been given to MM. Devienne, Deglaue, Bonnier, Esquié, and Monnier; while MM. Louzier, Joannis, Debric, Contier, Touzet, and Balleynier have obtained each a third medal.

The work for the Great Exhibition goes on slowly but steadily, without interruption so far from Ministerial changes. The long-talked-of construction of a museum of decorative arts seems to have entered on a new phase. The State is to abandon any claim to the ruins of the Cour des Comptes; and the Union Centrale des Arts Décoratifs is to engage to devote a sum of 2,500,000 francs to the immediate construction of a museum on the site of the said ruins, on the condition that at the end of thirty years the buildings and the collection they contain are to become the property of the State. If this scheme is adopted by the Chambers the works will be commenced at once. On the Quai d'Orsay will be disposed a gallery surmounted by an upper story lighted from the roof. The inner court of the palace will be covered in and surrounded by other buildings on the existing foundations, and the remainder of the site will be temporarily formed into gardens. If this is agreed upon, it will be certainly a change for the better in the aspect of this now desolate-looking corner of Paris. It is desirable also that the Government should come to some decision in regard to the Tuileries. As the actual Chamber of Deputies is now quite insufficient for the number to be accommodated, and the Palace of the Senate much too far from it, there is serious talk of creating a great legislative palace stretching along the Rue de Tuileries and uniting the Pavillon Marsan with the Pavillon de Flore. All the services of Parliament and of the Ministry of the Interior would be concentrated in this Pavilion, to which the Monument to the Revolution would serve as a façade. So far the idea is good; but unfortunately the plan submitted to the Chambers would include, apparently, the demolition of the Palais Bourbon, of which the materials and site would be sold for the benefit of the new structure. It is difficult to believe that such a piece of barbarism could be carried out as to destroy this building with its bas-reliefs of Cortot, Rude, and Pradier, which forms such

an important part of the architectural decoration of the Place de la Concorde, the design of which would be completely unaltered by such a step, against which it is to be hoped there will be an energetic public protest raised.

It may be noted that the famous Ministry of Arts instituted by Gambetta, and which had only an existence of a few weeks, seems to have come to life again; at least, there is an effort in favour of such an institution, emanating from the Société des Artistes Français, on the ground that the arts require to be more efficaciously supported and protected; and it is reported that there are petitions or demonstrations forthcoming, in the same direction, from a number of other artistic and literary societies, and even from the syndicates of the *ouvriers*. We see very little good likely to arise to art from any such institution, or, indeed, to any except the holders of some possible sinecures with large salaries attached to them.

NOTES AT THE AMERICAN EXHIBITION EARL'S COURT.

This Exhibition, which is sometimes spoken of as the "Yankeries," was opened on the 9th ult., but is still in a somewhat incomplete state. Pleasure has had the main attention: "The Wild West" and Tobogganning are ready and appreciated; so also is the "Switchback Railway," which is recommended to adventurous pleasure-seekers as affording "most fun to the square inch on earth."

There is an exhibit by the International Terra Cotta Lumber Company of Chicago, U.S.A., of porous earthenware, which can be moulded to any shape, and used for building purposes; these are called under the several names of terra-cotta lumber, brickwood, cellular pottery, and wood-stone. They are formed from the burned products of earthy and vegetable matters, such as clays, clayey loams, saw-dust, and cut straw, first made plastic by the addition of water in machine-mixing processes, subsequently pressed into any desired form by heavy power, and finally dried and burned as bricks are dried and burned. The vegetable matters in the dried compound, proportioned with clay in equal or greater parts, serve as fuel for burning the clay, none other being needed after ignition is effected, and when eliminated from the compound by combustion leave a brick-like residue so porous that its weight is from half to one-third the weight of common bricks, and the material can be nailed and worked with carpenters' tools; the specimens we saw seemed to cut readily with a saw, and were of a pale red terra-cotta in colour, and were only plain slabs similar in size and look to ashlar facing. It is claimed that this material is incombustible and adapted for the fireproofing of the interiors of brick and wooden houses, and can be used for the lining of chimneys, though we should have thought their porous formation would certainly require to be covered with cement or plastering of some kind, which would adhere remarkably well to such a material. It is further claimed that the insulating properties of the material against sound, heat, cold, and electricity are not to be excelled, and this we should think to be the case.

There is a wonderfully cheap and effective filter, called "The Boss Filter," the price being only 5s. It is easily attached to any moderate sized tap, say from  $\frac{1}{2}$  in. base to  $\frac{1}{4}$  in.; it is made of metal, and is cylindrical, being about 2 $\frac{1}{2}$  in. in diameter, with opening at the top for the nose of the tap to enter, and one at the bottom for the filtered water to pass out at. The tap passes into the opening at the top, and the filter is pressed tightly home to the tap, which then is compressed into or against a perforated rubber collar inside and secured by side screws. The water, passing at the top from a  $\frac{1}{2}$  in. hihook, comes from the filter very clear and very quickly, in about the same body as it would from a  $\frac{1}{2}$  in. bib (common way). We could not penetrate the confidence of the inventor, who showed it personally, far enough to find out the composition which formed its wondrous interior. He calls it "a special preparation or well-considered combination of the best known filtering media." Such a lengthy and mysterious compound could scarcely stand for charcoal and sand, we should think. If it but keeps away a few of the dire troubles that come from bad water, it is welcome and cheap. Messrs. Eaton & Co. are the London agents

There is shown some door furniture, "Pike's," that has an alarm concealed in the collar of the inner handle. Any one turning the outside handle to enter or open the door turns a little catch in the inside handle which strikes an alarm, and this alarm can be set so as not to sound if required. The same patentee is the inventor of the self-threading needle, which is already known in London. One side of the eye of the needle is cut through, and admits of the upper part bending in on the cotton being pressed against it, and the cotton at once enters the eye. The action is similar to that of the snaffle of a watch-chain.

Several (so-called) self-lighting gas-burners are exhibited, very similar in their construction, each having a small sentinel jet beside the larger one, and this small jet protected; no doubt jets of this kind are already familiar to some of our readers; and there are some with levers and chains, for hall-lights or public buildings. Mr. H. Fabrig, of Maskegon, Mich., U.S.A., and Hackney, has a series of these jets.

Mr. Pike, of New York and London, has another series. One of his is to be had for as small a sum as 2s. 6d. He is the patentee of the alarm door furniture and needle already referred to.

An improved plumbers' stove is exhibited by the Doane and Wellington Manufacturing Company, of New York and London. It is called the automatic cold-air pressure furnace. Naphtha or benzoline is used. The same patentees have what they call an automatic torch. This is a lamp for burning off paint. It produces a larger flame and greater heat than those now in use.

OBITUARY.

Mr. Henry Hill.—We regret to announce the death of Mr. Henry Hill, of Cork, who, during a long life, practised as an architect in that city. In 1839 his design for the Corn Exchange, Cork, was adopted, and about the same period he built the "Queen's Old Castle," a business establishment that is still a model of lofty proportions and good lighting. From that time he designed many churches, mansions, and other buildings, and was well known and highly esteemed throughout the South of Ireland. In recent years he was assisted by his son, Mr. Arthur Hill, B.E., but down to the last day of his life he took an active part in his profession. He died in his 81st year, and was interred in Cloyne Cathedral on the 30th ult.

Mr. W. Jacobm.—We regret to have to record the death of Mr. William Jacobm, the Engineer to the London and South-Western Railway Company, which occurred very suddenly on the 26th ult., at his offices, Waterloo Station.

Mr. W. B. Moffatt.—The death is announced at Summercourt, St. Enoder, Cornwall, on the 24th of May, of Mr. William Bonyngham Moffatt, for many years partner with the late Sir G. Gilbert Scott, R.A. Mr. Moffatt, who had been long ill, was 75 years of age.

THE DECORATIVE WORK OF VIRGILIUS SOLIS.

"Virgilius Solis was my name;  
Through all the world extends my fame;  
For artists many, formed by me,  
Acknowledge my paternity,  
And call me father. I did ever  
To serve them use my best endeavour:  
I painted; graved with the burin;  
Illumined, to make art alluring;  
Design'd, to waken their ability;  
And stud'd, to teach their hands facility;  
And subjects traced on blocks of wood:  
So no one as my equal stood  
In executing works of art.  
With skill, refined in every part.  
In justice, then, the voice of fame  
Has given me Solis for my name;  
For that imports that, like the sun,  
I stand alone,—the only one.  
When fifteen hundred sixty-two,  
As Christians reckon, onward drew,  
And years I counted forty-eight,  
God pleas'd to call me from the state  
Of mortal life; and His behest  
Has number'd me among the blest."

In this grandiloquent, but not very eloquent nor elegant, language, the versatile Virgilius Solis is popularly supposed to have written his own epitaph. The voice of Fame has hardly, we fear, assigned to him precisely the same niche in the temple which he would have selected for himself; in this respect, however, he has not been treated more rigorously than the rest of us,—perhaps even with more leniency, for a

full measure of appreciation has always been accorded to his work; fame has ranked him, if not the greatest, certainly not the least, of that group of early German engravers known as "The Little Masters." In our issue of December 12th, 1885, Part II. of "The Decorative Work of the Early German Engravers," the short paragraph in which we referred to his work did Solis but scant justice. We were working at that time from the collection of prints in the Fitzwilliam Museum at Cambridge, and that collection is, unfortunately, somewhat deficient in examples of his decorative designs; but the continuation of our work in the Print Room of the British Museum has brought under our notice numerous specimens of it, and it is from these and from Regnard's invaluable but little known "Album" that the sketches illustrating our present article are taken.

Virgilius Solis was born at Nuremberg in 1514, and, according to his own account,—which, in this respect, may be taken to be accurate,—practised and taught almost every form of art; he died at the age of forty-eight, having executed an enormous quantity of work of every description. His decorative work is very interesting, and, apart from a number of cups which, in common with all other engravers, he designed for the goldsmiths, may be classified under three distinct heads: first, pure Renaissance ornament, in which he was not always very successful; secondly, Arabesque, in which he excelled; and, thirdly, a peculiar species of ornament, which, borrowing the word from Mr. Ruskin, we may call "hlottesque."

Figs. 1, 2, and 3 are the best specimens we have been able to find of his pure Renaissance work, and they will serve to show how uncertain and variable his powers of designing in this style were.

Fig. 1 is one of a considerable number of similarly-shaped panels, which are the merest *pot-pourris* of Renaissance "items." Most of them bear the well-known signature,—the intertwined V and S; otherwise they might be passed by as the feeble attempts of some of his pupils. On the other hand, the little piece of flat jewelled metal-work (fig. 2) is gracefully conceived and well carried out. Fig. 3 is a more ambitious piece of design. The flow of the structural lines in the ornamental border are equal to the finest work of the best masters; but the charm of the design is sadly marred by the menagerie and one or two very badly-drawn flowers. Of his work in Arabesque, however, it is impossible to speak except in the terms of highest praise. Scattered through Regnard's Album there are innumerable first-rate examples of it, from which we have selected one (fig. 4). Solis acquired an astonishing facility of designing this graceful form of ornament, and though he was apparently able to produce any quantity of it, the merest fragment is marked by great originality. The sword-hilt (fig. 5) is a combination of rather weak Renaissance and graceful Arabesque. The outline, however, is exceedingly good, and the general effect is of considerable beauty, though it cannot compare with the elaborate hilt of Woeriot (figured Jan. 22, 1887), nor with either of the simple or elaborate ones of Holbein (figured Nov. 6, 1886).

The group of sketches given in fig. 6, contains three examples from a number of curious designs,—the purpose of which is not very apparent,—treated in Arabesque and pure line.

We now turn to Solis's third style of ornament,—the "hlottesque." It is always pleasant to devise ingenious theories accounting for successive steps in the growth of any art or science; there is a theory which we must confess has always appealed to us as a very plausible one, which accounts in a simple way for the stride forward which decorative art took from the use of lines of uniform thickness to those of varying thickness and leaf-like form. The suggestion is that the step was unpremeditated, but resulted from the resemblance which strokes made with a brush full of paint bore in outline to leaf and flower forms; and that the famous honeysuckle pattern owes its origin entirely to this. Be this as it may, it must be admitted that very charming forms are obtainable from the use of the swelling curves which slight pressure on a full brush produces, and that they may be obtained in an almost endless variety. Our readers may possibly remember what we called the "quill-pen curves," which Le Blond introduced into many of his designs (figured Jan. 15). Virgil Solis made use of brush-strokes of a kindred nature to a remarkable extent, and produced a charming effect



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 5.

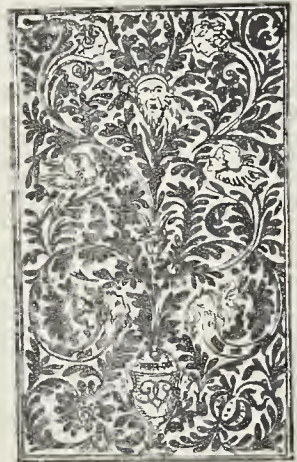


Fig. 7.



Fig. 6.



Fig. 8.



Fig. 9.



Fig. 4.



with them. In three plates, which we believe are well known to all students of early engravings, and of which fig. 7 is a copy of the most striking, a small surface (not much more than 2 in. by 3 in.) is closely packed with a scroll, the leaves and flowers springing from which are composed of nothing but these irregular and ever-varying brush-strokes. The main lines of the scroll are themselves exceedingly graceful and well balanced, but the undoubted charm of the design lies in the vigour and dash with which these strokes are drawn, concealing the art with which they are devised, and giving a general appearance of want of premeditation to the whole. In fig. 8 are three other little scraps, which we have selected as noteworthy examples of the same style from another series of Solis's designs.

In fig. 9, we have also sketched three designs, which are even still more worthy of the name "blottesque," by Pierre Floetner, who flourished about the middle of the sixteenth century.

#### MACHINERY AT THE MANCHESTER EXHIBITION.

MANCHESTER, as the head of one of the great centres of English engineering industry, has well exemplified its position by bringing together what may be fairly termed a really splendid collection of engineering plant and machinery. At Old Trafford the visitor may see in active operation and be initiated into the mysteries of spinning, weaving, wool-washing, wood-working, printing, &c., all carried out by machines of the most improved and advanced types. Instructive and interesting as these processes are, we confine our remarks to those exhibits which are more nearly allied to the interests of our readers.

*Prime Movers.*—Steam is supplied to the Machinery in Motion department by a battery of ten Lancashire boilers, made by W. & J. Galloway & Sons, Knott Mill Iron Works, Manchester. Each of these boilers measures 30 ft. by 8 ft., is fitted with thirty-eight coned tubes, and is capable of supplying steam for 400 indicated horse-power. They are made of steel and designed for an ordinary working pressure of 100 lb. to the square inch. They are each arranged with a back flue, and are complete with all usual fittings. The workmanship in them appears to be of the highest order. We may add that the exhaust steam from the various engines is carried into one main chimney.

Some fine specimens of locomotives are contributed by the London and North-Western Railway Company, Lancashire and Yorkshire Railway Company; Manchester, Sheffield, and Lincolnshire Railway Company; Beyer, Peacock, & Co.; Sharp, Stewart, & Co.; and Naemth, Wilson, & Co.

The machinery in motion is driven by engines supplied by Messrs. Hicks, Hargreaves, & Co., of Bolton; Messrs. J. & E. Wood, of Bolton; Messrs. Adamson & Co., of Hyde; and Messrs. Musgrave & Son, of Bolton.

Messrs. Hicks, Hargreaves, & Co.'s engine is a horizontal trunk engine of the Corliss type, and is a fine specimen of its class. The cylinder is 18 in. diameter by 4 ft. stroke. The valve gear used is a modification of the ordinary Corliss gear (Ingle's patent), and is fitted with double wrist plates, which control the steam and exhaust valves independently. The crank shaft bearings are made adjustable for wear horizontally and vertically. The engine is complete with high-speed and supplemental governor gear, and a Moscrop recorder is attached. Power is transmitted by rope gear from a driving pulley 20 ft. diameter, which acts also as a fly-wheel. For starting a small steam-barring engine is used,—this gears into teeth formed on the inside periphery of the driving-wheel, and is arranged to fall in and out of gear automatically.

Messrs. J. & E. Wood's engine is a high-pressure horizontal cylinder, 25 in. diameter by 5 ft. stroke. It is fitted with Corliss valve gear and quick-speed governor. The power in this case is transmitted by a rope pulley of 24 ft. diameter, grooved for fifteen ropes.

Messrs. Adamson's exhibit consists of a pair of coupled compound horizontal condensing engines, with 16 in. and 23 in. cylinders and 3 ft. stroke, to give off 200-h.p. These engines are of the trunk-girdle type and fitted with the Wheelock patent automatic cut-off gear, which is of very simple construction and appeared

sensitive and efficient in action. Both the high and low pressure cylinders are fitted with circular steam valves arranged with a reciprocating movement. A condenser and air-pump worked by oscillating gear are fitted, but are not in work. All the valves are placed below the cylinders, thus enabling any water arising from condensation to be readily got rid of. With the object, we presume, of reducing the friction of working, the cut-off valve is made concave on the face, with a double opening.

Messrs. Musgrave & Sons (Limited) show a strongly-designed pair of horizontal compound engines mounted on box framing. The high-pressure cylinder is fitted with a modification of the Corliss valve gear, and an automatic tripping gear is also fitted; a condenser is attached. These engines are started by one of Musgrave's patent barring engines, and must be pronounced fine examples of their type.

Messrs. Mather & Platt, of Salford, supply a pair of inverted cylinder engines, for driving part of the electric light installation. The cylinders are 20 in. diameter by 30 in. stroke, and two heavy fly-wheels are used. A convenient and somewhat novel form of automatic expansion valve gear is fitted. The dynamos are driven direct by means of leather chain belt made of double concave section to suit the convexity of the driving wheels. We noticed that these engines were driving at very short centres; the reason for this we are at a loss to conceive, as the slip and wear on the belt and bearings are thus considerably aggravated. The workmanship in these engines is everything that can be desired. Adjoining these engines is a pair of vertical high-speed compound engines, by Messrs. Davy, Paxman, & Co., of Colchester, of similar construction to those exhibited by the same firm at the recent Colonial Exhibition. Engines by Messrs. Robey & Co. and Messrs. Hornsby & Sons (Lim.), are also exhibited.

Seven Brush dynamos are driven by a fine pair of compound engines, constructed by Messrs. W. & J. Yates, of Blackburn, cylinders 14-in. and 25-in. diameter. The crank shaft, piston-rod, pins, &c., are constructed of Whitworth's compressed steel. A supplementary governor is fitted, arranged so that, in case of break-down or racing, steam is immediately shut off by means of an equilibrium valve.

Messrs. Rnston, Proctor, & Co., of Lincoln, drive some of the electric lighting plant with a highly-finished 14-in. and 24-in. compound engine. This is mounted on substantial box framing, in favour of which much is to be said, although some makers have abandoned it in favour of the girder type of frame. An extremely neat form of expansion gear, controlled by a high-speed Porter governor, is fitted. The valves are made treble ported, and the length of the steam passages has been reduced as much as possible. The feed-pump is worked by a separate eccentric. A condenser is fitted, but is not in use. The crank shaft bearings are made in three pieces, and are adjustable for wear in each direction.

An air-compressing and blowing engine is shown by Messrs. Walker Bros., Wigan. This is adapted for transmitting power in the form of compressed air in mines, tunnels, driving rock-drills, &c.; it is also used for compressing ether and ammonia for freezing purposes. The air is compressed by the action of a piston in an air cylinder, alternately drawing in the free air through valves, and expelling it afterwards through other valves, until by accumulation the air attains the desired pressure. The design and workmanship of this engine is very satisfactory.

Some specimens of vertical engines are exhibited by Messrs. Browett, Lindley, & Co., of Salford. They are of the simplest possible construction; the main frame is cast in one piece, and the slide bars are bored out true with the cylinder. The connecting-rod is made somewhat longer than usual for this class of engine, five times the crank. We noticed all the bearings were of anti-friction metal, a somewhat fresh departure for English-made engines, and one we do not altogether approve. The friction in using white metal may be somewhat less than with gun-metal, and also the first cost, but, unless the bearings are very carefully renewed, they often give much trouble and the shaft gets out of line.

Lindley's Patent Frictional Driving Gear for Dynamos is also shown. In this arrangement the engine and dynamo are placed on a bed-plate side by side. The crank-shaft of the

engine passes through the dynamo frame, and the face of the fly-wheel is used to drive a friction pulley on the dynamo shaft. The dynamo can readily be thrown out of gear, and for limited space and moderate powers this combination should prove useful.

A simple form of horizontal high-pressure compound engine is shown by Messrs. Westray, Copeland, & Co., Barrow-in-Furness. The apparent object in designing this engine was to reduce the cost of manufacture to as low a point as possible. Both the high and low pressure pistons are worked by one valve, and the piston-rods are coupled on to one cross-head, consequently only one connecting-rod is needed. The feed-pump is worked by the same eccentric and rod as the valve,—an awkward arrangement, to say the least, in case of a breakdown. The engine is mounted on a cast-iron foundation, which forms a water-tank. The workmanship displayed is satisfactory.

Gas-engines are well represented by the exhibits of Messrs. Crossley Bros., Messrs. Andrew & Co., Messrs. Dempster & Co., and Messrs. Wallworth & Co.

Messrs. Crossley Bros. exhibit, amongst other things, one of their 4-h.p. horizontal engines combined with a Crompton dynamo. The dynamo is mounted on the cylinder, and driven by a link leather belt from the fly-wheel. The arrangement is compact, but it necessitates the use of a short driving-belt, and the use of a jockey pulley to prevent undue slipping. A sensitive form of pendulum governor, especially adapted to the requirements of electric lighting, is fitted to this engine. A 7-h.p. engine, combined with force-pumps, and a 4-h.p. engine, with Lightfoot's patent dry-air refrigerator, are amongst the other exhibits.

Messrs. Andrew & Co., Limited, show one of their "Stockport" horizontal gas-engines in motion; and "Elland" gas-engines (Campbell's patent) are shown by Messrs. Dempster & Sons.

Messrs. Henry Wallworth & Co., of Manchester, exhibit Sturgeon's patent gas engine. It is claimed for this engine that the mixed charge of gas and air being ignited, its expansive force is received equally and simultaneously on two pistons. Each of these pistons moves up and down in a vertical cylinder, and imparts independently force to one pair of cranks on a double-crank shaft, to which it is connected by a sway-beam and connecting-rod. One impulse is given in every revolution of the crank shaft, and the working parts are balanced. The expansion of the charge is carried down almost to atmospheric pressure before the exhaust-pipe is opened.

In the grounds one of Spiel's patent petroleum engines is shown at work by Messrs. Shirlaw & Co., Birmingham. In this engine small charges of petroleum in its fluid state are used instead of steam or gas, the charge is ignited through the medium of a spirit-lamp and igniting-valve placed at the back of the cylinder. The petroleum is kept in a tank and drawn to a reservoir on the engine by means of a small centrifugal pump. The governor gear appeared to have the engine well under control, and the running was uniform. As coal or gas are dispensed with, this engine under certain conditions should prove itself useful.

Woodworking Machinery is represented by Messrs. Thomas Robinson & Son, of Rochdale, and Messrs. Pickles & Son, of Hebdon Bridge. Messrs. Robinson exhibit some ten machines, which include a centre-fed four-cutter planing and moulding machine. The main frame of this machine is cast in one piece, and the wood is fed through the machine by four feed rollers,—two plain and two fluted,—all of which are geared to prevent slipping. The bottom rollers are adjustable for wear, which is an improvement over the old plan of mounting them in fixed bushes. The top feed rollers are carried on swings hinged from a centro, and are readily raised or lowered by means of a hand-wheel to suit different thicknesses of wood.

The side-cutter spindles are mounted between the top and bottom cutter-blocks, which is preferable to placing them at the end of the machine, as is sometimes done. For working large mouldings, the top cutter-block is arranged to angle, so that the cutters working the thin part of the moulding need not project further from the block than the others, and it is less likely to be damaged. Altogether this is a compact and well-designed machine, but we notice that the countershaft is attached directly on to the machine; this may pass for small machines, but is distinctly objectionable on

large ones, as the belts have to run at short centres, which means more rapid deterioration of both belts and bearings.

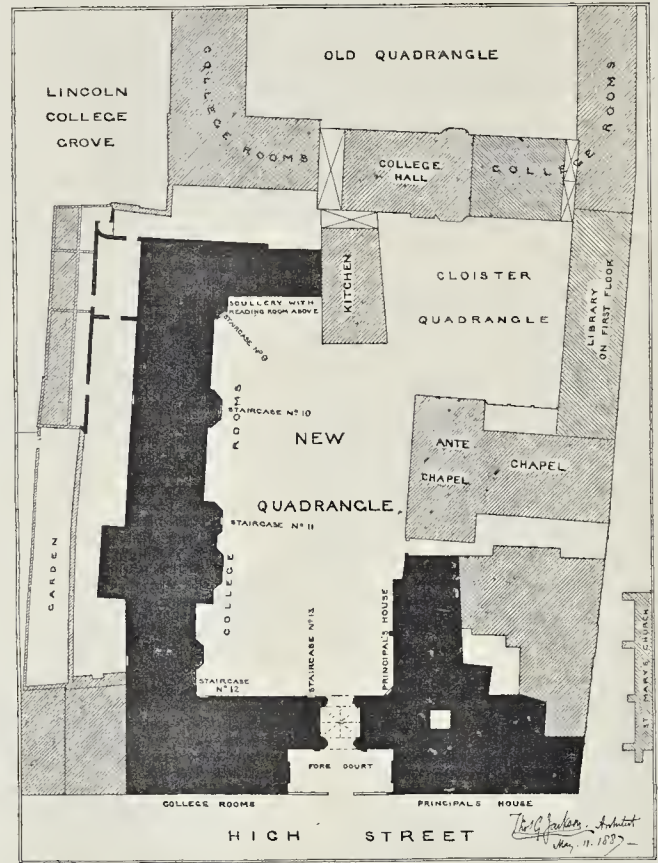
A somewhat new combination in the shape of a combined hand-feed planer and moulder is also shown here. This consists briefly of an ordinary surface-planer with the cutter-block spindle extended, and carrying an extra cutter-block for moulding at its outer end. An additional rising and falling table is fitted, and so arranged that the extra block can be worked either above the table,—the wood being fed under it for straight moulding, thickening, &c.,—or below the table,—the wood being fed over it for tonguing, grooving, &c. A fence and pressure spring for guiding and holding the wood are fitted. The outer end of the cutter-block spindle can also be arranged for carrying boring tools.

A sample of Armstrong's well-known patent machine adapted for cutting ordinary dovetails, angle dovetails, and blind dovetails, especially adapted for the requirements of box and packing-case makers, is also shown here. Amongst the other exhibits is a continuous feed circular saw-hench, a combined hand and power feed planing-machine, a tenoning-machine, steam mortising-machine, and band saw. The wood is fed through the saw-hench by means of fluted rollers mounted vertically on a spindle carried at the end of an adjustable radial arm. The radial arm swings on a pillar bracket in the front of the machine, and can be adjusted to suit saws of varying diameter. The front of the fence is fitted with friction rollers, and the bench can be used either for deepening or flattening as may be required.

Amongst other machines Messrs. Pickles & Son exhibit one for planing and thickening, fitted with Rawling's spiral cutters. For working curly or cross-grained woods these cutters possess advantages, as they give a gradual shearing cut to the wood instead of a more or less chopping cut, as given by ordinary straight cutters. The cutter-block is of spiral form and the steel cutters are screwed to it. The use of these cutters necessitates the employment of a special grinding apparatus to make them perfectly true on the cutting edge. The wood is fed through the machine by means of geared rollers in the usual way. The main frame is cast in one piece and is arranged with an extended base. An ordinary hand-feed surfacing and jointing machine fitted with these cutters is also shown, and a self-feeding cutter grinding machine for grinding long plane-irons to one exact level. This consists briefly of a horizontal spindle carrying a cylinder or cup emery wheel. The iron to be sharpened is bolted on to an adjustable face-plate mounted on a slide arranged with a horizontal traverse past the edges of the emery wheel. Adjustable stops regulate the traverse of the slide carrying the iron and reverse a rack and pinion motion till the right amount of level is produced on the iron, when it stops grinding. For planing very wide pieces, and to do clean and accurate work, a machine of this class is almost a necessity.

A combined continuous and drag feed circular saw-bench has one or two fresh features, the drag feed and continuous feed being driven from the same motion. The continuous-feed roller is readily adjustable to different sizes of saws or thicknesses of wood, and can be easily removed when it is required to use the drag feed. A useful form of saw-guard is fitted on one of the saw-benches, the guard is of hollow section to cover the top of the saw. It is hinged to a horizontal stand, arranged to adjust vertically by means of a hand wheel and screw. The guard may be swung back out of the way to allow of the saw being sharpened, and it is so placed at the back end of the bench that it does not interfere with cross-cutting.

Brick and Tile Making Machinery is represented by Mr. Wm. Johnson, of Leeds, and Mr. Thomas Fawcett, of Leeds. Amongst other things Mr. Johnson shows one of Kennedy's semi-dry brick, tile, cement, and concrete block making machines. This machine presents several features of interest, and its operation may be briefly described as follows:—The clay to be formed into bricks is fed into a hopper, in either a semi-dry or semi-plastic state, and is received by a hotbottom box or charger, which works in a slide on the face of the table and over the face of moulds formed in the table. The moulds are thus filled, and to ensure a dense feed a pressing-head drops on the material, whilst the charger is over the moulds, the pressing-head is then raised



Plan of New Buildings, Brasenose College, Oxford.

to allow the charger to return again under the hopper to be refilled, and in its passage it strikes off the surplus clay level with the top of the moulds. The pressing head then drops a second time, and two distinct additional pressures are given to the clay or brick. The presser then leaves the moulds, and the bricks are raised for delivery. A regulating apparatus is fitted, by which the thickness of the brick may be varied as required whilst the machine is running. The pressing plates and moulds are heated by steam, and require no further lubrication.

Four distinct pressures are given by this machine, and the bricks produced are of good form and very dense. For working difficult materials, it should be particularly useful. Hand lever brick and tile pressing and other machines are also shown here.

Amongst Mr. Thomas Fawcett's collection of brickmaking machinery, we noticed a very workmanlike duplex lever hand-power brick and tile press. In this press the pressure is obtained by means of double levers working from a crank shaft with a fly-wheel on, and it is claimed that a leverage of 5 to 1 over the ordinary lever or crank press is thus obtained. The brick, when pressed, is lifted out of the mould automatically at the same time the bottom plate is dropped down ready for the next brick. Mr. Fawcett also makes a wrought-iron perforated bottom clay grinding-pan, especially adapted for grinding shale, blind, marl, &c. It is driven from below, and is fitted with an arrangement for taking the weight of the rollers off the pan when not grinding.

**Penance.**—A new Reclabite Hall has lately been opened here. Besides the large hall, which will seat 700 persons, there is a smaller hall. The building is chiefly built of granite. Mr. J. W. Trounson is the architect.

## Illustrations.

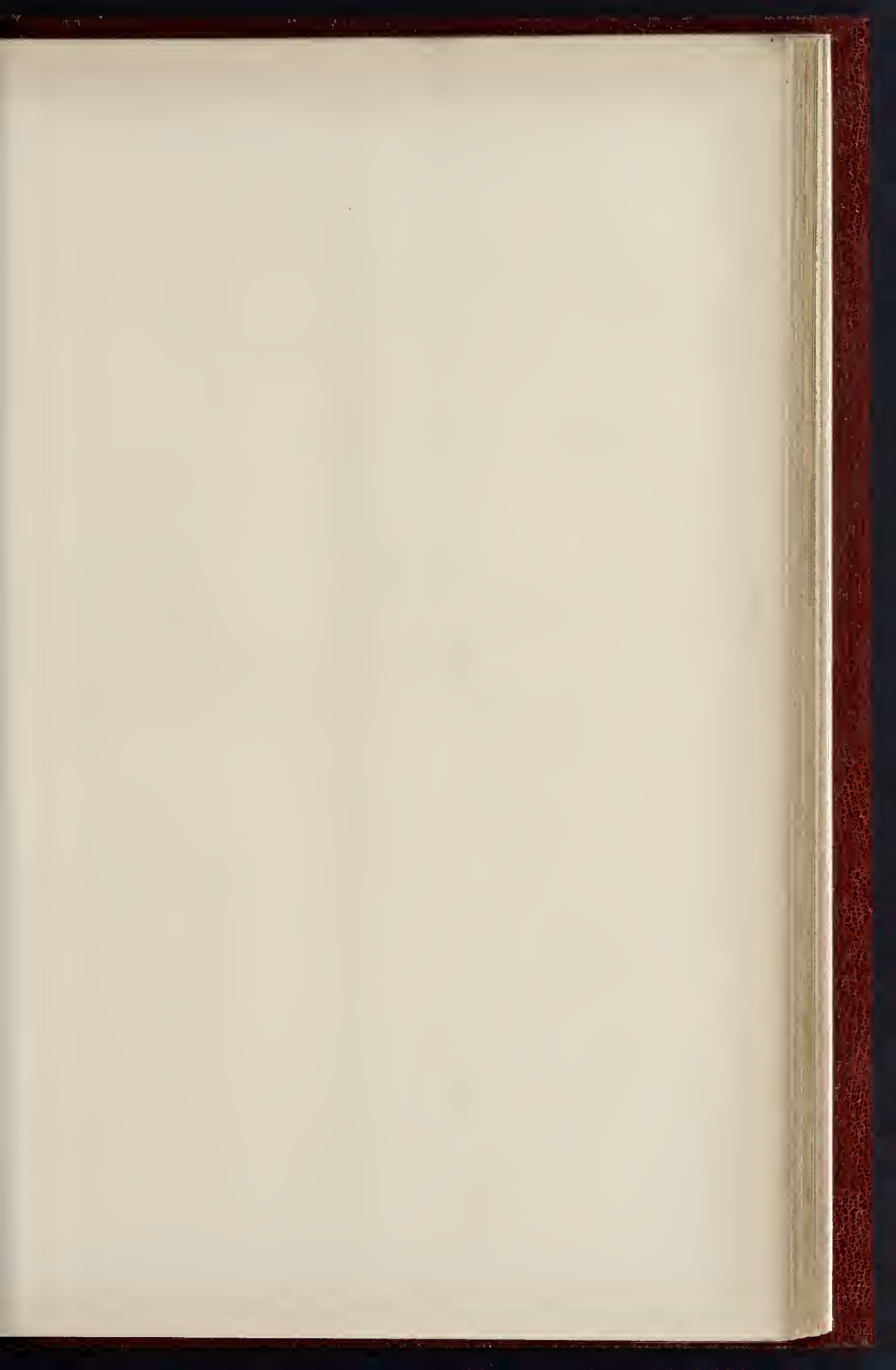
### BRASENOSE COLLEGE, OXFORD.

THE new quadrangle which is being built from Mr. Jackson's designs, at Brasenose College, Oxford, has been formed by the removal of several cottages in Amsterdam-court (whose name has preserved the memory of an ancient University hall which has long disappeared), and some buildings of timber and plaster of no antiquity, which contained rooms for undergraduates.

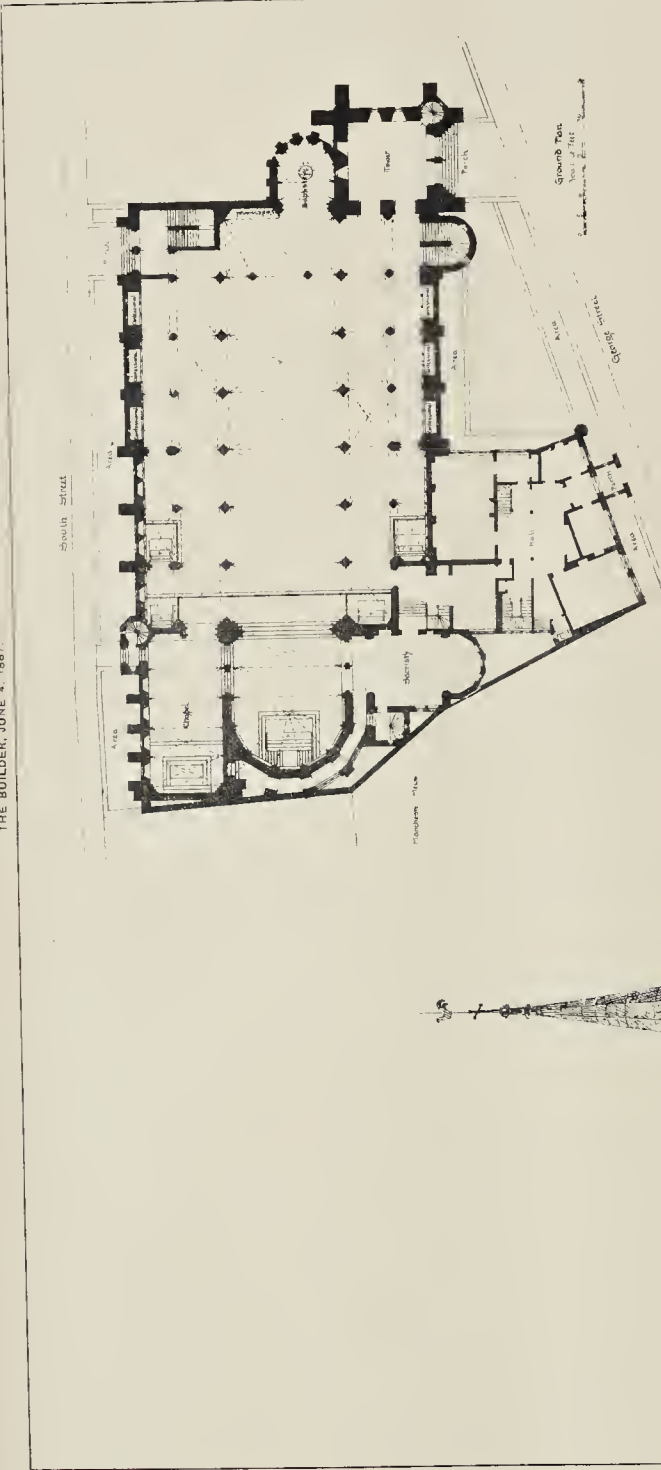
The wing which forms the west side of the new quadrangle was begun in 1882, and has just been completed, together with the return wing on the north. These buildings contain twenty-two sets of rooms for undergraduates, one large set for a Fellow, and two large lecture-rooms, as well as a reading-room for undergraduates, and some additional offices connected with the college kitchen.

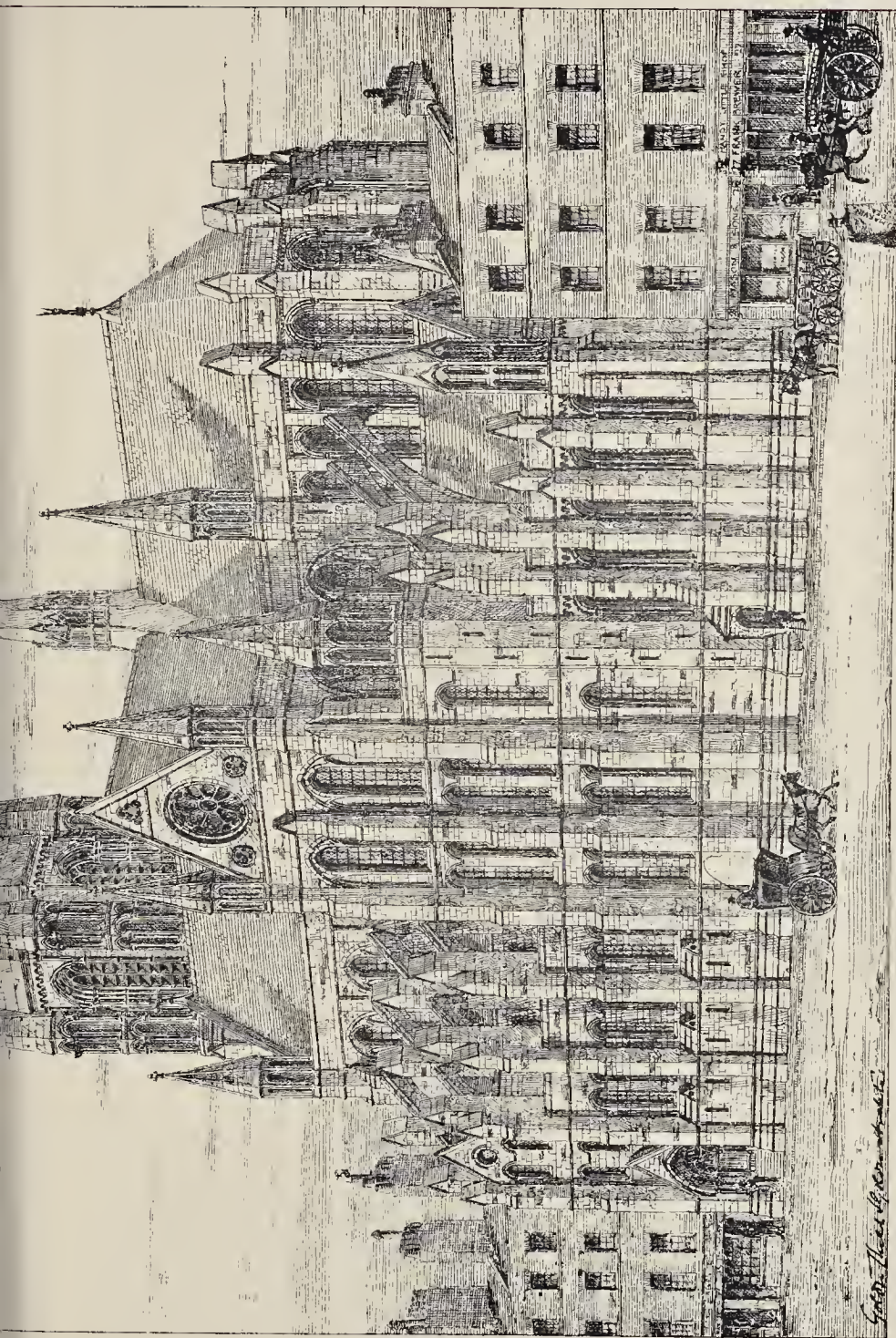
It is now proposed to complete the quadrangle by a south wing, with a frontage to High-street, extending westward from the corner next St. Mary's Church, with a gateway and entrance-tower in the middle. In order to place this tower so as to group well with the steeples of St. Mary's and All Saints' churches, which form the principal features of the well-known view of the High-street of Oxford, the new tower is set back from the street frontage, as the block plan will explain, so that a small forecourt will intervene between it and the street, enclosed at the sides by the other parts of the new building.

The introduction of a third important object into so famous a picture is naturally a difficult matter, and one that requires grave consideration. A square tower, such as is usual over collegiate gateways, would be discordant with the two steeples between which it would appear, while a steeple would be too ecclesiastical in



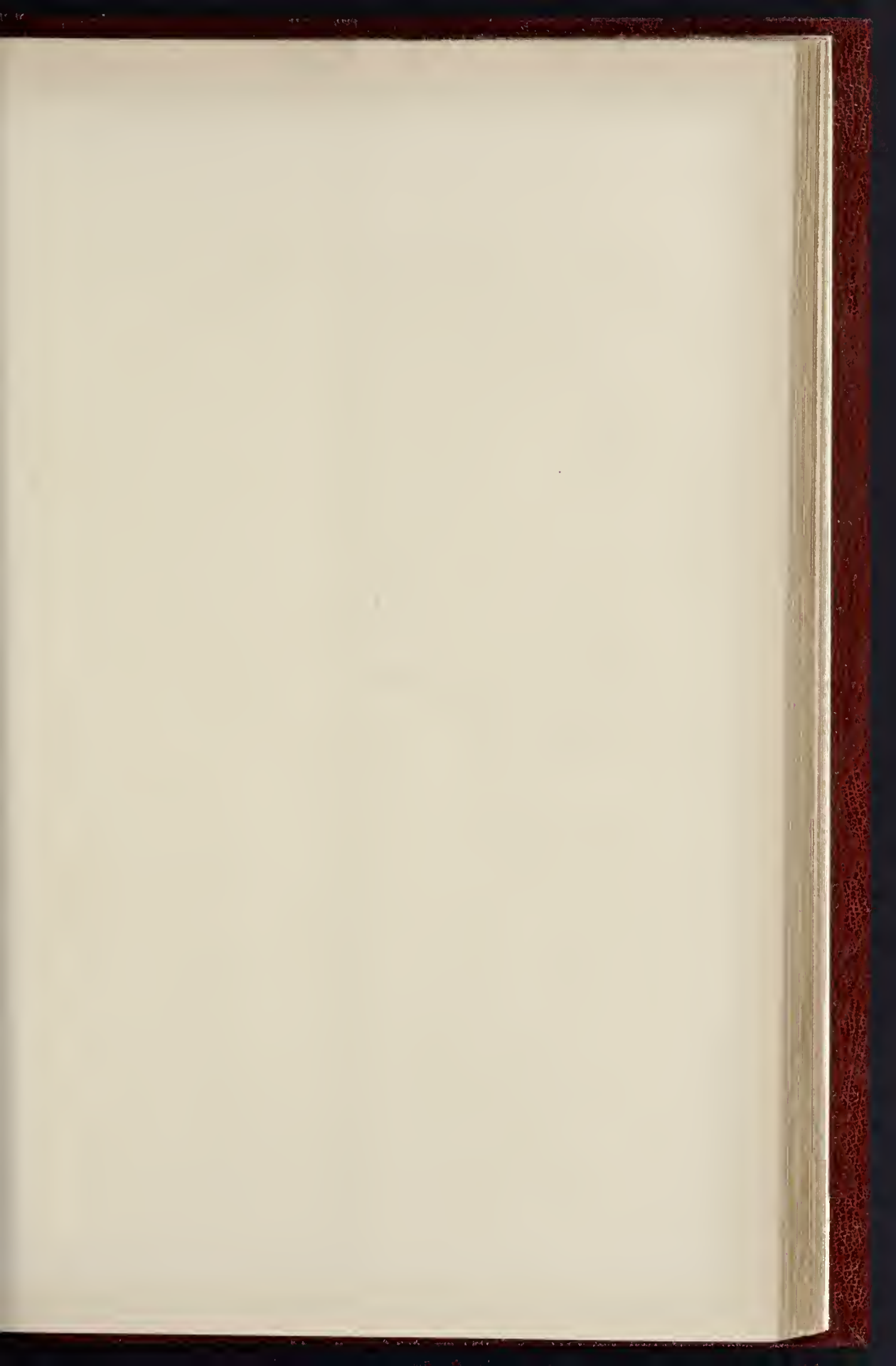
THE BUILDER, JUNE 4, 1887.





CHURCH OF ST. JAMES, SPANISH PLACE, REVISED DESIGN.—MESSRS. GOLDIE, CHILD AND GOLDIE, ARCHITECTS.



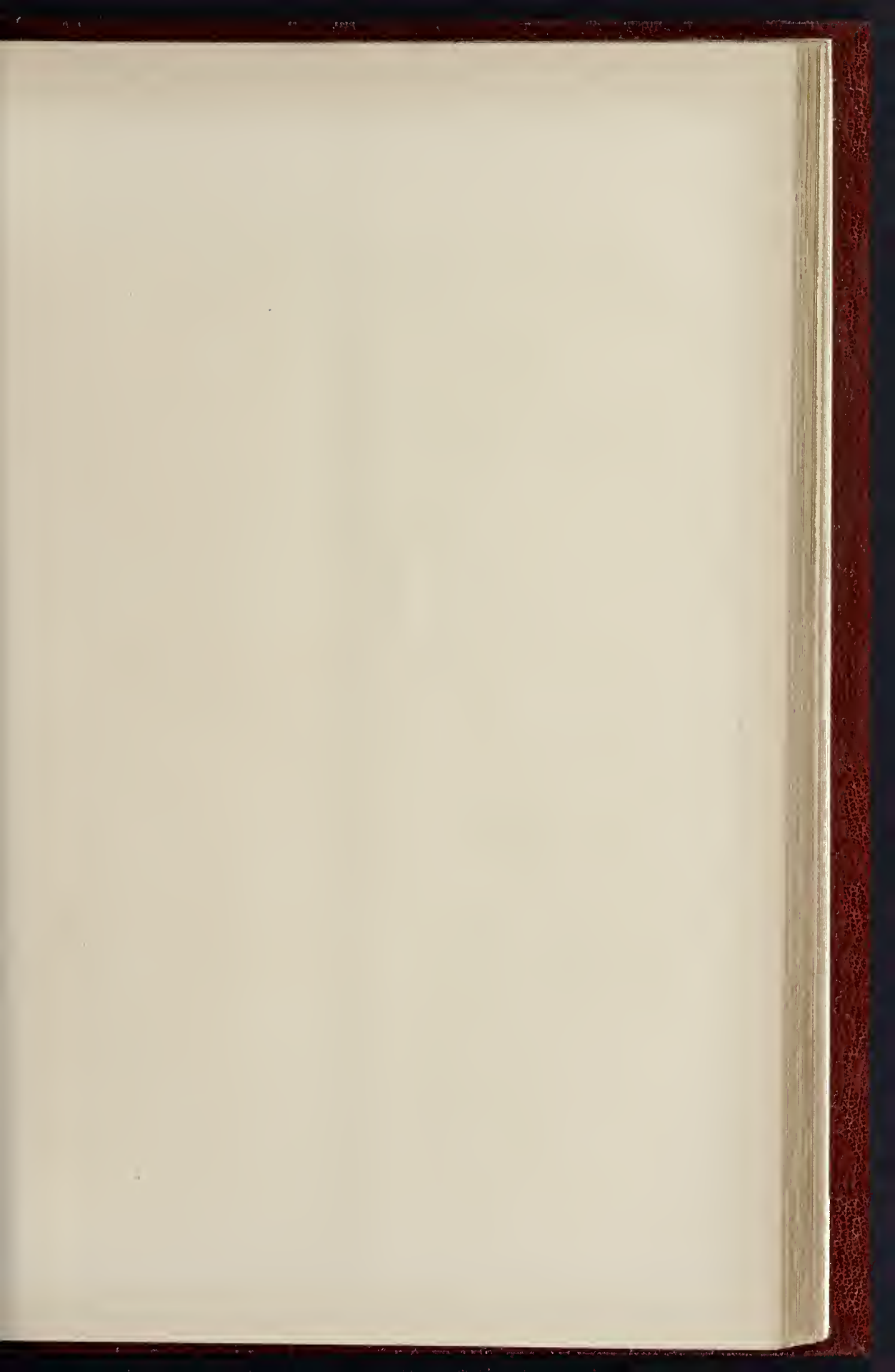


THE BUILDER, JUN 4, 1887

THE BUILDER, JUNE 4, 1887.







THE ARCHITECTURE OF THE HOUSE

THE BUILDER, JUNE 4, 1887.

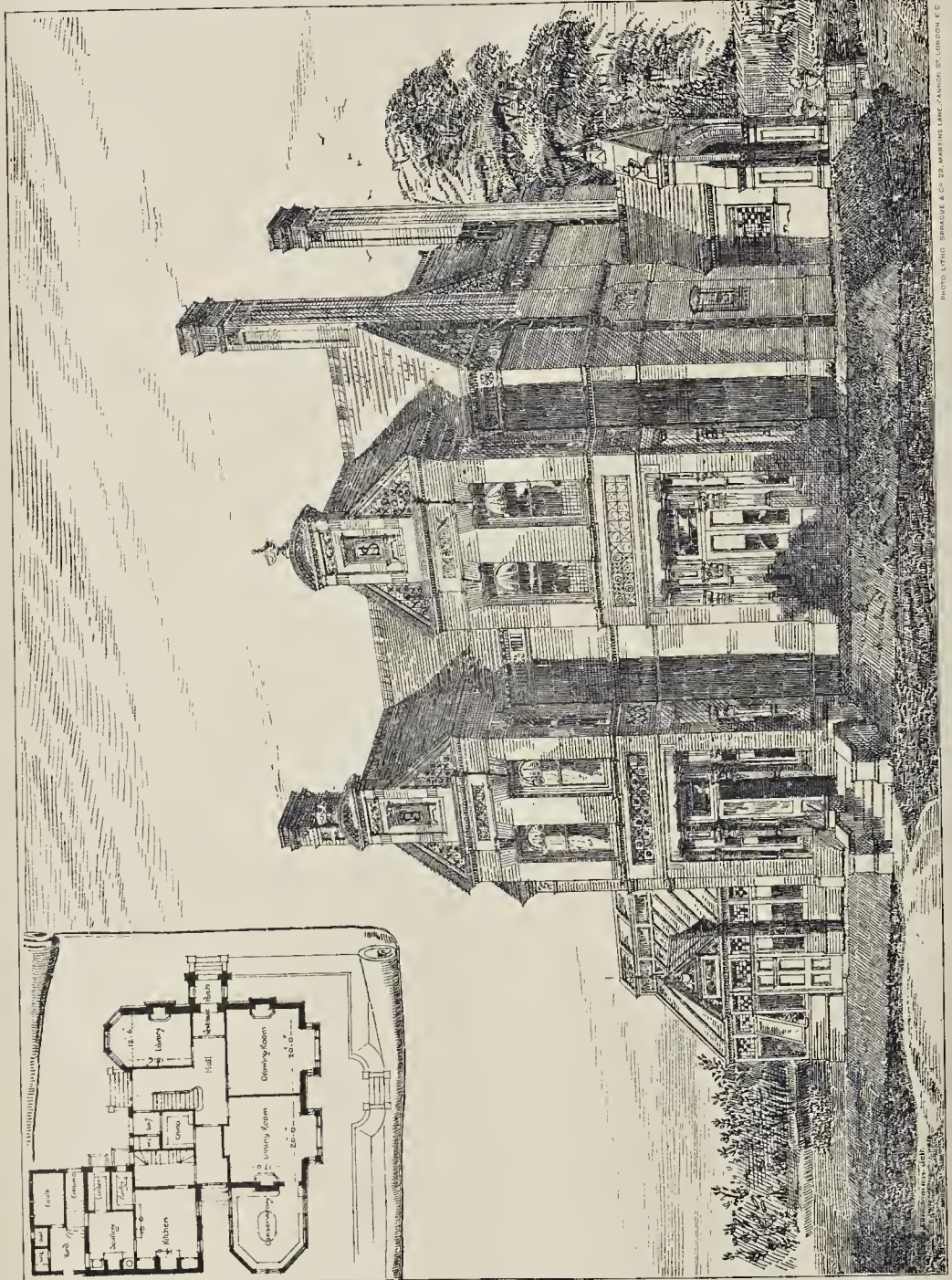


PHOTO LITHO. BRIDGE & CO. 25, MARK LANE, LONDON, E.C.

HOUSE AT GRINSBY.—MR. CHARLES BELL, F.R.I.B.A., ARCHITECT.

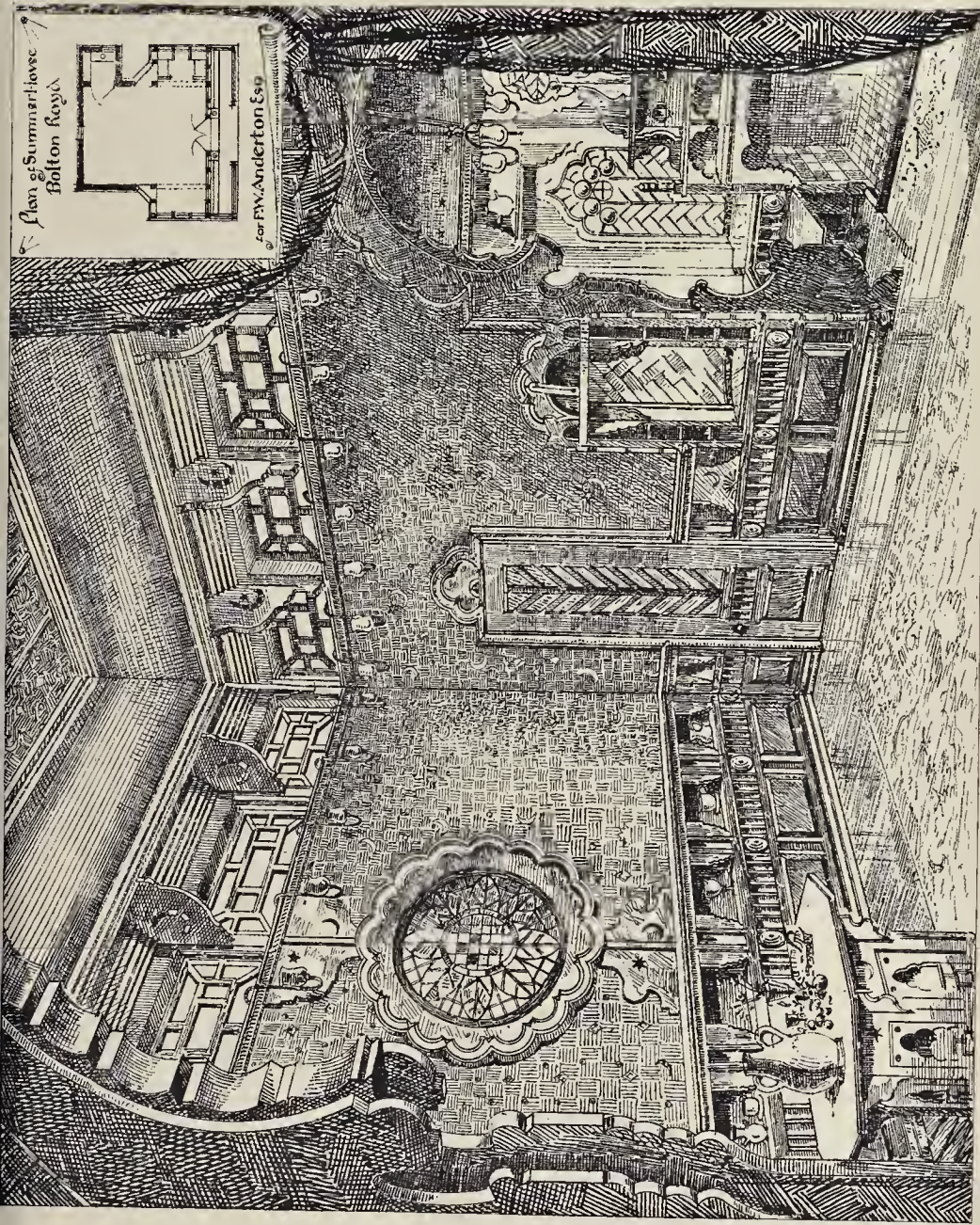


PHOTO-LITHO. SPAGNIE & CO. MARTINE LAKE, CANNON ST. LONDON, E.C.

SUMMER HOUSE AND SMOKING ROOM. BOLTON ROYD.—MESSRS. H. & E. MARTEN, ARCHITECTS.

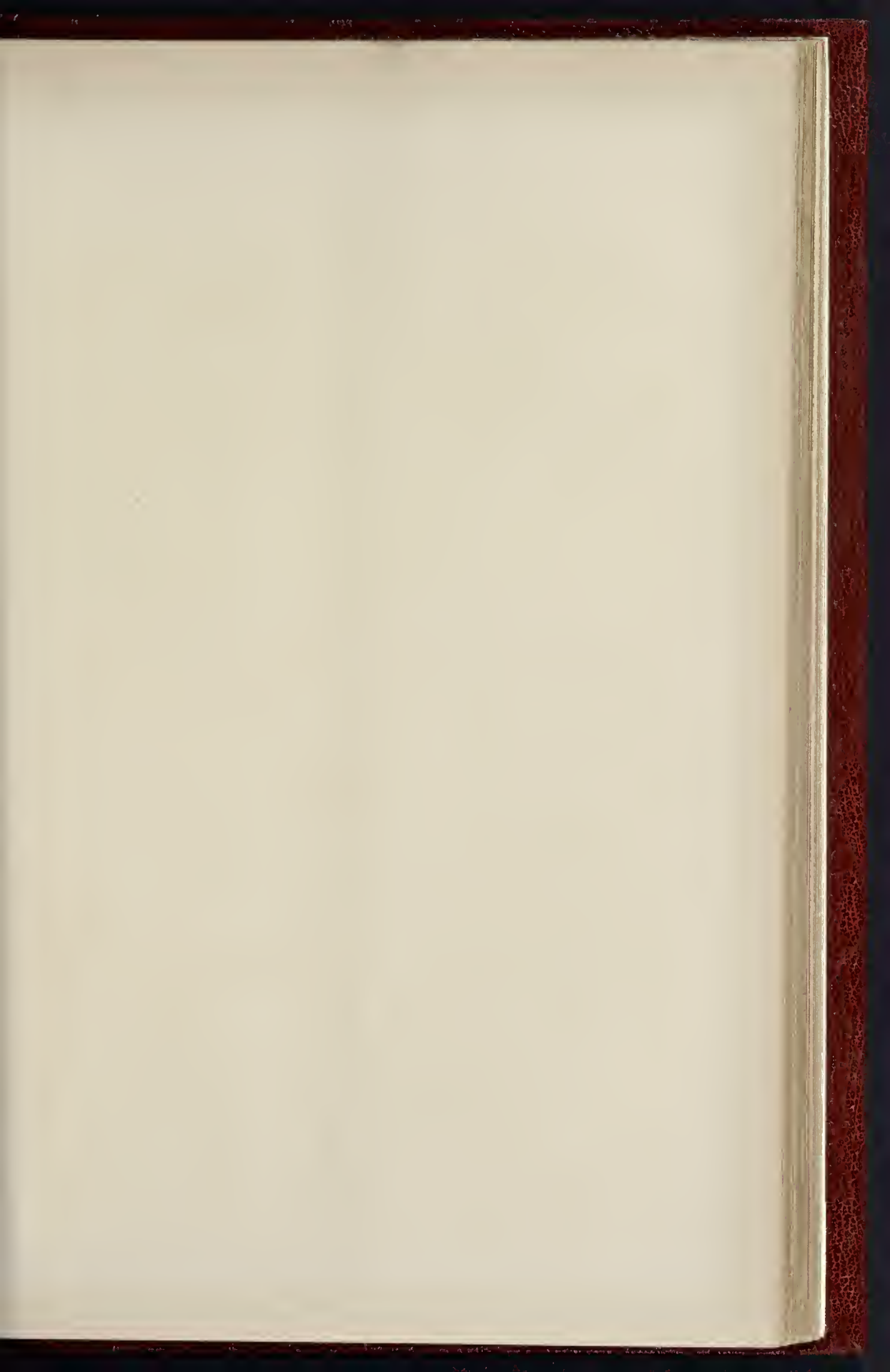




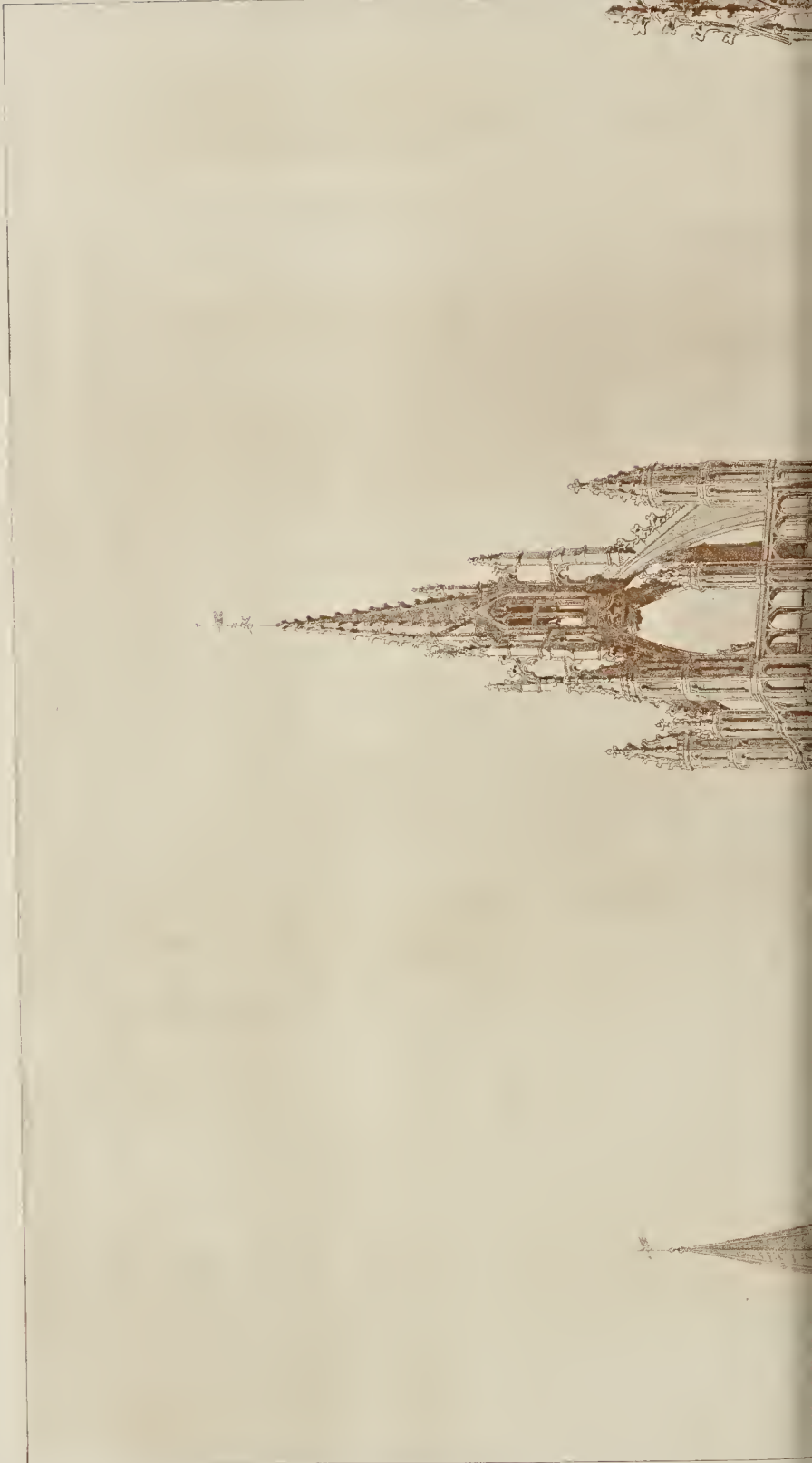
THE PHOTO ENGRAVING OF HARRIS & SONS, LONDON, IS THE PROPERTY OF THE

DRAWING ROOM AND LIBRARY, ROYAL MAIL STEAMER "ORMUZ".—DESIGNED BY MR. J. J. STEVENSON, F.R.I.B.A.





THE BUILDER, JUNE 4, 1887







NEW BUILDINGS, BRASENOSE COLLEGE, OXFORD.—MR. T. G. JACKSON, ARCHITECT

INT. PHOTO. SPANISH & CO. 22, MARTIN LANE, LONDON, E.C. 4.

THE UNIVERSITY OF CHICAGO

character for its purpose. An open crown steeple surmounting a massive square tower was adopted by the architect as the form which would best reconcile these difficulties.

Of the two blocks of buildings fronting the street, the nearer one will contain a new house for the Principal, and the farther one rooms for undergraduates.

The drawing from which the illustration is taken is hung this year at the Royal Academy.

THE SALOONS OF THE ORMUZ.

We give this week two drawings, one of the dining-saloon, the other of the drawing-room and library, of the new royal mail steamer *Ormuz*, the latest addition of the Orient Company, trading to Australia.

The Drawing-room and Library are on the main deck, beside the sleeping cabins, occupying together the breadth of the ship,—a dimension of 52 ft.; the total length of the ship being 480 ft. Their walls are lined throughout with satinwood, its rich yellow colour enhanced by gilding. In the panels of the drawing-room are pictures by Pettie, MacWhirter, Colin Hunter, Heny, O'Connor, Wylie, and Dudley. The furniture in this room is covered with blue Utrecht velvet from Morris's, and that of the library with dark green morocco. The floors are laid with Morris carpets. There is ample light from the reflection from the water from the white painted ceiling, and through the oval opening in the dining-room with its skylight above.

The Dining-room is placed on the upper deck, an innovation from the arrangement hitherto usual of placing it on the main deck, in the position occupied in this ship by the drawing-room and library. This avoids the necessity of going below for meals, which in rough weather prevents many passengers from taking them; while a passage outside the saloon, between its wall and the ship's side, allows the windows to be kept open in all weathers.

In the dining-room the floor is the teak deck of the ship; the walls are in Spanish mahogany, relieved by carved columns and inlay of satinwood patterns in rosewood stiles, with ebony mouldings round bevelled mirrors.

These rooms are all in the fore part of the ship, before the engines, instead of as formerly at the stern, for, since the introduction of crew-propellers, the forepart is found to be the pleasantest part of the vessel, especially in a voyage through the Red Sea and the Tropics, and is consequently devoted to the first-class passengers. On the deck above the dining-room is a second drawing-room, with a broad promenade on each side measuring an eighth of a mile round. There are thus four saloons besides the smoking-room for the first-class passengers instead of the single dining saloon devoted to their use in older ships.

The *Ormuz* has just returned from her first trip to Australia, having made the fastest passage on record by one day and nine hours, including stoppages and detention. She was built by the Fairfield Company at their works in the Clyde in nine months from receiving the order, the workmanship throughout being of the most excellent description. The fittings of the saloons were executed at Fairfield from drawings by Mr. J. J. Stevenson, architect, of London; the carving and inlay were done by Messrs. Knox and Walter Smith, of Lambeth.

R.C. CHURCH, SPANISH-PLACE.

We give the revised design of the exterior of this church, by Messrs. Coldie, Child, & Coldie. The design has been somewhat modified since we published a view of it at the time of the competition. (See *Builder*, August 1st, 1885).

A HOUSE AT GRIMSBY.

This house occupies a good site in the outskirts of the town, and is built of best red local bricks with Red Mansfield stone dressings. The ring-courses and gables, &c., are of the northern Company's bricks, as are also the balustrade and wall to the garden in front of the house. The roofs are slated.

The plan is specially made to suit the owner's requirements, and consists of drawing and dining-rooms in the front, with library in rear, spacious hall, and staircase. There are six bedrooms and dressing rooms. All the principal

rooms have mahogany doors. The hall is marble mosaic, by De Crelle & Co., of London.

The glazing to the staircase window is of special design, introducing conventionally-treated sea fish, &c., and in the centre is a fishing smack. Mr. Alderman Smethurst, J.P., Mayor of Grimsby, the owner of the house, is one of the largest smack-owners in the town. The architect is Mr. Charles Bell, of London, and the builder is Mr. T. H. Smith, of Grimsby.

SUMMER-HOUSE AND SMOKING-ROOM, BOLTON ROYD.

The exterior of this room is treated in Japanese character, whilst the interior is of Moorish design.

The plan shows two recesses, one for a fireplace, the other a divan; a lavatory or pantry adjoins, and arrangements are provided for serving afternoon tea or other light refreshments.

The windows in the elevation facing the lawn-tennis ground are glazed with patent plate in leading lights, the remainder of the glazing being richly coloured.

The walls are constructed of timber and concrete on a stone base, and are covered internally above the dado with Lincrusta-Walton, and effectively decorated with Moorish symbols.

The furniture, hanging lamps, and other details were specially designed by the architect, Messrs. H. & E. Marten, of London.

NOTES FROM DENMARK AND SWEDEN.

WITH regard to the decision of the Danish Parliament, recently referred to in the *Builder*, of rebuilding the Castle of Christiansborg, the royal residence at Copenhagen, which was destroyed by fire a few years ago, and also to erecting a new House of Parliament, it now appears that the committee appointed to report on the details of these plans have recommended that the future castle shall serve both as a residence for the royal family and seat of the Assemblies. The latter are, however, to be located in a wing of the palace entirely separated from the rest. Designs will be invited for this plan, the number of premiums being seven, of 115*l.* each.

The Danish Parliament decided, in the session just closed, to devote a sum of 350,000*l.* of State funds for the purpose of pulling down certain "rookeries" in Copenhagen, and to build on their sites modern dwellings for labourers and artisans. The amount will be advanced by the city authorities, in the manner they may decide, at a very low rate of interest to builders.

A little while ago the first stone was laid of the Exhibition building in Copenhagen, to be opened next year. The frontage of the main building will be about 1,000 ft., and it will be surmounted by an enormous glass cupola and four towers at the corners. There will be three entrances. This building will be devoted to home and foreign art exhibits, whilst a number of small buildings will be occupied by the various other courts. There will also be gardens, &c., as at the last exhibitions at South Kensington. It seems that the exhibition has a very good prospect of success, as a large number of applications for space has been received from abroad, as well, of course, as from Scandinavia.

During last year the chief of the Copenhagen fire brigade paid a visit to several European capitals in order to study the system of fire-extinguishing adopted in those cities, the result of which visits is that the whole fire brigade in the Danish capital is to be reformed. Thus, the numerous little fire-stations all over the city, equipped with a manual engine and some ten men, are to be replaced by one central and a few hand stations, replete with steam-engines, life-saving apparatus, &c. The wages of the men are also to be increased, and they will have the right of retiring on a pension after fifteen years' service. A complete system of telegraph and telephone service will also be established. The outlay in the new scheme will be 35,000*l.*, and the annual cost 18,000*l.*

In Sweden the restoration of the ancient cathedral of Upsala is now in full progress,—a work chiefly carried out by State aid. During

the cold months only internal work could be carried on, but now the restoration of the exterior has been resumed. The architect carrying out the restoration is Herr F. Langlet.

It appears from the Stockholm journals that during the present spring the building industry in the suburbs of Stockholm has been very depressed,—in fact, it seems that the demand for small modern villa-like residences and artisans' dwellings, which gave such an impetus to the industry some years ago, has now been fully satisfied. On the other hand, speculators have turned their attention to the more central parts of the city, where so-called "eligible" sites for mansions are in great request, although difficult of obtaining. It is chiefly with the disposal of such sites that the principal estate agencies are now engaged.

The Queen of Sweden has appointed a committee for inviting and selecting a design, subject to her majesty's approval, for the new institute for the training of nurses, to be built in the celebrated Stockholm Park Djurgården, at the expense of the king and queen, the cost being estimated at 10,000*l.*

An institute, somewhat on the plan of the Imperial Institute, is to be founded in Stockholm, the President being the Crown Prince of Sweden. The object of the scheme is to develop the sale in foreign markets of articles of Swedish manufacture and industry, arranged exhibitions of the same, &c., with a central export exhibition depot in Stockholm. Some 500 members have already joined the association.

From the latest statistics published relating to the timber industry of Sweden, we learn that at the beginning of 1886, the total area of forest land in the country was 17,150,000 hectares, and that in course of the year 1,776,000 cubic metres of timber were felled, the price varying from 3*s.* 3*d.* to 6*s.* 6*d.* per cubic metre. At the end of the year, the value of the State forests was estimated at 2,250,000*l.* The revenue from the same amounted to 100,000*l.*, and the expenses to 40,000*l.*

A Swedish engineer, Herr Wellin, has constructed skates of glass instead of iron, which are said to have been found very suitable for their purpose.

THE LATE SIR HORACE JONES.

At the meeting of the Court of Common Council, on the 26th ult., the Town Clerk having read a letter announcing the death of Sir Horace,

Mr. Hicks, Chairman of the City Lands Committee, said he was quite certain that every member of the Court would receive the intimation of the City Architect's death with the deepest sympathy and respect (hear, hear). It was about twenty-three years since the then Mr. Horace Jones entered the service of the Corporation. He had been one of the high officers, and a more honest and faithful officer had never served the Corporation (hear, hear). He would content himself by saying that a large portion of the genius of Sir Horace Jones was written in stone in the City of London (hear, hear). He moved,—

"That this Court has heard with sincere regret the death of Sir Horace Jones, City Architect, and desires to offer its condolences to the widow and family on the irreparable loss they have sustained, and further to place on record its high appreciation of his ability as an architect, and of the faithfulness and integrity with which he always discharged the duties of his office."

Alderman Sir F. W. Truscott seconded the motion, which was agreed to in silence. The resolution was ordered to be signed by the Town Clerk and sent to the family.

Mr. Hicks subsequently moved "That it be referred to the Officers and Clerks' Committee to consider the nature, duties, and emoluments of the office, reporting thereon to the Court." He said he did this entirely on his own responsibility, because he felt there was a somewhat general feeling in the Court that the Committee should consider whether it would be more satisfactory to appoint a Surveyor rather than a City Architect (hear, hear).

Mr. Shaw seconded the motion, which was agreed to.

Mr. Hicks moved that Mr. Murray, the Principal Clerk in the Architect's Office, be authorised to carry on the duties of the office till the further orders of the Court. This was also agreed to *sem. con.*

The funeral took place on Friday, the 27th ult., at Norwood Cemetery, where the interment took place in the family vault. The *cortège* (consisting of a four-horse hearse and seven pair-horse mourning coaches, besides a number of private carriages) left the residence of the deceased, 30, Devonshire-place, W., about ten o'clock, and arrived at Norwood Cemetery shortly before half-past eleven. The burial service was read by the Rev. J. Hawes, (vicar of St. Paul's, Mill Hill, Hendon) and the Rev. Henry Patch (rector of Winchelsea, Sussex), brother-in-law of the deceased. The outer coffin, which consisted of polished oak, bore upon a knight's shield brass plate the following inscription:—"Sir Horace Jones, Knight, born May 20th, 1819. Died May 21st, 1887."

Among the chief mourners were Lady Jones (widow of the deceased), Mrs. Billing, Miss Wallick, Mr. Octavius Hansard, F.R.I.B.A., Sir J. B. Monckton (Town Clerk), Mr. H. H. Crawford (City Solicitor), Mr. G. P. Goldney (City Remembrancer), Mr. A. J. Brand (City Comptroller), Mr. Roderick (Secondary), Mr. W. Payne (City Chamberlain's Office), Col. Haywood (Engineer to the Commissioners of Sewers), Sir Charles Hutton Gregory, K.C.M.G., Mr. John Wolfe Barry, Hon. Associate R.I.B.A., Engineer of Tower Bridge; Mr. H. M. Brunel, Hon. Associate R.I.B.A.; Mr. James Patch, Mr. A. Great-Rex (medical attendant), Mr. E. H. Burnell, F.R.I.B.A.; Mr. A. H. Ewer, Mr. R. W. Edis, F.R.I.B.A.; and Mr. W. W. Onless, R.A.

The following gentlemen attended from the City Architect's Office, viz.: Mr. Andrew Murray, A.R.I.B.A. (Principal), Mr. Thomas Baker, Mr. A. L. Gosling, Mr. F. H. Williams, Mr. G. D. Stevenson, Mr. J. Pyhus, Mr. J. Hambling, Mr. P. Rees, Mr. J. Ellwood, Mr. G. Jackson, and Mr. W. J. Liberty.

There were also present at the grave the following representatives of the Royal Institute of British Architects, viz.: Mr. E. P. Anson (President), Mr. Ewan Christian (Past-President), Mr. Chas. Barry, F.S.A. (Past President), Mr. G. Aitchison, A.R.A., Mr. Alexander Graham, Mr. Arthur Cates, Mr. James Brooks, Mr. Henry Currey, and Mr. E. A. Gruning, Mr. Octavius Hansard, Mr. R. W. Edis, Professor T. Hayter Lewis, F.S.A. (Past Vice-President), Professor T. Roger Smith, Mr. Robert W. Mylne, F.R.S., Mr. Harry Oliver, Mr. Wyatt Papworth, Mr. John Norton, Mr. J. J. Stevenson, F.S.A., Mr. J. G. Turner, Mr. Andrew Oliver, Mr. Thomas Wells, Mr. C. E. Barry, Mr. W. E. Clifton (representing his father, Mr. E. A. Clifton), Mr. Thomas Henry Wyatt (Hon. Associate), Mr. W. H. Atkin Berry, Mr. F. T. Reads, A.M.I.C.E. (Hon. Associate), Mr. Pearson, jun., Mr. Charles Fowler, Mr. Thomas H. Watson, Mr. Henry Stock, Mr. H. H. Collins, and Mr. W. H. White (Secretary). Mr. Waterhouse, R.A. (who was on the Continent), Mr. J. Macvicar Anderson, Hon. Sec. (who was in Scotland), and Mr. C. L. Eastlake, Keeper of the National Gallery, and formerly Secretary, R.I.B.A., were unavoidably absent from the funeral.

The following gentlemen attended from the "Jerusalem Lodge" (197) of Freemasons, of which Lodge the late City Architect was a P.M. (having served that office in 1869; he was initiated in 1864), and treasurer at the time of his decease, viz.: Mr. R. F. Grantham (Hon. Associate R.I.B.A.), G.S. (Worshipful Master); Mr. G. L. Eyles (Senior Warden); Mr. C. E. Hollingsworth, P.G.S.; Mr. E. Letchworth, P.G.D.; and Mr. T. G. Bullen (Secretary).

From the Turners' Company, of which the deceased was a member, there were present Dr. R. Turtle Piggott, D.C.L. (Master), Mr. John Jones (Past-Master), Mr. E. Sydney (Past-Master), Mr. Brackstone Baker (Past-Master), Mr. R. Loveland (Past-Master), and Mr. W. M. Shirreff (Clerk). The Upper Warden, W. L. A. B. Burdett-Contts, M.P., sent the regrets of Lady Burdett-Contts.

There were also present at the grave Mr. Edward Woods, President of the Institution of Civil Engineers (Hon. Associate R.I.B.A.); Mr. Frederick Dadswell, C.C.; Mr. G. E. Wood, C.C.; Mr. P. de Lande Long, Mr. W. Miller

(clerk of works), Mr. T. Arnold, Mr. W. P. Padmore, Mr. C. Thwaites, Mr. John Mowlem Burt (Mowlem & Co.), Mr. C. H. Mabey (sculptor), Mr. Keavill, Mr. W. Read, Mr. Mills, Mr. H. Baily, Mr. F. Farwell, Mr. R. G. Glover (War Office), Col. Charles Harding, and Mr. G. de Maid.

Among the carriages which followed was that of Mr. Ex-Sheriff George Burt. Among the wreaths sent may be mentioned those from the Lord Mayor (Sir R. Hanson, Bart.), Lady Monckton, Mr. and Mrs. A. Murray, Mr. T. Baker, Mr. H. Oliver, the Staff of the City Architect's Office, the Officers of the Corporation, and the members of the Jerusalem Lodge. In all about 150 persons were present at the cemetery.

We may add that a portrait of the deceased, by Mr. W. W. Onless, R.A., is exhibited in this year's Royal Academy Exhibition.

#### BUILDERS' BENEVOLENT INSTITUTION.

##### ELECTION OF PENSIONERS.

An election of three pensioners on the funds of this Institution was held at Willis's Rooms, St. James's, on Thursday, May 26th, Mr. Basil E. Peto, the President, in the chair. There were six candidates for the three vacancies, viz., four men and two women. The poll was open from two to four p.m.

Shortly after the close of the poll the scrutineers, Messrs. Thomas Stirling and T. F. Rider, announced the results of the polling to be as follows, viz.:—James Picking, 25, Shillington-street, Clapham Junction, aged 61, builder (third application), 463 votes; Edward T. Roberts, 33, Broomwood-road, Wandsworth-common, aged 68, builder (second application), 1,685 votes (including sixty votes in respect of his former contributions); George N. Cott, 10, Mordaunt-street, Brixton, aged 69, builder (second application), 505 votes; James A. Abbott, 63, Stowe-road, Shepherd's Bush, aged 61, builder, 1,751 votes (including 210 added in respect of former contributions); Sarah A. Stableford, 366, York-road, Camden Town, aged 71, widow of Wm. Stableford, builder, 586 votes; and Ann Winter, 47, Maygrove-road, Bromdesbury, aged 62, widow of Benjamin Winter, builder, 488 votes (including 290 votes added for her late husband's contributions). The successful candidates were therefore declared to be E. T. Roberts, J. A. Abbott, and Sarah A. Stableford.

Among the friends of the Institution (other than those already named) who took part in the proceedings, were Messrs. George Plucknett, J.P. (Treasurer); C. Busnell, T. G. Smith, T. Hall, W. Scrivener, H. Colls, and R. Richardson. A vote of thanks to the chairman terminated the proceedings.

#### COMPETITIONS.

*The McArthur Hall, Belfast.*—The designs submitted in public competition for the McArthur Hall, Belfast, have been submitted to Mr. Alfred Waterhouse, R.A., for adjudication. Those of Messrs. Newenham Deane (R.H.A.) & Son, 3, Upper Merriion-street, Dublin, have been selected.

*Wesleyan Chapel, Newcastle-on-Tyne.*—The designs of Mr. J. W. Taylor, architect, of Newcastle-on-Tyne, have been accepted for the new Wesleyan chapel, lecture-hall, class-rooms, and caretaker's house, to be erected in Dilston-road, Newcastle. The chapel, which is of Gothic design, will accommodate 850 persons, and the lecture-hall 400. The estimated cost of the building is 5,000*l.*, exclusive of site.

#### ARCHITECTURAL ASSOCIATION VISITS

The first Saturday afternoon vacation visit of the Architectural Association was made on the 28th of May to Woolpits, Ewhurst, the house now being built for Mr. Henry Doulton, from the designs of Messrs. Ernest George & Peto.

From the site of the house magnificent views of the Weald of Surrey can be had, and the house has been designed with charming loggia, balconies, and belvedere, from which they can be seen.

The house is built of red bricks, which rise six courses to the foot, and huff terra-cotta dressings, the treatment of the detail being rather Flamboyant in character. The terra-cotta, which was made by Messrs. Donlton, is the most perfect work of its kind, the traceries

of the lines in the mouldings being particularly noticeable.

Over the entrance doorway a panel by G. Tinworth has been inserted, the subject being Abraham and the Three Angels, symbolising welcome; and over two of the mantel-pieces large panels by G. Tinworth are placed. All the mantelpieces are of terra-cotta.

The stables and coachman's house, and the entrance lodge, are picturesque buildings with tile hanging and half-timber work.

The drainage and sanitary work are very perfect. A double system of water-pipes is arranged in the house, so that the service can be continued even if any of the pipes are under repair.

#### WATER SUPPLY.

*Bristol.*—Dr. D. S. Davies, Medical Officer of Health for Bristol, has recently issued his first annual report, in which he explains that he has endeavoured to put before the Committee the present position of the district in regard to those details which more especially go to make up the sum of "sanitary condition." Referring to the water supply, he says:—

"The water supply is in the hands of a private company. Water is obtained by gravitation from springs at Barrow Gurney (Goldbath Spring), five miles, at Watery Combe, and at Chelston Meads (Chew Hill Head), sixteen miles from Bristol, on the side of the Mendips, from springs in the Triassic conglomerates and in the Carboniferous limestone. A recent additional supply is also obtained from springs in the Carboniferous limestone at Sherborne. The water from the Sherborne and Goldbath Springs is brought direct into the city; that from Chew Hill Head and Watery Combe is intercepted by the reservoir at Barrow Gurney, 310 ft. above Ordnance datum, with an extreme holding capacity of 350,000 gallons; whence it is brought to the city, joining the direct supplies at Redcliff. The combined waters supply the lower parts of the city en route, and also rise by gravitation to the pumping station and reservoir at Oakfield-road, 200 ft. above Ordnance datum, from which they are pumped up to the Durham Downs service reservoir, 320 feet above Ordnance datum, for the supply of Clifton and the higher parts of the district. The gravitation works were completed in 1851. After the dry winters of 1891-93, it was found necessary to provide permanent pumping works for a supplementary supply in years from wells at Chelvey, eight miles from Bristol, sunk in the New Red Sandstone (Triassic) 200 yards from any inhabited place. Two of these wells are 40 ft. deep, and a third 195 ft. The water is supplied to the city at constant pressure, except when turned off for necessary repairs. The present supply per head is calculated at about twenty-two gallons per day. A third reservoir is now in course of construction at Barrow, with a holding capacity of 500,000 gallons, which will practically double the available supply. As to any risk of excremental contamination, the water appears to be above suspicion; and no case of disease has, within my knowledge, ever been traced to its use. In the older parts of the city, many private wells still exist, the water from which is often preferred to the company's supply, on the ground of coolness. It is difficult in most cases to convince consumers of the ever-present danger that must always attend the use of water drawn from wells in the midst of a large city, where the subsoil from which the water is collected is necessarily loaded with the filth resulting from the life-conditions of 223,000 persons."

*Olney.*—Major-General C. Phipps Carey, R.E., one of the Inspectors of the Local Government Board, recently held an inquiry at the Mechanics' Hall, Olney, respecting the Board's application for a Provisional Order to amend the Olney Local Board's Act of 1885, so as to give additional powers to acquire twenty-five acres of land, instead of seven acres, and to borrow 20,000*l.* instead of 7,500*l.*, as sanctioned in the original Act. Mr. C. S. Rooke, the Board's Engineer, went into details of his scheme, and said the reservoir would hold a fifty-three days' supply, allowing twenty gallons per head per day for the population, which was now some 7,000. Mr. Jas. A. Paskin, Water Engineer to the Halifax Corporation, and Mr. Arthur Guyfield, of Olney, gave evidence for the Board. Mr. Gladstone, who opposed the application on behalf of a number of ratepayers, said that the scheme had not been sufficiently considered by the Board, who had first bought the land and then consulted an engineer as to its suitability for water storage. He submitted that the supply gained by the proposed outlay would be quite out of all proportion to the cost, and would not meet the demands for any length of time. Evidence on behalf of the opponents was given by Dr. W. H. Cheetlam, Mr. Alfred Preston, C.E., and Mr. B. Woodhead, C.E.

*Egg Buckland (Devon).*—Two new stained-glass windows have just been placed in the south side of the chancel of St. Erasmus's Church, Egg Buckland. They are the work of Messrs. Fournier & Watson, of Stonehouse. One of them contains a representation of the Blessed Virgin, whilst the other represents the patron saint of the parish, St. Erasmus.

ARBITRATION CASE.

THE GREAT NORTHERN RAILWAY COMPANY v. HER MAJESTY'S POSTMASTER GENERAL.

THIS arbitration, in which Sir Henry James, Q.C., Mr. Littler, Q.C., and Mr. Jeune appeared for the claimants, and the Attorney-General, Mr. Bidder, Q.C., and Mr. Casserley for the Postmaster-General, involving the question of compensation consequent upon the railway company's Bill and Mouth Depot, Aldersgate-street, being required for the extension of the General Post-office, has been concluded. The hearing extended over a period of twelve days, and the umpire, Mr. Charles J. Shoppee, has awarded the sum of 31,350*l.* as the compensation to be paid to the railway company.

THE IMPERIAL INSTITUTE.

SIR,—The Organising Committee of the Imperial Institute have published an outline of their scheme for the government of that Institute, and they propose to appoint a General Council for the purpose.

Certain of the members of this Council are to be nominated by some of the learned and scientific societies, including no less than four societies devoted to the promotion of Engineering, but not one connected with Architecture.

It is stated in the opening paragraphs of the scheme that "the details are open to further consideration." It is to be hoped that the result of such further consideration will be to add the Royal Institute of British Architects to the list, especially as, if I am not misinformed, a Vice-President of that Institute is a member of the Organising Committee.

F. R. I. B. A.

May 30, 1887.

SIR,—Those of your readers who are interested in this new organisation will have noticed, possibly, from experience, without surprise,—that Architecture has no representative on the General Council of Management. Amongst the forty-five members nominated on behalf of the United Kingdom are representatives from such societies as the Royal Irish Academy, the Society of Arts, the Institution of Civil Engineers, the Institution of Mechanical Engineers, the Iron and Steel Institute, the Chemical Society, the Society of Telegraph Engineers and Electricians, the City and Guilds Institute of Technical Education, the Royal Academy, the Mining Association of Great Britain, the Trades Union Congress, and the National Miners' Union; but not on behalf of the Royal Institute of British Architects.

Few, if any, of the societies I have enumerated are as widely interested in the questions with which the Imperial Institute will have to deal as the profession of architecture is; and it must be considered a signal instance of unintentional, or marked, neglect, that a body so intimately mixed up with Colonial interests as our own should have been omitted from a list so comprehensive as to include all those mentioned above.

I do not know whether the Council of our own Institute has moved in this matter. If not, it has again shown a supineness with regard to passing events which, if characteristic, is none the less reprehensible.

It may not be too late to have this slight on the profession of architecture condoned, but this will certainly not be attained by the continuance of apathy on the part of our leaders.

J. WREGHITT CONNOR.

Leeds, May 30th, 1887.

"A STUDENT'S NOTES ON GLOUCESTERSHIRE."

SIR,—I thank you and Mr. Paul for the very interesting paper. [See p. 814, ante.]

Allow me to say, if any student is taking the same ground, that I would advise him to come *via* Oxford and Chipping Norton, to Bourton-on-the-Water, as he is then only six miles from Northleach, and about ten from the Roman villa at Cbedworth. The latter will teach him more of architecture than a cartload of books (if he has eyes to see), and no student should miss it.

Tisbury and Dursley are worth a visit; and near Gloucester there is the ruined Abbey of Llanthony waiting for some one to measure and draw it, and properly write its architectural history before it is finally carted away.

Upleadon Church, with its early sculpture, Churchdown, Burnwood, Bulley, and Newent churches are all worth a visit.

ROBERT PHILLIPS,  
Clerk of County Works for Gloucestershire.

Chiswick Church.—In reference to a note of the visit of the Architectural Association to this church last week (see p. 798, ante), Mr. Griffiths, the clerk of works, writes to say that the teak and oak seats, &c., are not "polished," but only dry-rubbed.

PROVINCIAL NEWS.

**Birkenhead.**—The new Sessions and Police Courts at Birkenhead have lately been opened. The new courts, which are situate in Chester-street, adjoining the Town-hall, form part of a large scheme launched some years ago by the Birkenhead Corporation, involving altogether an outlay of about 100,000*l.* The foundation stone was laid on January 6th, 1885. The architects are Messrs. T. D. Barry & Son, of Liverpool, whose designs were selected in competition. The amount named by the architects as the probable cost of the complete structure was 32,500*l.*, and the tender of Messrs. A. Bleakley & Son, of Birkenhead, who offered to execute the building for 28,890*l.*, was accepted. The style of architecture adopted is Classical. The stone used in all the elevation of the buildings is from the Storeton Hill quarries. The system of ventilation adopted is that known as the "Plenum" system, which consists in the admission of the warmed or cooled air to such parts of the building as are to be treated, the air being admitted at the lowest level of the rooms. The Chester-street front, above the principal entrance, is arranged to form an open colonnade, recessed about 5 ft., containing columns with richly-carved caps. Above these on the two principal angles are square turrets, about 5 ft. square and rising to a height of about 15 ft., terminating in pediments supported by pilasters with carved caps. The space between these turrets is filled in by a mask wall about 10 ft. high, and immediately in front of this, though standing considerably above it, is a large sculptural group representing "Justice." This group, which is about 15 ft. high, including its base, represents the figure of the "Law Giver," which is itself 9 ft. 6 in. high, standing on a pedestal between the half-reclining figures of "Justice" and "Mercy." The two principal windows on the Chester-street front are surmounted by carved figures of emblematic design, whilst the tympana are filled in with very fine floriated carving. The principal windows facing north and south are crowned with circular-headed pediments, the tympana containing carvings representing Hope, Penitence, Justice, and Retribution. The whole system of speaking tubes, as well as of the fire-extinguishing apparatus, pipes, hydrants, and also the copper-plate lightning conductor, were executed by Mr. A. Bucknall, of Renshaw-street, Liverpool; the other sub-contractors being as follows:—Glazing, Messrs. Lachland & Son, Birkenhead; ironfounders' work, Edward Jones, Conway Foundry, Birkenhead; carving, R. L. Boulton, Cheltenham; heating and ventilation, Messrs. Haden & Son, Trowbridge; wood block and fire-proof flooring, Mr. R. L. Lowe, Farnworth; ceramic mosaic, Mr. G. Swift, The Temple, Liverpool; marble lining to walls, Messrs. John Stubbs & Son; grates and mantels, Mr. James Roy; blinds, Messrs. Price & Patterson, Birkenhead; gasfittings, Messrs. R. Hamilton & Son, Conway-street, Birkenhead. The whole of the works were carried out under the superintendence of the architects, the clerk of works being Mr. Peter Thomas, of Liverpool.

**Buxton.**—The Local Government Board have lately given their sanction to an application by the Buxton Local Board for a loan of 6,000*l.* for providing offices for the proposed Free Library and Reading Room, subject to sanction being given for the appropriation of a plot of land for the library, as required by Act of Parliament. This, with the previous sanction of 2,000*l.* for a Town-hall, and 1,900*l.* from the insurance companies for the loss of the Market-hall by fire, makes up the 10,000*l.* necessary to complete the scheme for the erection of a Town-hall, Free Library, public offices, and market shops. It is stated that the Duke of Devonshire has promised a site of land free for a portion, if not the whole, of the buildings.

**Iseworth.**—Mr. S. Woodbridge, jnn., of Brentford, has been appointed architect for the public hall to be erected at Iseworth to commemorate the Queen's Jubilee.

**Leeds.**—By the munificence of Mr. John North, of Leeds, a Semi-Convallescent Home is being erected at Cookridge, the institution being intended as an adjunct of the Leeds Infirmary. The architects are Messrs. Chorley & Connor, Park-row, Leeds. It is expected that the building will be ready for occupation about the beginning of 1888. According to the *Leeds Mercury*, the institution will afford accommodation for forty-two beds, and should it be necessary to increase this number, some un-

appropriated rooms may be devoted to the purpose. The site is a portion of the grounds of the existing Convalescent Home at Cookridge, which have been extended for the purpose. The frontage is 230 ft. long, and the depth 120 ft. The structure will be faced with brick, the doors and windows having stone dressings. Picturesqueness will be imparted by the erection on each side of deep verandahs, which will afford shelter to the patients when out of doors, as well as by the elevated central administrative block. The general plan internally is intersected by a T-shaped corridor, the central arm forming the approach, and the head of the T leading right and left to the male and female sides. There are two large wards, 63 ft. by 24 ft., two 20 ft. square, and two 14 ft. by 12 ft. There are two day-rooms, each 27 ft. by 20 ft., with nurses' rooms, medical officers' rooms, servants' and nurses' bedrooms, cloak-rooms, kitchen, store-rooms, collarage, &c. There is also a small detached mortuary. The cubical area allowed to each patient is somewhat in excess of that usually found in such institutions. It amounts to 1,300 ft. per patient. The well-known firegrates designed by Mr. Pridgin Teale will be used throughout the building. The bath-rooms, lavatories, &c., are to be in detached pavilions, one on each side of the main block, communication between these and the wards being intercepted by isolation lobbies. The whole of the house will be heated by steam, the cooking apparatus to be arranged in connexion with the same boiler. The estimated cost of the building, exclusive of furnishing, is 5,600*l.*, and Mr. North has already contributed 5,000*l.* The contracts for the new building have been let as follows:—Mason and brick work, Mr. Chas. Myers; joiner's work, Mr. Banks Mawson; plumber's work, Mr. George Lazenby; slater's work, Messrs. Sharp & Harper; plasterer's work, Mr. J. P. Mountain; and painting, Mr. Joseph Walker.

**Newcastle-on-Tyne.**—The foundation-stone of the Fleming Memorial Hospital was recently laid by Lady Armstrong. The architects are Messrs. Quilter and Wheelhouse, of London, whose design was selected in competition. The contract was given to Messrs. John and William Lowry, of Newcastle. The site of the building is a piece of open land, about three acres in extent, facing the Town Moor, and adjoining the Philipson Memorial Institution. The building is arranged with all the wards on the upper floor, having windows on both sides, ensuring a thorough circulation of fresh air and sunshine (when any of the latter is to be had). The grounds are surrounded by an iron railing, with entrance gates and lodge at the south-west corner. At the right of the entrance-hall is the committee-room, and on the left a waiting room, adjoining which is the separate entrance for out-patients and the porter's room. The surgery, dispensary, and drug store occupy a position in the north wing, beyond which is the residence of the medical officer, and the south wing is occupied by the matron's residence, with store-room, linen and work-room. Beyond the principal staircase eastward is the dining-hall, with passages and serving lobbies on each side. A paved playground is formed on each side of the dining-hall, in addition to a large grass playground, which occupies the east portion of the site. The whole of the upper floor is occupied by the wards and rooms for patients and nurses. In the centre of the west front, over the entrance, is a day-room for convalescents. On the east side of the principal staircase, over the dining-hall, are the surgical ward, operating-room, and a small dark room for special cases. Isolation wards for four boys and four girls are arranged over the kitchen buildings, with a separate entrance, and provided with nurses' room, bath-room, scullery, and w.c. These have no internal communication with any other part of the building. The materials employed externally are dark red-pressed bricks with stone dressings for the walls, and green slates with red tile-ridges for the roof. The internal fittings and the heating and sanitary arrangements are all of the most improved character. The general style of the building has been adapted from that employed during the sixteenth century in English domestic buildings, of which so many fine examples are to be found in various parts of the country. The entire cost of the work, including purchase of site, furnishing, &c., is 20,000*l.*, and is the gift of Mr. John Fleming, of Newcastle, in memory of his wife, Mary Fleming.

## JAHN'S TRIPOD HEAD

FIGURE 1

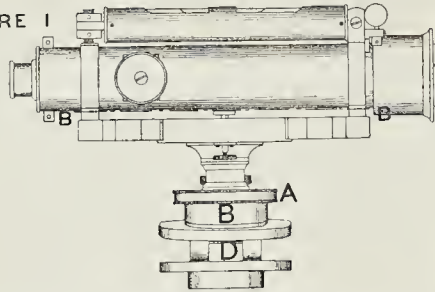
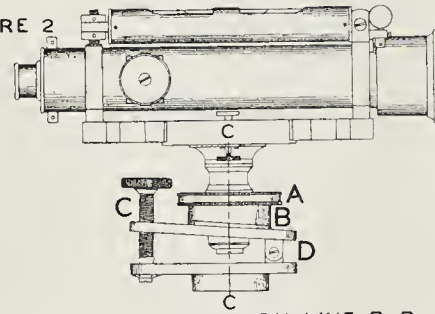


FIGURE 2



SECTIONAL PLAN ON LINE B-B -

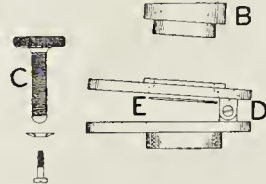
FIGURE 3



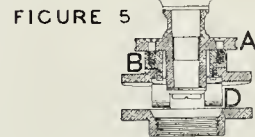
DETAILS



FIGURE 4



SECTION ON LINE C-C -



NOTE THIS INSTRUMENT IS SET LEVEL BY BEING PLACED ALTERNATELY IN THE POSITIONS SHOWN IN FIGURES 1 AND 2 - THESE POSITIONS ARE AT RIGHT ANGLES TO ONE ANOTHER - THE ADJUSTMENT IN FIGURE 1 IS EFFECTED BY MEANS OF THE WEDGE SHAPED CONNEXION B WHICH IS TURNED BY THE MILLED EDGE A AND THE ADJUSTMENT IN FIGURE 2 BY MEANS OF THE SCREW C -

IN REVOLVING THE TELESCOPE ON ITS AXIS THE WEDGE SHAPED PORTION B MUST BE MAINTAINED IN POSITION BY HOLDING THE PIECE A AS NO CLAMPING ARRANGEMENT IS PROVIDED -

Norwich.—The ceremony of opening the new premises of the Church of England Young Men's Society took place on Wednesday, the 25th of May. The following accommodation has been added to the premises which were erected about ten years since:—In the basement, a large gymnasium, 65 ft. by 25 ft., and 19 ft. high; on the ground-floor (in addition to the existing reading-room, which will be used as a general reading-room and library), a room, 25 ft. by 30 ft., devoted to study and quietreading, Secretaries' room, two class-rooms, and a refreshment-room; the lavatories have also been rebuilt and greatly enlarged; on the first floor, a large class-room, members' sitting-room, small class-room, and lavatories. The lecture-hall has also been enlarged. On the second floor two class-rooms and the resident superintendent's apartments; and two storage rooms on the third floor. The total area of the rooms as they now stand is about 7,050 square feet against the 2,500 square feet obtained in the old building exclusive of staircases and passages. The contract for the building was 2,720*l.*; extra expenses 350*l.*; and furniture and fittings 400*l.* The building was carried out by Mr. G. E. Hawes from the designs of Mr. Arthur J. Lacey, architect, Norwich.

Sculcoates.—The new Sculcoates parochial offices, which have been recently erected in Bond-street, were lately formally opened. The building is an adaptation of fifteenth-century Gothic architecture, in local red bricks, with stone dressings and shafts of polished shap granite to the ground-floor windows. The ground-floor provides a large rating office, with a strong room attached, and opening from it is the private office for the assistant-overseer. From the porch access is obtained by double doors to the stone staircase leading to the overseers'

committee-room, which will also be available for other parochial purposes. The building has been erected in a substantial manner, the wood-work for the internal fittings, and also for the doors and windows, being of Stettin oak, which has been simply oiled and wax-polished. The fittings of the public office, supplied by Messrs. Audas & Leggott, are also in oak and wax polished, and executed from the architect's designs. The building has been erected by Mr. John Drury, of Beverley-road, who has had associated with him as sub-contractors, Mr. Jordan, mason; Mr. Kendall, carpenter and joiner; Messrs. Wright & Son, ironmongers; Mr. Taylor, plumber; Mr. Hunter, slater; and Mr. Drewery, painter. The gas-fittings were supplied by Messrs. Stones, Settle, & Wilkinson, and Messrs. Jones & Willis, of Birmingham. The whole of the works have been carried out from the designs and under the superintendence of Mr. Samuel Masgrave, F.R.I.B.A., Hull.

Warrington.—Large new warehouses have just been completed at the Bank Quay Soap Works, for Messrs. Joseph Crossfield & Sons. They adjoin the other buildings belonging to the firm, and each floor contains an area of about 5,700 superficial feet. All the walls are built of the best Wigan bricks, and the elevations are relieved with Cefn stone and pressed bricks. A special feature of the building is the roof, which has a span of about 60 ft., and is constructed of wrought iron and covered with Velenheli slates. On each side of the roof a skylight is formed, about 5 ft. deep, and the full length of the building. In elevation the treatment is of a plain but substantial character, with bases, copings, labels, and pediment of Cefn stone, and the openings in the main gable are filled with louvre boards and have mionided labels. The ground-floor is to be used for tablet-

stamping and cutting soap, and the buildings are so arranged that five waggons can be loaded at the same time. The second-floor is to be used for a packing-room, and two hoists are fixed for loading the waggons below. A bridge has been constructed on the second floor so as to give access from old warehouse to the new buildings. The top floor is constructed of flitched beams resting on cast-iron columns and joists and covered with rebated boards. The ironwork has been executed by The Pearson and Knowles Coal and Iron Company, Warrington. The contract for the whole of the works has been successfully carried out by Mr. William Taylor, builder, Warrington, from plans and under the superintendence of Mr. William Perry, architect, Warrington.

### The Student's Column.

FIELD WORK AND INSTRUMENTS.—XXIII.

Levelling Instruments.

VII.—JAHN'S LEVEL.

THIS instrument is illustrated by figs. 1 and 2, and consists of a levelling telescope mounted upon the ends of a horizontal bar, which is supported upon a tripod head, the details of which are shown in figs. 4 and 5. The telescope is set level by being placed alternately in the positions shown in figs. 1 and 2. These positions are at right angles to one another. The adjustment of the longitudinal bubble in fig. 1 is effected by means of the wedge-shaped connexion marked B, which is turned horizontally by the milled edge marked A, and the adjustment in fig. 2 is effected by means of the vertical screw marked

Fig. 1

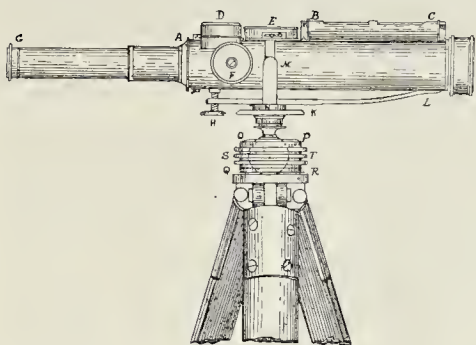


Fig. 2.

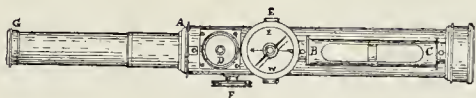
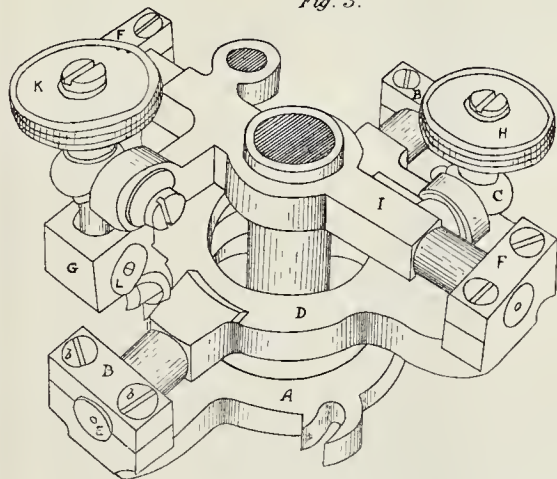


Fig. 3.



3. The comparative tightness of the adjustment may be effected by regulating the screws below the wedge-piece plate and of that fixed to the main body of the vertical axis cone. When attention is paid to this, the revolution of the telescope may be effected without disturbing the wedge-piece plate. Otherwise it must be held in position as stated upon the note in the diagram.

VIII.—STEVENSON'S LEVEL.

Figs. 1 and 2 of the annexed illustration show levelling instrument invented by the late Mr. David Stevenson, M. Inst. C.E., in 1844. It consists of a 10-in. telescope, arranged to unscrew at A, so as to pack conveniently in two parts. B C represents the longitudinal level, D a circular, or, more correctly speaking, spherical level, E a compass, F the screw for adjusting the focus when viewing an object, and G the eye-piece. The telescope rests in a support marked M, which is attached to the body of the instrument by a screw at N, and is secured to the tripod by a ball-and-socket joint, indicated by dotted lines in fig. 1. This joint is constructed to be clamped and unclamped by means of a screw, worked upon the inner circle of the piece marked S T. The telescope is clamped at M by the spring K L, and is acted upon by the elevating screw marked H. To

set the instrument level the screw-plate S T is first unclamped and the telescope is carefully moved by the hand until the circular bubble at D appears central. The screw-plate S T is then moved by the hand so as to clamp the ball-and-socket joint, and the telescope being directed to the point of observation required, the final adjustment is effected by setting the longitudinal bubble B C in the centre of its run by turning the milled head of the screw H. It will be observed that in this instrument no preliminary setting of the level by the tripod legs is required, but that any movement of the telescope would necessitate the longitudinal bubble requiring to be re-adjusted to the centre of its run, in order to make the line of collimation horizontal.

IX.—SANG'S LEVEL.

One of the earliest forms of gimbal action employed to aid the setting-up of a level is shown in fig. 3, which illustrates the arrangement contrived by the late Mr. John Sang, of Kirkcaldy in Fifeshire. The lower portion, marked A, is secured to the head of the tripod, and the vertical axis of the telescope is supported in the central socket, which is connected by a horizontal axis, marked I, to socket-bearing at F F. These bearings are rigidly attached to the middle piece, marked D, which has an axis, E, working

in the sockets B B. The axis B B is at right angles to the axis F F, and the trunnions of these two axes are formed by a double cone fitted into the socket-bearing and clamped by screws, marked k and h. The milled-headed screws, marked K and H, work each in a nut, which by a revolving-joint are connected in each case to a crank arm, so that by their means the upper portion, marked I, is adjusted in one direction, and the central portion, marked D, is adjusted in the other direction, as required.

DISSENTING CHURCH-BUILDING NEWS

**Carlisle.**—The Warwick-road Presbyterian Church, Carlisle, has lately been reopened, after extensive alteration and improvement. The church was erected about twenty-five years ago, to meet the wants of the increasing congregation of Presbyterians in Carlisle. When the site was selected it was close upon the outskirts of the east end of the city, but since then numerous streets have been formed, and the church now occupies a site almost in the centre of the best part of the town. After the site had been purchased from the Earl of Lonsdale the services of an Edinburgh architect were obtained, and as the congregation at that time was small, and not very wealthy, it is recorded (says the *Carlisle Journal*) that the following very brief instructions were given, viz. "Make it as plain as ye can, and be canny wi' the bawbees." The architect faithfully carried out their instructions, and the church has always ranked as one of the plainest internally in the town. Mr. T. Taylor-Scott, architect, of Carlisle, having been consulted, prepared plans for remodelling the whole of the interior, and the contract for carrying out the whole of the work was let to Mr. William Latimer, joiner, Victoria Viaduct. The most critical portion of the work was the roof scheme, as the whole of the interior construction of the large span roof, covering an area of 4,000 superficial feet, had to be removed and a new roof constructed without interfering with the alates and roof boarding.

**Fovey.**—A new Congregational chapel is being erected at Fovey, in place of the old one, which is not only dilapidated, but is in an obscure and out-of-the-way position. It is reached by two paths, one involving an ascent of seventy steps and the other forty-five steps, and was inaccessible to the aged and infirm, and even dangerous. The site for the new chapel is at the beginning of Lostwithiel-street. The building, which is of red brick, and Gothic in style, consists of a chapel and organ-chamber, with schoolroom and class-rooms behind. The architect is Mr. J. Wills, of Derby, the builders being Messrs. Penter & Cossentine, Polruan; and Mr. W. J. Sambell is clerk of the works. The cost is expected to be about 1,200l.

**Glasgow.**—The memorial stone of a new United Presbyterian church, in course of erection in Lancefield-street, Glasgow, for the Cranstonhill U.P. congregation, was recently laid by ex-Preceptor Mathieson. The church, which has a frontage to Lancefield-street of 70 ft., is flanked right and left by small towers rising to a height of 55 ft. The wall between these is rusticated, and built to the circle, concentric with the seating inside. Access is had from woman entrances placed in the towers. The church inside is seated entirely to the circle, to accommodate about 900 persons. Behind, and having a frontage to Oak-street of 70 ft., is placed a building in which are constructed hall, session-house, vestry, &c. The hall is seated to accommodate about 300 persons, and has passages on each side for exit from church and hall into Oak-street. On either side of the passages are placed the vestry, retiring-rooms, session-house, and stair to hall gallery and meeting-room, also stair down to kitchen, &c. From the south vestibule in Lancefield-street a stair communicates to an underground passage and the lavatories. This passage leads across the basement to a large kitchen, heating-chamber, store, &c. The church is being built by Messrs. McKissock & Co., from designs by Messrs. H. B. W. Steel & Balfour, architects, and is Classic in style.

**Mepal (near Cambridge).**—A Munich window, by Mayor & Co., has lately been erected in Mepal Church, near Cambridge, representing "The Angel at the Tomb." The window is the gift of Mr. George Borwick Mead, M.D., of Newmarket, and is erected in memory of his wife, Elizabeth Bessie Owen, died December 6th, 1885, aged fifty-three years.

## Books.

*Circular Work in Carpentry and Joinery: a Practical Treatise on Circular Work of Single and Double Curvature.* By GEORGE COLLINGS. London: Crossly Lockwood & Co.

THIS is one of "Weale's Rudimentary Series," and is an excellent example of what a book of this kind should be. Cheap in price, clear in definition, and practical in the examples selected, it will be a help to those who carry out work of the nature treated upon. The scarcity of hands who can undertake curved work, compared to those who can do straight work, is often a trouble to smaller employers when they have a job out of the common run. Mr. Collings's book gives simple and sufficient instructions for accurately setting out most of the forms that the carpenter and joiner is likely to meet with in ordinary practice. If, therefore, the employer has men of sufficient manual skill, there should, with this book to refer to, be no difficulty in compassing any forms within reasonable limits of single and double curvature. The work is divided into two parts, the first treating of simple curvature, and the second of complex circular work. In the former the more general forms are dealt with, such as solid-headed frames, elliptical heads, bulls-eye frames, Gothic forms, circular frames, &c. The way in which these should be set out is described and illustrated by suitable diagrams. The diagrams are based on geometrical principles, but nothing is introduced not necessary for the practical application of the instructions laid down. The second division of the book is naturally more complicated than the first, but here again the author's chief aim has been towards simplicity, and practical methods are used throughout. The author states that he has either himself executed, or seen executed by others, examples of all the work set forth in the book according to the rules laid down. We see no reason to doubt the accuracy of the various methods, although in some instances they may differ from the ordinary procedure of architects. It may be said, however, that where such differences arise Mr. Collings can claim the merit of greater simplicity. Altogether, the book is one to be recommended, and forms a most appropriate volume in Weale's series; none the less welcome because its principles will endure, and it is not likely to become valueless, even after twenty or thirty years' service.

*St. Wandrille's Abbey: a Lecture, with Historical Preface.* By ALFRED GATTY, D.D., Sub-Dean of York. London: G. Bell & Sons. Sheffield: Thomas Rodgers.

THIS is a pleasant, chatty, and amusingly naïve account of the author's one journey across the Channel, to visit the ruins of the Abbey of St. Wandrille, not far from Rouen, with which abbey his own parish of Ecclesfield had formerly been connected, the Church of Ecclesfield having been served in early days from the Abbey of St. Wandrille, which also (*temp.* Henry I.) held property at Ecclesfield. The ancient priory, the original foundation of which is assigned by Mr. Hadfield to the date of circa 1250, now remains apparently in the form of a late Gothic building, which is in course of repair and conservative restoration, under the care of Mr. Hadfield. One or two sketches of the remains of the French mother-church are given, not very well, it must be admitted, at the hands of an amateur sketcher.

One cannot but sympathise with the wish of the author to see whatever was left of the French abbey church, which was the original mother-church to his own parish: he gives an account, brief and rather crude, but picturesque, of some bits of architectural remains known to few persons at present; and the simplicity of the narrative is amusing, even where it conveys no special instruction.

*K. Baedeker Mittel-Italien und Rom. Achte verbesserte Auflage.* Mit einem Panorama von Rom einer Ansicht des Forum Romanum. 8 Karten und 31 Plänen. Leipzig. 1886.

THE eighth edition of Baedeker's Central Italy and Rome has just appeared. If the volume were a mere guide-book for the use of the tourist, to notice it would be superfluous; but the present edition should serve a wider purpose. The full details given as regards classical antiquities, sites, and excavations make it a practical hand-book of high utility, both for

student and teacher. Any one who is reading Roman history will do well to have before him such a plan as, for example, that of the excavations between the Capitol and the Arch of Titus, and any one who is teaching Horace will find his work the livelier for occasional reference to the excellent Panorama of Rome and its surroundings, with Mount Soracte and the Sabine range. The book cannot claim to rank as quite equal with the "Rom und die Campagna" of Gaelfels, but it runs it close.

*The Geology of England and Wales: with Notes on the Physical Features of the Country.* By HORACE B. WOODWARD, F.G.S., of the Geological Survey. Second edition. London: George Philip & Son. 1887.

THE appearance of the second edition of this very useful work will be welcomed by all who take an interest in geology, whether they study the subject from a purely scientific or from a practical point of view. It differs in its construction from any other geological treatise with which we are acquainted. The professional duties of the author have unquestionably given him peculiar advantages in prosecuting his researches. The book is divided into three parts, has two appendices, a copious index, and a coloured geological map of England and Wales. The introduction to the work is occupied by an abstract of the elements of the science, given in a clear and suggestive manner.

The first part deals with the chief divisions, from the Archaean to the Carboniferous inclusive, and these are classed together under the term Palaeozoic. In spite of the fact that the author takes up a more or less independent position with regard to controversial matters, he believes that there is no great break between the Archaean and Cambrian rocks; yet, it has frequently been demonstrated, that metamorphosed portions of the former are often found as a basal conglomerate in the latter! We observe with much satisfaction, however, that the Cambro-Silurian difficulty is bridged over by the adoption of the term Ordovician for the upper Cambrian of Professor Sedgwick. The extension of the Devonian and Carboniferous beds under the London basin are most admirably treated, and good practical suggestions are here and there thrown out in regard to undiscovered coal-fields.

The second part of the book describes the beds from the Permian to the Cretaceous inclusive. It has been customary in the more prominent of our recent text-books to class the Permian with the Palaeozoic rocks, and we see no reason why this course should have been departed from. The one given by the author,—that they should be associated with the Triassic rocks on account of the similarity in their characters and methods of formation,—does not seem to us to be sufficient. Palaeontological evidence is against it, especially so on the Continent. The Jurassic and Cretaceous series are handled in a masterly manner, particularly that portion describing the Lias.

The third part embraces the Tertiary and recent periods, volcanic phenomena, mineral veins, denudation, and scenery. We are pleased to notice that the necessity of classifying the Bovey Tracey beds with the Bagshots has been felt. Some of the subdivisions of the Tertiaries have, however, been very summarily disposed of. Surely the description of the highly fossiliferous Barton Clay ought to occupy more than a dozen lines. Each important section throughout the book concludes with a brief description of the economic products of the rocks comprised therein, and it is these portions of the work which would probably be most interesting to the majority of our readers, dealing, as they especially do, with building stones. The information under this heading, however, is not given in a connected manner. The book, as a whole, is a standard work of reference, and thus it is principally useful to us in referring to the stone quarries of particular districts. Here and there the author ventures to point out the better kinds of building stones, and sundry observations occur on the causes of the decay of stone.

The first appendix shows the relative thicknesses of strata passed through in several deep wells. The second,—by Mr. E. T. Newton, F.G.S., F.Z.S.,—is a synopsis of the animal kingdom, with especial reference to the fossil forms, which is exceedingly useful; we believe that a reprint of it is issued as a separate pamphlet. The coloured map, drawn by Mr. J. G. Goodchild, F.G.S., might have been

executed on better paper, and its scale should have permitted a more minute sub-division of the formations. We must take exception also to the colour of the Archaean and Metamorphic rocks being identical, as certain portions of the map are thereby rendered inaccurate. For instance, there are many areas in which the Palaeozoic rocks are metamorphic in every sense of the term, but the map does not show them.

Speaking generally, there can be no question as to the high value of the work as a book of reference. Its author has apparently left no stone unturned to render it complete, and we can therefore confidently recommend it to those who are interested in the subject.

*School Hygiene: The Laws of Health in Relation to School Life.* By ARTHUR NEWSHOLME, M.D. London: Swan, Sonnenschein, & Co. 1887.

THIS is a most admirable and practical little book, containing in a small compass a great deal of sound information put in a concentrated and at the same time intelligible form. A certain portion of the book is purely medical, having relation to diet, diseases, school accidents, &c.; but more than half of it is occupied with the construction, drainage, and ventilation of the buildings; and while we do not always find that medical men, in spite of their diatribes against architects, are really very well up in the mechanism of sanitary construction, we must say that as far as Mr. Newsholme goes into the subject he shows a thorough and workmanlike knowledge of it, and his sections of lavatory and closet drainage, &c., are careful and correct in showing the main outline and principle of the objects to be aimed at, and he is alive to some little details sometimes overlooked by even those who would be considered sanitarians, such as the necessity for a trap in a sink waste to prevent any foulness on the inside of the pipe from contaminating the air of the house. The remarks on warming and ventilation are also to be commended, and one point is drawn attention to in the chapter on this subject, which is often overlooked, viz., that when a furnace is employed to supply a current of warmed air, the source of the air supply to this furnace is a matter of great practical importance; "the furnace-room may contain decomposing vegetables or an empty bell-trap leading to a defective drain or a water-closet, none of which increase the purity of the school atmosphere." People are too apt, especially in the case of buildings in crowded neighbourhoods, to look only to the means of supplying and circulating air in the building, and to forget the important question, "Where does the air come from?"

Dr. Newsholme's book is mainly written for the guidance of teachers in schools, that they may know the proper conditions of health in a school, and be competent to see that these are kept up. The brief and clear wording of the book, and its moderate size and scope, render it particularly suitable for such readers, who require to obtain a general but sound knowledge within a small compass, and without too many technicalities.

*Practical Electric Lighting.* By A. BROMLEY HOLMES. Third Edition. London: Spon. This little book is well got up, and gives in a concise form a résumé of the information on the subject which can be gathered from such writers as Thompson, Gordon, Dredge, Clerk-Maxwell, and others. To any one who knows nothing of the subject, and who wishes to obtain a popular knowledge of it, such a book will be fairly interesting; but we should not recommend it to a student who wishes to master the principles of electric lighting, as he will get them far better from the larger and more scientific treatises of the authors above mentioned. Indeed, we are disposed to question the advisability of multiplying the number of professedly non-scientific treatises on scientific subjects.

*Levelling and its General Application.* By THOMAS HOLLOWAY, of Chippingham, Wilts. London: E. & F. N. Spon, 125, Strand.

IN this work the author has fulfilled in a very able manner the task which (as stated in the preface) it was his intention to undertake, namely, to provide a book solely for the guidance of the uninitiated. The experienced-practitioner will, however, find nothing new with respect to instruments, and, as regards



the portion of the book devoted to the general application of levelling, it would not be difficult to give many hints upon omissions, as invited by the author at the conclusion of the work. We are glad, however, to note some valuable remarks upon contouring, a subject generally omitted or very imperfectly alluded to in similar existing treatises, but described by the author in a very practical manner. We are sorry to find that the introduction of a column for "intermediate sights" in a level book is not recommended, as it facilitates the reduction of the levels that have been booked in the field to a common datum when checking the figures page by page. The author gives some important advice upon holding a level staff, but omits the all-important consideration of waving a staff in a vertical plane in order to obtain the shortest reading. We think also that he has shown rather too much partiality to one maker, although he has been fortunate in obtaining the loan of engravings of instruments from so eminent a maker as Mr. Stanley. There are other makers, such as Messrs. Adie, Cooke, Elliott, and Troughton & Simms, equally well known to surveyors generally. At the same time, we can heartily recommend the careful perusal of the pages of this book to young beginners. The print and binding of the book are attractive, and almost invite a study of the contents. A comprehensive index and a very practical list of questions for examination is added at the end of the book.

*Elementary Plane Co-ordinate Geometry, as applied to the Straight Line.* By W. E. ROBERTS, Architect and Government Surveyor, Durban, Port Natal. London: White, Holmes, & Stephens, Coleman-street.

The author has in this work arranged and compiled in an intelligible form about one hundred pages of useful information connected with co-ordinate geometry. His chapters deal with the co-ordinates of points, areas of rectilinear figures, equations to straight lines referred to both rectangular and oblique axes, and polar equations to straight lines, together with several valuable explanatory problems. A knowledge of Algebra, Euclid, and Plane Trigonometry is assumed to have been acquired by the student, and the reader is then presented with the above subjects in a form which the author has found eminently successful with his own pupils, and which, if not so complete as furnished by many higher mathematical works, cannot fail to be of great assistance to the student in leading him through the most essential and practical portions in as simple a manner as the subject will permit. At the end of the book are added some remarks upon the application of the subject to survey calculations, the determination of co-ordinates and area of plots of land. We doubt the general usefulness of the application to surveys which the author would assign to it, but as an example of the principles laid down in the book this chapter is well placed. The subject has a wide range, and the information which the author has dealt with in his book places very clearly before mathematical students many practical methods. We are glad to see so reliable an authority upon conic sections as Todhunter quoted. The answers given at the end of the book to the problems contained within its pages will also be welcomed by those who desire to study the subject in the only way in which it can be properly learned, namely, with pen or pencil in hand, working out the examples.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

7,797, Glazing. C. F. Elliott.  
In this invention, putty or cement is dispensed with, and the improvement consists in the particular form of, and connexion between, the sash-bar and cap, which is such as to allow for expansion and contraction. The sash-bar is provided with wings, the edges of which are turned up, and provided with grooves or channels to receive packing strips. These turned-up flanges and packing strips form the seat or bed for the glass sheets. The sash-bar is sometimes provided with a wooden core. The form of the sash-bar or astragal is claimed by the patentee, and also dies for stamping out the metal in this particular form.

7,884, Outlets for Ventilators. T. G. Norman and S. E. Major.

This invention relates to a chimney cap of rather elaborate construction, which expands the air in the shaft by creating a vacuum in the cap when the air impinges on the exterior of an air-chamber con-

structed therein. The intensity of the force of the up-current may be augmented by placing a shield or plate in the interior of the cap, which is made of metal, and is designed for terra cotta or earthenware chimney or ventilating tops.

8,120, Portland Cement. S. Lowden.  
The object of this invention is to manufacture a nucleus of cement which may be transported from place to place; so that the cement may be cheapened by reducing the cost of transport, and by the use of this nucleus to make the cement on the ground where it is to be used, whenever chalk or limestone is found in the vicinity.

8,145, Improvements in Water-closets. W. Smeaton, sen.

This invention consists mainly in the introduction of an intermediate turret or cover placed between the bottom of the closet-pan on the top of the siphon or other trap. The turret may be turned in any position, and thus a connexion of the closet and soil-pipe may be effected independently of the situation of either.

8,152, Lead Glazing. H. M. Keene.  
According to this invention, a strip of metal, lead preferably, with a ridge in the centre of the strip, is fastened down the centre of the rafters. The thin portion of the strip is then turned well back against the narrower portion (the ridge), the glass is laid on the rafters, and the thin edges are flattened to the glass and smoothed with an ordinary putty-knife.

8,175, Window-sashes and Sash-frames. T. Howdill.

This is claimed as an improvement chiefly designed to avoid the risks of cleaning windows from the outside, and also to improve the ventilation of the rooms. The sashes are hinged and secured to the sliding stile at their lower ends by means of centre hinges, in such a manner that the sashes can be tilted or drawn inward, leaving the outside uppermost. When desired, one or both sashes may be tilted so as to form a kind of hopper ventilator.

NEW APPLICATIONS FOR PATENTS.

May 20.—7,387, S. Oldershaw and D. Butt, Machines for Cutting or Stamping Holes in Slates, &c.—7,356, J. Armstrong, Lead Glazing.—7,378, W. Mosley and J. Lewis, Electric Indicators and Bells.—7,351, J. Dudley and J. Hamilton, Concrete and Artificial Stone Mantelpieces.—7,359, R. Fladgate, Securing Double Doors, Panels, &c.

May 21.—7,411, A. Busch, Manufacture of Cement.—7,448, J. De Winton, Machinery for Sawing Slate, &c.

May 23.—7,485, A. Bonit, Wire Cloth for Lathing of Bridges, Roofs, Columns, &c.

May 25.—7,517, T. Tyack, Saws.—7,524, H. Lake, Manufacture of Pigment or Paint.—7,539, A. Smith and Others, Portland Cement.—7,571, J. Tuckett and G. Foster, Security Mortise Lock.—7,578, H. Wilson, Window-sash Fasteners.—7,584, H. Schallehn, Domestic Fireplaces.

May 26.—7,644, F. Wicks, Paving, also applicable for Flooring, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

5,211, N. and L. Skelsey, Disinfecting Apparatus for Water-closets.—5,769, H. Hartland, Firebricks.—5,815, T. Lodge, Manufacture of Portland Cement.—6,152, W. Thompson, Portable buildings.—6,651, H. Densted, Water-closet Pan.—4,242, M. Hoffman, Artificial Majolica.—5,108, J. Harrington, Drain Valves.—5,928, H. Richardson, Piercing or Boring Holes in Walls constructed of Brick, Stone, &c.—6,346, A. Morse, Roofing and Wall Tiles.—6,884, F. Chapman, Nails.—6,937, R. Ripley, Paint or Colouring for Metal Work, Stonework, Stucco, &c.—6,953, J. Campbell, Glue.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.  
8,222, J. Dulston, Wood-turning Machines.—9,244, S. Yeates, Surveyors' Levels.—9,320, W. Bartholomew, Water Supply and Discharge Fittings for Baths and Lavatories.—9,608, J. Newman, Pneumatic Door Checks and Combined Door Checks and Springs.—9,643 and 9,644, H. Lake, Construction of Walls, Ceilings, &c.—10,960, M. Benedictus, Material for Removing Oil Paint.—5,723, S. Pitt, Manufacture of Building Materials from Glass.

**Restoration of a Roman Aqueduct.**—The *Kölnische Zeitung* states that, by order of the German Government, the Roman aqueduct near Ars, on the Moselle, one of the greatest Roman works north of the Alps, is to undergo thorough repair in the course of this summer. Of this structure, which dates from the time of Augustus, and originally spanned the whole valley of the Moselle, there remain on the left bank of the river nine, on the right bank seventeen piers, some of them to a height of 18 metres. The work of restoration, which is superintended by Dombaumeister Tornow, will be confined to the preservation of the existing remains.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

MAY 23.

|                                                                                             |        |
|---------------------------------------------------------------------------------------------|--------|
| Betchworth—Freehold house, saw mills, and out-buildings.....                                | £1,350 |
| Hyde Park—24, Connaught-square, 68 years, ground-rent 16 <i>l</i> . 16 <i>s</i> .....       | 2,190  |
| Wood Green, Ewart-street—The Laurels, Freehold.....                                         | 765    |
| By R. J. COLLIER.....                                                                       |        |
| By Messrs. GRENCH.....                                                                      |        |
| Gray's Inn-road—No. 344, freehold.....                                                      | 800    |
| Fulham-road—Nos. 178 and 180, term 14 years, ground-rent 20 <i>l</i> .....                  | 245    |
| St. John's Wood—22, Carlton Hill, 50 years, ground-rent 12 <i>l</i> .....                   | 800    |
| Portman-square—5, Gloucester-street, and stabling, 36 years, ground-rent 8 <i>l</i> .....   | 1,630  |
| By GRAVES & SON.....                                                                        |        |
| Marylebone—48, Church-street, 34 years, ground-rent 10 <i>l</i> . 10 <i>s</i> .....         | 420    |
| By Messrs. TAPLEY.....                                                                      |        |
| Brixton—6 acre-lane, 19 years, ground-rent 8 <i>l</i> .....                                 | 760    |
| By FURBER, PAICE, & CO.....                                                                 |        |
| Holloway-road—Ground-rents of 30 <i>l</i> , reversion in 78 years.....                      | 2,020  |
| By Messrs. BARLOW.....                                                                      |        |
| Marylebone—8 and 10, Great Barlow-street, 35 years, ground-rent 14 <i>l</i> .....           | 720    |
| By ROBERTS & BARNARD.....                                                                   |        |
| North Kensington—114, Wormington-road, 87 years, ground-rent 7 <i>l</i> . 10 <i>s</i> ..... | 290    |
| 28, Wilestone-road, 88 years, ground-rent 7 <i>l</i> . 10 <i>s</i> .....                    | 290    |
| Belvedere, Kent—Ground-rents of 26 <i>l</i> , reversion in 79 years.....                    | 590    |
| By E. WOODS.....                                                                            |        |
| Anerley—Ground-rent of 84 <i>l</i> , reversion in 67 years.....                             | 2,000  |
| By E. WOOD.....                                                                             |        |
| Stoke Newington—38, Foulden-road, 85 years, ground-rent 8 <i>l</i> .....                    | 240    |
| By DYER, SOX, & HUTTON.....                                                                 |        |
| Lee—71 and 73, Burnt Ash-road, 78 years, ground-rent 20 <i>l</i> .....                      | 600    |

MAY 24.

|                                                                                                     |       |
|-----------------------------------------------------------------------------------------------------|-------|
| By BERTON & SONS.....                                                                               |       |
| Forest Gate—59, Leyton-road, 32 years ground-rent 7 <i>l</i> .....                                  | 265   |
| Leyton-road, Vanistart-road—A plot of freehold land.....                                            | 215   |
| By S. HERBACE.....                                                                                  |       |
| Clapham—1 to 7, St. John's-road, freehold.....                                                      | 5,450 |
| Kingston-on-Thames—1 to 5, London-road, freehold.....                                               | 1,600 |
| By E. TARBAGALE.....                                                                                |       |
| St. John's Wood—Improved ground-rents of 35 <i>l</i> , term 67 years.....                           | 605   |
| Improved ground-rents of 11 <i>l</i> , term 67 years.....                                           | 1,955 |
| By WISBO & SON.....                                                                                 |       |
| East Dulwich—3 to 14 even, Hincley-road, 81 years, ground-rent 26 <i>l</i> .....                    | 850   |
| Brixton Hill—1 and 3, Appach-road, 78 years, ground-rent 16 <i>l</i> .....                          | 540   |
| 26, Harrington-road, 25 years, ground-rent 24 <i>l</i> . 3 <i>s</i> . 300                           |       |
| 43, Holland-street, 12 years, ground-rent 7 <i>l</i> . 16 <i>s</i> .....                            | 385   |
| Clapham—86, 83, and 80, Wittenberg-street, 13 years, ground-rent 8 <i>l</i> . 15 <i>s</i> .....     | 120   |
| 1 and 2, White-square, 57, Spectacles.....                                                          | 280   |
| Pimlico—17, Palford-road, 27 years, ground-rent 3 <i>l</i> . 9 <i>s</i> .....                       | 275   |
| By C. W. DAVIS.....                                                                                 |       |
| Barnsbury—95, Brixton-road, 21 years, ground-rent 6 <i>l</i> .....                                  | 270   |
| Islington—91, Cloudeley-road, 34 years, ground-rent 4 <i>l</i> .....                                | 275   |
| By A. REYNOLDS.....                                                                                 |       |
| Enfield, High-road—Freehold detached house.....                                                     | 500   |
| By E. & H. LUMLEY.....                                                                              |       |
| Hanover-square—The lease of 27, George-street, term 18 years.....                                   | 1,025 |
| By C. & H. WEAVER.....                                                                              |       |
| Camberwell—9 to 13, Palmerston-street, 64 years, ground-rent 24 <i>l</i> .....                      | 1,645 |
| 11 and 13 to 21, Cambridge-street, 64 years, ground-rent 33 <i>l</i> .....                          | 2,095 |
| 22 and 24 to 28, Cambridge-street, 64 years, ground-rent 21 <i>l</i> .....                          | 1,235 |
| Improved ground-rents of 15 <i>l</i> , term 64 years.....                                           | 210   |
| Lambeth—Improved ground-rents of 18 <i>l</i> . 10 <i>s</i> , term 72 years.....                     | 235   |
| By WELLS & READ.....                                                                                |       |
| Walhamtown, Castle Avenue—A plot of freehold land.....                                              | 130   |
| By C. D. FIELD & SONS.....                                                                          |       |
| Regent's Park—Improved ground-rents of 12 <i>l</i> . 2 <i>s</i> , term 31 years.....                | 110   |
| Southwark Park-road—No. 104, 48 years, ground-rent 6 <i>l</i> .....                                 | 400   |
| Southwark Bridge-road—A plot of land, area 5,150 feet, term 999 years, ground-rent 1 <i>l</i> ..... | 900   |
| By DEBENHAM, TROWSON, & CO.....                                                                     |       |
| Belgravia—1 and 2, Ebury-street, 36 years, ground-rent 12 <i>l</i> .....                            | 2,120 |
| Bermondsey—69, Long-lane, freehold.....                                                             | 600   |
| 21, Crosby-row, and 1 to 4, Prince's-place, freehold.....                                           | 1,000 |
| By WALKER & RENTZ.....                                                                              |       |
| Clerkenwell—9 and 10, Coldbath-square, freehold.....                                                | 1,190 |
| King's Cross—185 to 207 odd, King's Cross-road, freehold.....                                       | 8,510 |
| 183, King's Cross-road, and 31 and 32, Field-street, freehold.....                                  | 680   |
| 25 to 30, Field-street, freehold.....                                                               | 1,540 |
| 10 to 16 even, St. Chad's-place, freehold.....                                                      | 225   |
| 1 to 11 odd, St. Chad's-place, freehold.....                                                        | 800   |
| MAY 26.                                                                                             |       |
| By WETHERBALL & GREEN.....                                                                          |       |
| Lambeth—48, Lower Marsh, 24 years, no ground-rent.....                                              | 640   |
| St. John's Wood—20a, Park-road, 35 years, ground-rent 12 <i>l</i> .....                             | 630   |
| Holloway—11, Drayton Park, 76 years, ground-rent 8 <i>l</i> .....                                   | 520   |
| By A. WALTON.....                                                                                   |       |
| Horton—52, Allerton-street, 21 years, no ground-rent.....                                           | 195   |

|                                                                                      |       |
|--------------------------------------------------------------------------------------|-------|
| By PHILLIPS, SON, & NEALE.                                                           |       |
| South Belgravia—89, Cambridge-street, 44 years, ground-rent 8l.                      | £600  |
| By INMAN, SHARP, & HARRINGTON.                                                       |       |
| Walthamstow—Ground-rent of 12l. 10s., reversion in 33 years                          | 365   |
| Leyton—Ground-rent of 10l., reversion in 68 years                                    | 230   |
| By J. McLAUREN & SONS.                                                               |       |
| Lambeth—Improved ground-rents of 57l. 5s. 4d., term 37 years                         | 1,470 |
| Chelsea—Improved ground-rent of 19l. 10s., term 22 years                             | 215   |
| Clapham—49, Manor-street, 21 years, ground-rent 5l. 10s.                             | 320   |
| By NEWBORN & HARDING.                                                                |       |
| Dalston—71, Shrubland-grove East, 61 years, ground 8l.                               | 300   |
| Kingland—64 and 65, De Bevoise-road, 31 years, ground-rent 7l. 4s.                   | 560   |
| Hoxton—45, Essex-street, 82 years, ground-rent, 8l. 5s.                              | 350   |
| Holloway—24, John's Park, 64 years, ground-rent 8l.                                  | 430   |
| 36, Mildmay Park, freehold                                                           | 830   |
| By E. SIMSON.                                                                        |       |
| Bermondsey, Jamaica-road—A plot of freehold land 5 to 8, Bermondsey-square, freehold | 750   |
| Wandsworth—1, the Grove, freehold                                                    | 230   |
| 11 to 19, Burdocks-road, freehold                                                    | 1,450 |
| West Dulwich—6 and 6a, Kew-bridge-road, freehold                                     | 435   |
| 40, Chancellor-road, freehold                                                        | 330   |
| Southwark—125 and 123, Great Suffolk-street, freehold                                | 1,190 |
| Canterwell—22, 24, and 30, Filton-street, freehold                                   | 1,890 |
| 2, 4, and 6, George-street, freehold                                                 | 840   |
| By C. R. CROSS.                                                                      |       |
| Uxbridge-road, Ashaw-road—Delhi Lodge, 69 years, no ground-rent                      | 465   |

## MEETINGS.

SATURDAY, JUNE 4.

Association of Municipal and Sanitary Engineers and Surveyors.—Home Counties District Meeting at Portsmouth. Paper by Mr. Boulnois on the Drainage Works of Portsmouth, recently carried out by Sir Frederick Bramwell.

St. Paul's Ecclesiastical Society.—Visit to Cobham. Train from Holborn, 8.16 p.m.

MONDAY, JUNE 6.

Surveyors' Institution.—(1) Annual General Meeting to receive the Report of the Council and to elect officers for the ensuing year. (2) Distribution of Prizes. 3 p.m.

Society of Biblical Archaeology.—3 p.m.

Institution of Civil Engineers.—Annual Meeting of Corporate Members only, to receive the report of the Council and to elect the Council and Officers for the ensuing year. 8 p.m.

THURSDAY, JUNE 9.

Architectural Association.—Annual Dinner, Holborn Restaurant.

Society for the Encouragement of the Fine Arts.—Third Concertations at the Galleries of the Royal Institute of Painters in Water Colours, Piccadilly. 8 p.m.

FRIDAY, JUNE 10.

Royal Institution.—Mr. Thomas Hodgkin on "Aquilaia the Precursor of Venice." 9 p.m.

SATURDAY, JUNE 11.

Architectural Association.—Visit to Banstead Park, the residence of the Hon. Francis Baring. (See advertisement on p. xvi.)

## Miscellaneous.

**The Iron Process for Sewage.**—In the course of a recent report to the Health and Drainage Committee of Windsor, by the Chairman of the Committee and Mr. Alderman Lundy, in referring to the treatment of the sewage at Chichester Barracks by the iron process, says:—"The application of sulphate of iron is very simple, and the precipitate, occurring below the outfall, was perfectly free from offensive smell. A careful examination of the sewage resultant shows it to be a true chemical precipitate, which soon desiccates, when it may be handled with impunity. The effluent possesses a high degree of purity. The sewage discharge, which is weak, as thirty-four gallons of water are daily supplied per head, amounts to 15,000 gallons in twenty-four hours. Mr. Conder's scheme is that the crushed dissolved sulphate of iron must be applied continuously; that the gentle flow and the absence of light, such as occur in every sewer, render the chemical operations of sulphate of iron on sewage most effectual, that its darkness and agitation are essential to make the experiment effectual. . . . It yields a deposit free from associated water, unlike lime and other reagents, which do not destroy sewage matters, but aggregate them into sludge—a resultant most difficult to get rid of and expensive to deal with."

**Cremation.**—During the past eight months there has been carried on upon a large scale, in the midst of a populous part of London, a system of cremation the results of which have, after severe trials, proved highly satisfactory. In the summer of last year a serious difficulty arose at the Temporary Home for Lost and Starving Dogs, in Battersea, in consequence of the local authorities of the district, where the dead bodies had hitherto been disposed of, having refused to allow of their being received there any longer. At a public meeting of the supporters of the Institution, it was

decided that the bodies should be destroyed by cremation. A furnace has been erected in a small yard at the extremity of the Society's premises near to the Battersea Park-road, and consisting of a close-chamber (capable of containing about 120 dead dogs) constructed with bottom, sides, and arched tops, of Stourbridge fire tiles, specially made and supplied for this purpose by Messrs. Cull & Son, of Palmerston-buildings, London. Underneath the chamber is placed the furnace, from which a series of cells or flues, after conveying the flames round the sides and top of the chamber for its whole length, are led by a longitudinal flue along the top, into a shaft, about 70 ft. high, built over the entrance to the furnace. The bodies of the dogs which have been destroyed in the lethal chamber on the previous night are placed in the morning in layers on the floor of the chamber until it is nearly full, leaving a space all round between the bodies and sides and top of the chamber, after which the opening is closed by a heavy cast-iron door (which is raised or lowered at pleasure) and hermetically sealed. The fire, which has previously been lighted in the furnace beneath, is then actively increased until the bottom, sides, and top of the chamber become red-hot. The gases which are created in the chamber are led back, by openings specially arranged for the purpose, into the furnace beneath, where they ignite, and, together with the contents of the chamber, become a mass of flame, thus rapidly and effectually completing the process of cremation. After the products of combustion in the close chamber have passed through the fire, they are then conducted (together with any smoke from the fire itself) through the series of super-heated flues before entering into the shaft, with the result that the whole is consumed, nothing being left but a small quantity of incinerated bones and ashes, which are eventually disposed of for manure. The furnace was designed by Mr. E. Crutchlow, the architect to the Committee, and carried out by Mr. W. Neil.

**Opening of the New Windsor Lines of the London and South-Western Railway.** The additional double lines of rails, between Clapham and Barnes, for the purpose of giving increased facilities for the traffic on the London and South-Western Company's Windsor system, were opened on Wednesday. The works, which have been in course of construction for upwards of three years, have involved a very large outlay in actual works, in addition to the heavy expenditure which has had to be incurred in the purchase of the necessary land along the line of route. All the bridges crossing over the several roads between Clapham and Barnes have been rebuilt and widened, and the stations at Wandsworth, Putney, and Barnes have all been reconstructed and very much enlarged. The most costly portion of the undertaking has been at Wandsworth, where the new and widened lines are carried over York-road by massive iron girder bridges. The former old station, which was one of the most inconvenient on the company's system, has been replaced by a large and very commodious new station, about 1,000 ft. in length and 200 ft. wide, with spacious station buildings on the north and south platforms, and also on a central platform, upwards of 50 ft. in width, all these several platform buildings being supplied with numerous waiting-rooms and station-masters' and other offices. All the platforms are about 700 ft. in length, the greater portion being roofed over. The booking-offices are on the north side, being reached through a spacious booking-hall, 60 ft. long and 30 ft. wide.

From the booking-hall the railway platforms above are approached along a subway extending entirely under the railway from the north to the south side. From this subway the platforms are reached by a central and north and south staircases. The subway is 12 ft. wide, and faced on each side with white enamelled brick, and well-lighted from the railway level above. A large open area in front of the approach to the booking-hall will be appropriated as a cab-stand. The works have been carried out from the designs of the late Mr. W. Jacob, the company's engineer-in-chief, whose painfully sudden death took place on Thursday week, as elsewhere mentioned, and who was interred at Wimbleton Cemetery on Tuesday last in the presence of several of the directors and large numbers of the company's officers and employés. Messrs. Perry & Co., of the Tredegar Works, Bow, are the contractors.

**Electric Lighting.**—The Gülcher Electric Light and Power Company, Limited, have completed the lighting of a house at Elsted, near Petersfield, for Mr. E. A. Nevill. An engine-room has been built between two stone buildings specially roofed over and paved; the total distance from the house being about twenty-five yards. The plant consists of a two-horse power Spiela's petroleum engine made by Messrs. Shirlaw & Co., of Birmingham, which drives a No. 1 Gülcher shunt-wound dynamo machine. The dynamo charges a battery consisting of twenty-seven Elwell-Parker 15-plate cells which are used to store the electricity for use during the night. A Mountain's improved switch board is placed by the dynamo machine and is used for charging and discharging, running the dynamo and accumulators together in case of emergency or running the lamps direct from the dynamo. A five-contact switch is also provided on the same slate slab for adding extra cells as the E.M.F. falls, and the volt and ammeters, with measuring-plugs, are arranged so that by inserting or withdrawing a plug the E.M.F. can be measured. The current from the dynamo room is led to the house by a pair of 7-15 cables made by Messrs. Callender & Co., supplying thirty-eight lights. In the hall special hammered iron brackets have been used in order to lend themselves to the old character of the house. In the bedrooms special rising and falling pendants, designed by Mr. Mountain, have been placed, either one on each side of the toilet table or over the centre of the looking-glass, and as these fittings are made to swing from side to side the light can be brought into any desired position. Throughout the house the shades are of cut glass. This installation is one of the first where a Spiel Petroleum Engine has been used for private house lighting.

**The Registration of Plumbers.**—The movement for the registration of plumbers, inaugurated by the Plumbers' Company of London, has, we are glad to see, extended to Scotland, and on the 24th ult. a successful meeting was held in the Town-hall, Dundee, presided over by Provost Bellingall, and addressed by Mr. W. R. E. Coles, C.E., and Mr. G. Young. In the course of the proceedings, the Provost said that they in Dundee had in prospect the foundation of a Technical Institute in connexion with University College, and he had no doubt that the Institute would give young men who were desirous of being educated practically and scientifically in the plumbing trade every opportunity of being so. Professor Ewing, Professor of Engineering in the University College, took a great interest in the Dundee and District Sanitary Association, and his connexion with the late Professor Fleeming Jenkin gave him the assurance that if a class for the technical education of plumbers was to be set up in connexion with the Institute very great good would result to Dundee and district. Eight practical plumbers from different parts of Scotland, including Broughty Ferry, Aberdeen, Cupar Fife, Inverness, Duns, and Oban, were present at this meeting, and received certificates of registration, their signatures being attested by the Provost.

**The South-Western Railway Company's New Locomotive Works at Nine Elms.**—The new departure which the London and South-Western Railway Company are about to take in the construction of their own locomotives will, it is stated, shortly give employment to about 2,000 working engineers and other artisans at the new locomotive works at Nine Elms, now in course of preparation. The company's engines have hitherto been supplied by private engineering firms, but the increasing extent and magnitude of the undertaking has determined the company to be the builders of their own engines, thus following in the footsteps of the London and North-Western and other leading companies. A considerable portion of the extensive depot at Nine Elms, occupying several acres on the south side of the line, is being set apart for carrying on the locomotive works, and new buildings and machinery are at present being erected preparatory to commencing the manufacture of the Company's engineering plant. In the meantime the first engine has for some time past been in course of construction, and is intended to be placed on the line for working the traffic on the day of the Queen's Jubilee, the designation given to the engine being the "Jubilee."

\* That is, "electro-motive force."

Monument to the Marquis of Montrose.

We mentioned a little while ago that a monument was to be erected in St. Giles's, Edinburgh, to the memory of the celebrated Marquis of Montrose. This has been designed by Dr. Rowand Anderson, and is to be executed by Mr. Rhind. We take the following particulars from the Scotsman:—"The monument will be erected on the east wall of the Montrose aisle. It is in the Renaissance style of the seventeenth century, and is suggestive of the form the monument would probably have taken had it been erected at the time Montrose was hurried. The principal feature in the design is a semi-circular arch deeply recessed, having in the recess a sarcophagus, with black marble hieroglyphs carrying the recumbent figure of the Marquis. The archway is flanked by two Corinthian pillars in black and gold marble, with caps and bases of alabaster. In the centre of each of the pillars is an alabaster wreath. These pillars are surrounded by a frieze, entablature, and cornice, with ornamented pinnacles. The frieze is decorated with floral wreaths and panels. The latter contains one of the Montrose mottoes, 'N'ouhiez,' while the rose of Montrose and the clam shell of the Grahams are also worked into the design. In the frieze immediately above the pillars is a panel with the favourite device of the Marquis,—a lion leaping from one rock to another, with the motto 'Nil Medium.' Rising over the cornice, and between the pinnacles, is a large ornamental panel, in which is quartered the full coat of arms of 'The Graham,' flanked by richly-carved pillars and dolphins, and surmounted by a pediment. In this pediment is another of the Montrose crests,—a gloved hand grasping a porcupine, with the motto, 'Col Senno a son Lamano.' The monument is finished off by another panel, which rises over the pediment, containing yet another crest,—an eagle displaying a stork. The work will be carried out in coloured marbles and alabaster. The cost will be about 1,000."

"The Stones of London": Temple Bar. "An Architect" writes to the Pall Mall Gazette:—"I hear indirectly, but on substantial authority, that Temple Bar, notwithstanding all promises, has been sold, and will be erected in private grounds. If this had been the Bridge of Sighs! And yet the 'stones of London' are fewer than those of Venice. . . . I cannot think that the gentleman who has bought it would not on public and historic grounds consent to forego his purchase if there were a desire to preserve it in London. In one of the parks, with the colonnade of Old Burlington House,—another example of exactly harmonious style,—to lead up to it or make a portico-like shelter, a fine composition might be made, and the future averted."

Distressingly Healthy.—At the first meeting of the New Blayden (Northumberland) Local Board, the medical officer of health created considerable amusement by his congratulatory report, in which he said:—"Since last meeting nothing whatever has occurred of medical interest in your district. The high state of health extending over so lengthened a period is still fully maintained. It is really altogether remarkable. Personally I may fairly claim to join in the doleful and all too general cry, 'Ah, yes, indeed; trade is very slack!' Could I pay a higher compliment to the good officers of your Board?"—The Sanitary Record.

PRICES CURRENT OF MATERIALS.

Table with 4 columns: Timber, Price (£ s. d.), and other materials. Includes items like Greenheart, B.G., Oak, E.I., Sequoia, U.S., Ash, Canada, Elm, Birch, Elm, Fir, Dantsic, etc.

Table with 4 columns: Timber (continued), Price (£ s. d.), and other materials. Includes items like Swedish, White Pine, Canada, Pine, etc.

Table with 4 columns: METALS (continued), Price (£ s. d.), and other materials. Includes items like COPPER, British, sheet, Chili, bars, etc.

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Table with 5 columns: Nature of Work or Materials, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes items like Paving Bricks, Making-up and Paving Roads, etc.

PUBLIC APPOINTMENTS.

Table with 5 columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes Cambridge School of Art.

TENDERS

Table with 2 columns: Name of contractor, Amount (£ s. d.). Includes BETHNAL GREEN, ELTHAM, etc.

ESHER (Surrey)—For proposed alterations and additions at Brookleigh, Hare lane, Esher, Surrey, for Mr. J. P. Robinson. Mr. R. T. Eham, architect, Hampton Wick, Middlesex. Quantities by the architect:— W. & H. Castle, \* Bed Cross street, £4,073 0 0 P. Peters, Horsham 3,970 0 0 E. Pink, Milford 3,980 10 0 W. H. Eschelar, Leatherhead 3,781 0 0 Martin Wells & Co., Aldershot 3,787 0 0 J. F. Collinson, Teddington 3,758 0 0 H. Simmonds, Reacing 3,560 0 0 W. Wheeler, Kingston-on-Thames 3,483 0 0 R. Wood, Cobham 3,485 0 0 J. H. Jarvis, East Molesey 3,483 0 0 C. F. Kenley, Uxbridge 3,447 0 0 C. Bond, Teddington 3,419 0 0 J. & J. Greenwood, Bernardsay 3,407 0 0 Kirk Bros., Battersea 3,399 0 0 T. Hiscock, Hounslow 3,385 0 0 W. Hickinbotham, Teddington 3,369 0 0 J. Bottrill, Reading 3,284 0 0 J. Piller, Teddington (accepted) 3,240 0 0 T. H. Kingdley, Oxford 3,187 0 0 R. Rowe, Manchester-square 3,130 0 0 W. J. Besie, Battersea 2,820 0 0 \* We are informed that Messrs. Castle have since written stating that their estimating clerk had made an error in the casting of the summary, and their tender should have been 3,145/.

HAMPSTEAD.—For stables at West Hampstead, for Mr. H. G. Randall. Mr. Banister Fletcher, architect— Downing & Sons 2,019 0 0 Manbridge 829 0 0 Atheson 800 0 0 Dainton 775 0 0 Skele Bros 745 0 0 Wm. Tout 745 0 0 Nesve & Nears 718 0 0 J. O. Richardson 689 0 0 Barsill (accepted) 675 0 0

**HEREFORD.**—For the erection of Jubilee Almshouses for the Ancient Order of Foresters, Hereford. Mr. W. W. Robinson, architect, 10, King-street, Hereford:—  
 H. Welsh ..... £1,097 0 0  
 E. Jones ..... 1,877 0 0  
 W. Bowers & Co. .... 845 0 0  
 T. Lewis ..... 930 0 0  
 J. Davies ..... 890 0 0  
 G. Williams ..... 843 0 0  
 W. B. Partington, High-street ..... 833 0 0  
 R. Taylor ..... 795 0 0  
 C. Lawrence ..... 765 0 0

\* Accepted.  
 [All of Hereford.]

**HEREFORD.**—For the erection of a villa residence for Mr. T. Maund. Mr. W. W. Robinson, architect, 10, King-street, Hereford:—  
 Wm. Cullis, Hereford (accepted) ..... £650 0 0

**HOLLOWAY.**—For alterations and additions to St. John's Tavern, Junction-road, Upper Holloway, N., for Mr. Ascott. Mr. H. I. Newton, architect, 17, Queen Anne's Gate:—  
 Godden ..... £1,335 0 0  
 Mark ..... 1,420 0 0  
 Lambie ..... 1,419 0 0  
 Burman & Sons ..... 1,315 0 0  
 Jackson & Todd (accepted) ..... 1,179 0 0

**KEW.**—For proposed gymnasium at the Star and Garter Hotel, Kew Bridge, for Messrs. Fuller, Smith, & Turner:—  
 Ashford & Co. .... £869 0 0  
 S. Hunt, Chiswick ..... 855 0 0  
 T. Nye, Ealing ..... 722 0 0

**LONDON.**—For pulling down and rebuilding the Chapter Coffee House, Paternoster-row. Messrs. Taylor & Locke, architects. Quantities by Mr. W. Birdseye:—  
 Snow & Co. .... £2,447 0 0  
 Hall, Beddall, & Co. .... 7,749 0 0  
 Clarke & Bracey ..... 7,688 0 0  
 Coulsell Bros. .... 7,610 0 0  
 H. & E. Lee ..... 7,583 0 0  
 Perry & Co. .... 7,418 0 0  
 Boyce ..... 7,350 0 0  
 Kilby & Oayford ..... 7,220 0 0  
 J. & J. Greenwood ..... 7,171 0 0

**LONDON.**—For alterations and additions to No. 59, Wellington-road, St. John's Wood. Mr. Henry J. Treadwell, F.S.I., surveyor:—  
 W. Whiteley ..... £770 0 0  
 Styles & Son ..... 635 0 0  
 J. K. Tinson ..... 634 0 0

**LONDON.**—For alterations to Nos. 3 and 4, Whitecross-place. Mr. Banister Fletcher, architect:—  
 J. Garrud ..... £284 0 0  
 Kiddie & Sons (accepted) ..... 281 5 0

**LONDON.**—For new entrance and staircases to Throne Room, forming small private dining-room, alterations to lavatories, &c., at Crosby Hall, Bishopsgate, for Messrs. Gordon & Co.:—  
 G. S. Archer, Featherstone-street, City-road (accepted) ..... £226 0 0

[No competition.]

**LONDON.**—For new stable and alterations at 184, Drummond-street, Hampstead-road, for Mr. Thomas A. Saunders. Messrs. Nevinnson & Newton, architects:—  
 Patman & Fotheringham ..... £223 0 0  
 Vernal & Griffiths ..... 223 0 0  
 G. & J. Green (accepted) ..... 159 0 0

**MAIDSTONE.**—For alterations to the Fens, Maidstone, for Captain Stacey. Mr. Arthur R. G. Feilding, architect, 10, Lincoln's Inn-fields:—  
 Thos. Barden ..... £106 0 0  
 Wallis & Clements ..... 394 0 0  
 A. Fryer & Co. .... 393 0 0  
 Cor Bros. (accepted, subject to modifications) ..... 388 0 0

[All of Maidstone.]

**MANSFIELD (Notts).**—For making and forming Welbeck and Newcastle streets, Mansfield. Mr. R. Frank Vallance, Town Surveyor:—  
 Fisher Bros, Mansfield ..... £373 0 0  
 W. A. Vallance, Mansfield ..... 320 7 0  
 J. Greenwood, Mansfield ..... 309 10 0  
 S. & G. Frisby, Mansfield ..... 306 0 0  
 James Bradley, Lincoln (accepted) ..... 282 12 10

**PAIGNTON (Devonshire).**—For the erection of two shops on the Gerston Estate, for Mr. F. Palk. Mr. Stephen Woodbridge, jun., architect, 210, High-street, Brentford:—  
 Messrs. C. & R. E. Drew, 1,350.  
 [No competition.]

**SOUTHWARK.**—For new bishop's residence and partial rebuilding of existing clergy house adjoining St. George's Cathedral, Westminster Bridge-road, for the Right Rev. Dr. Butt, R.C. Bishop of Southwark. Mr. Fred. A. Walters, F.S.A., architect. Quantities by Mr. W. H. Brayshaw:—

|                                        |         |
|----------------------------------------|---------|
| Less for Ancaster Stone.               |         |
| Dove.....                              | £15,253 |
| Goddard.....                           | 14,698  |
| Lansdown.....                          | 13,640  |
| Brown.....                             | 13,623  |
| Parmenter.....                         | 13,560  |
| Conder.....                            | 13,384  |
| Boyce.....                             | 12,840  |
| Macey.....                             | 12,638  |
| J. Smith & Sons, Norwood Junction..... | 12,387* |
| * Accepted with modifications.         |         |

**STOKE NEWINGTON.**—For the erection of St. Michael's Vicarage. Messrs. J. E. K. and J. P. Cutts, architects:—  
 James Holloway (accepted) ..... £1,749 0 0  
 [No competition.]

**SUTTON MADDOCK (Shropshire).**—For taking down and rebuilding Sutton Maddock Church. Messrs. Nicholson & Sons, architects, Hereford:—  
 J. Inwood\* (Worcester and Malvern) £1,840 0 0  
 \* Accepted.

[Twelve other tenders submitted, ranging from 3,397l. (highest) to 1,595l. (lowest). Names of senders of these not forwarded to us.]

**TURNFORD (Herts).**—For the erection of dwelling-houses for Mr. Rochford:—  
 Bentley, Waltham ..... £1,384 0 0  
 Boswell, Enfield ..... 1,310 0 0  
 Saunders, Chesbunt ..... 1,247 0 0  
 Brown, Hoddeston ..... 1,243 0 0  
 Hampton, Hoddeston ..... 1,227 0 0  
 Pavey, Winchmore Hill ..... 1,153 0 0  
 Farley & Maycock,\* Waltham Cross 1,095 0 0  
 \* Accepted.

\*\* SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 49, Catherine-street, W.C., not later than 12 Noon on THURSDAYS.

**FIRE BRICKS.**

BEST STOURBRIDGE FIRE BRICKS, and Cement Fire Clay, Gas Retorts, Mullers, &c. Fire Bricks and Bricks for the Highest Fires, for Iron Blast Furnaces, Forge, Rolling, Founding, and Steel Furnaces, Flint Glass Furnaces, Roasting and Refining Furnaces, Chemical Works, Coke Ovens, &c. Boiler Setting Blocks, Flue Covers, Locomotive Bricks, Tugers, Steel Runners, Grate Bricks. Special Sizes and Shapes made to Engineers' Drawings. Prices quoted to any Port or Railway Station.  
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 R. CULL & SON'S Stores, Railway Arches, London-street, Bethnal Green Station, E.  
 Chief Office:—72, Palmerston-buildings, Old Broad-street, E.C.

**TO CORRESPONDENTS.**

Registered Telegraphic Address, "THE BUILDER, LONDON.

R.R. (should send names and amounts).—W. F. P.—A. F.—C. S. (not quite in our style).—T. R. S.—H. D. A.—E. C.—D. N.

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

Note.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors. We cannot undertake to return rejected communications.

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# The Builder.

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### Preservation of Stone.



ALTHOUGH "durable as a stone" has become an almost proverbial expression, it is hardly necessary to point out to practical men how perishable and unreliable many varieties are. A mere change of position or climate will often cause the rapid disintegration of stones which may have withstood atmospheric influences for ages in a situation favourable to their nature.

The causes of the decay of many stones have been several times the subject of inquiry, notably by the Commissioners appointed to investigate the cause of the serious destruction of the stone used in building the Houses of Parliament, and to suggest the best means of preventing further mischief. Their Report, published in 1839, was the most complete summary of the question up to that time, and contains much valuable information, and some questionable conclusions. Numerous articles have appeared since then in various technical and other journals, and several papers on the subject have been read before learned societies interested in the matter, but for the most part these have either been *résumés* of the Parliamentary Report, or else have been written in the interests of some one or another of the many patented protectives. It will be instructive to indicate the present condition of our knowledge on this subject, and may suggest some fruitful ideas to those whose interests may be with stone and stonework.

The chief conditions which affect the life of a stone are porosity, chemical nature, the atmosphere, soil or water that it may be in contact with, and the temperature to which it may be constantly or intermittently exposed. Vibration, great pressure, and position in a building also in some cases have their influences.

Porosity is a well-understood property of certain stones, although not always taken into full account. It is measured by the amount of weight gained by immersing the dried stone in water for a given time, say twenty-four hours. The degree of absorption varies widely from a scarcely appreciable trace in the case of hard crystalline blocks of dense structure to more than 20 per cent. in the case of common soft stones, such as certain sandstones, &c. The writer of a valuable, albeit popular, article\* in 1860 brings this fact home to the mind in a striking form by the

statement that "one square yard of building stone after being long exposed to dry warm air is capable of absorbing from nine to fourteen gallons of water, according to the nature of the stone, before being saturated to a depth of one foot, and in the earth each ton of stone never contains less than a pint, and may contain twenty-five gallons of water."

This porosity of stone is a matter to be carefully considered, but need not under all circumstances be regarded as a disadvantage. Where exposed to great alternations of temperature the destruction of a water-laden stone must obviously be rapid. Such a stone, moreover, would draw up by capillary attraction the ground moisture if by inconceivable ignorance, gross carelessness, or dishonesty, an efficient damp-course had not been interposed. On the other hand, in a building constructed of porous stone or brickwork more efficient ventilation and a more equable temperature can generally be maintained than is possible if the constructive material be of a hard, non-cellular nature. Pettenkofer's well-known ventilation experiment, in which a candle is blown out by a puff of air which has passed through two thicknesses of brick or porous stone (like sandstone, &c.), is a striking illustration of this porosity. When soaked in water such materials lose their perviousness to air almost entirely, but, inasmuch as such a condition seldom practically obtains, we may confidently assert that porous building materials containing only such water as they may have absorbed from the atmosphere are factors of some importance in helping to secure the healthy condition of the interior of buildings. "But the ubiquitous microbe may get through, as well as any foul gases that may result from insanitary external conditions," cries some one. As to the first objection, it has been proved by convincing experiments that finely-divided and porous materials will filter out most effectually the germs of fermentation, decay, disease, &c., from both air and water, if indeed such filtration be necessary in the vast majority of cases. As regards the second, the oxygen occluded in the pores of the stone would have some influence in modifying the character of many offensive gases; but still more to the point is the retort that it is self-evident that if external sanitary conditions are bad it would be practically impossible to maintain a pure atmosphere in a structure built of no matter how non-porous a material. If their strength, accessibility, and other conditions are favourable, the porosity of a stone need not be looked upon, sanitariously at any rate, as a drawback. The chemical nature of a stone is also to be taken into consideration in determining its suitability for specific purposes. Although chemical

analysis will not always by itself indicate the best quality of stone, the mechanical condition of the aggregate particles being frequently of at least as much importance, there can be no reasonable doubt that it is of service, and will frequently prevent the employment of certain stone for obviously unsuitable purposes.

The chief building stones are the following: The sandstones which consist of particles of hard silica or sand bound together with more or less force with some cementing materials which may be of a ferruginous, clayey, siliceous, or calcareous nature, and the density of the stone will largely depend on the pressure to which it has been subjected during formation, and the amount of the cementing material present. In some cases the grains of silica are so loosely held together that the stone quickly disintegrates, and in other cases they are cemented by a substance quickly acted on by acid atmospheres of towns, &c., so that the cohesion is rapidly destroyed.

In 1873 Dr. Angus Smith, in a paper read before the Manchester Literary and Philosophical Society, proposed a plan for measuring the value of stones for resisting the air of towns, which consisted in the immersion of 1 in. cubes of the stones in solutions of hydrochloric or sulphuric acids and noting the deterioration of strength which resulted. Some sandstones under such treatment give way at once, while others, the cementing material being of a more resistant nature, will stand prolonged action of the acid.

The limestones, which contain as their main ingredient carbonate of calcium, are the most important and varied of the building stones used in this country. Some varieties, such as dolomite or magnesian limestone, contain, in addition to the carbonate of calcium, carbonate of magnesium, and are not regarded as so readily decomposable by acids as the ordinary limestones. All carbonates are, however, decomposed ultimately by even weak acids, so that they are far from imperishable, especially in large towns, although the physical conditions of some qualities will frequently enable them to resist disintegration far longer than another variety having precisely the same chemical composition.

Slate, shales, &c., are mainly composed of clayey material (impure silicate of alumina) that has been hardened by enormous pressures acting in particular directions.

Granites, which are crystalline rocks of the old formations, as a rule consist of irregular mixtures of three minerals, felspar, quartz, and mica. A variety, known as syenite or syenitic granite, contains, instead of mica, hornblende. The granites are largely used, many sorts being very ornamental, hard, and durable. Even

\* Cornhill, vol. ii., p. 709.

this variety of stone undergoes decomposition in some circumstances: thus, although in a favourable climate like that of Egypt, granite obelisks have weathered successfully the storms of 2,000 years, the same rapidly show signs of deterioration in the atmospheres of New York and London.

The variety of felspar found in granite is orthoclase, a compound containing potash, alumina, and silica, and this is probably the weak point in the composition of the stone. Moreover, in moist climates granite surfaces are apt to become, according to M. Robert, the *habitat* of a minute cryptogamic plant, which decomposes the stones in order probably to obtain the supply of mineral matter necessary for its own nourishment.

It has, at various times, been more or less authoritatively stated that lichens which form frequently on stone surfaces in country places help to preserve such stone, but this idea is not supported by any reasonable argument. The lichens do not thrive in acid town atmospheres, which are likewise destructive to stonework, but it by no means follows that when lichens do cover the stone they conduce to its preservation. The greater probability is that the stone would last better if kept free from such growths, which requiring, as they do, mineral matter for their sustenance, obtain such matter chiefly by the decomposition of the surfaces upon which they reside; especially is this true of the lichen, *Lepra antiquitatis*, which has been described as "one of the worst enemies of stone."

This subject, however, requires and deserves further investigation, and if any readers of this summary of an important question are inclined to place at the author's disposal specimens of stone upon which may be growing lichens, mosses, fungi, or other cryptogamic plants, together with all possible information as to the position, circumstances, &c., in which the specimens were found, he will be glad to examine the same and to point out appearances, &c., that may tend to prove or disprove the theory that such growths are harmless to stone on which they develop.

Position in a building often has much to do with the longevity of stonework. The harder material should, so far as possible, be placed on the most exposed sides, in this country generally south, south west, and west. The wind and driving rain are the chief causes of the mischief, though a strong wind laden with sharp, gritty dust will also in time obliterate inscriptions, tracery, &c., in the hardest stone.

The following are the devices, patented and otherwise, good, bad, and for the most part indifferent, or, at any rate, imperfect, which have been brought before public notice with the idea of securing the object that forms the title of this article.

To obtain immunity from the growth of lichens, &c., numerous sterilising concoctions, such as those containing copper compounds, have been suggested; but these are of little importance.

A large proportion of the patented preparations consist of varieties of more or less perishable paints and varnishes, which protect the stone for just so long as they themselves remain perfect and impervious. Disregarding ordinary paints and similar preparations, we will briefly enumerate the various compounds which have been patented, and which contain some proportion of animal or vegetable material,—of course, all such substances, and nearly all other paint-like compositions, are inadmissible for most stonework, especially of an ornamental character, hiding as they do the natural colour of the stone, and clogging and destroying the sharpness of designs, &c. Still, there are conditions where such substances as some of the following may be usefully employed.

In 1847 W. Hutchison patented a mixture of rosin, pitch, and similar matters, mixed with oil and powdered stone, slate, or chalk.

B. Barrett suggested, in 1853, a process which he deemed specially applicable to the more porous stones and cements. The stone was to be placed in a chamber from which the air was exhausted, and one or another of the following indurating mixtures allowed to flow

in; or, in some cases, where exhaustion was not practicable, the mixtures might be applied like ordinary paint. No. 1 contains resin dissolved in turpentine, naphtha, or spirits of wine, mixed with gutta-percha dissolved in coal-tar naphtha, and while still warm, oil of some sort is added. No. 2 consists of gutta-percha dissolved in coal-tar. No. 3 contains shellac, Venice turpentine, &c., dissolved in spirits of wine or turpentine. No. 4 is made up of unslaked lime and soft soap; Russian tallow is added while the lime is slaking, and the whole is subsequently placed in a copper with alum, water, sulphate of iron, and "solution made from potatoes and beer settlings"! Other mixtures are also mentioned in the specification, containing sulphur, gutta-percha, &c. The latter seems to be regarded by some patentees as the *best* ideal of an imperishable substance, but the author's experience by no means bears this idea out. A few years ago he was handed some ornamental mouldings made from pure gutta-percha about thirty years since, and which were riddled through and through with minute holes, apparently the work of some insect, the holes being filled with a fine, dry, brownish powder. It is well known, too, that, in hot climates especially, the gum oxidises after a time and becomes useless.

Assanti (1854, pat. 427) uses gutta-percha dissolved in carbon disulphide. Another patentee uses the same substance, as well as other gums, dissolved in naphtha. An attempt was made in 1853 to obtain a patent for impregnating natural and artificial stone by immersion in cauldrons of melted resinous and bituminous substances; the idea being to utilise the pressure of the superatant fluid for forcing the same into the pores of the stones, a depth of at least 12 ft. of the melted substance was recommended.

G. Winspear in the same year patented the application of varnish and pulverised mineral matter to protect metallic and stone surfaces, which were first to be coated with any ordinary varnish, and while yet moist, Roman cement was to be applied by means of a blast of air. The cement might be combined with calcined oyster-shells or other preparation of lime, and the coatings of cement and varnish might be several times repeated. For interiors, pounded glass, ground flints, and even borax might be employed.

More recently (1886, No. 4,872) a plan has been patented somewhat similar to Winspear's apparently, except that the powders used are of greater variety, and include powdered sandstone, freestone, brick, terra-cotta, granite, onyx, marble, &c. These are made to adhere to the surface with paint or varnish.

In 1856, another inventor recommended that the stone should be just coated with a solution of gelatine, glue or similar matters, and then when dry the gelatinous matter was to be rendered insoluble with tannic acid; or silicate of soda or potash might be applied. So-called "anti-nitrous cements" were patented in 1858 by Candelot, which were also applicable for rendering damp surfaces impervious and for the preservation of stone. They consisted essentially of a liquid containing boiled oil, rosin, turpentine, wax, stearine, and liquid india-rubber, and of a powder containing glass or silica, chalk, oxide of zinc, sulphur, or talc and pulverised slaked lime. The powders are well mixed and sifted and when added to the liquid for use form a hard and quickly-drying cement, which can, while still semi-fluid, be applied with a brush to walls, stonework, &c. Another patent in the same year, which obtained provisional protection only, was for the special purpose of rendering plaster of Paris harder, and for the prevention of efflorescence on walls, to which such plaster was to be applied. For the first purpose the plaster was mixed with water containing hydrochloric acid and American potashes (which would result in the production of a solution of chloride of potassium); this causes the plaster to set slower, but harder. To prevent efflorescence the following mixture was to be applied to the walls:—Arsenic (which is presumably meant the oxide, commonly termed arsenious acid), half a pound; hydrochloric acid, half a pint; sulphuric acid, one

gill, mixed with one quart of milk, and three or four gallons of water. In 1861 a protective paint for stone was patented by W. Smith, which was made up of powdered flint, or other silica, with alum or sulphate of alumina, the mixture being formed into a paint with dissolved glue, bituminous substances or linseed oil and turpentine. About the same time another paint, which was also to be used with linseed oil, was brought out as being specially applicable to plaster surfaces. The dry basis of the mixture was made up of powdered slag, borax, white lead, sulphate of alumina, acetate of lead, sulphate of zinc, silicates of soda and potash, and kaolin; sufficient water was first added, and then the linseed oil. An oily compound, patented in 1863, for preserving stone, was made up of one gallon "of any oil," and one gallon of water, to which was added two pounds of nitre, salt, or soda, mixed or separate, and two pounds of dissolved sulphur. Another patent of doubtful utility obtained in the same year was for a mixture made up of animal gall, lime-water, and "liquid from boiling potatoes": this was called No. 1 solution. No. 2 consisted of a solution of sulphur and camphor obtained by the use of a combination of mineral and linseed oils. Before applying the mixtures it is directed that the stone should be cleaned first with an alkali, and then with an acid, and after being well washed with clean water, No. 1 solution is applied, to be followed by No. 2.

We will refer to some other preservative processes in a second article.

#### MILAN CATHEDRAL.

COMPETITION FOR NEW WEST FRONT.

It will be remembered that the Administration of the Duomo at Milan issued in the early part of last year a programme inviting architects to send in designs for a new west front. It was intended to do so in consequence of a considerable sum of money having been left it for this purpose by a citizen of Milan under certain conditions.

The problem of improving the west front seems to have excited the greatest interest amongst Italian architects for many generations, and numerous projects with this object in view have been from time to time prepared, and are now in the hands of the Administration.

The question has lately assumed increased importance in the opinion of the Milanese, from the fact that the new buildings surrounding the Piazza have considerably dwarfed the Duomo.

The competition has resulted in the exhibition of 126 designs, five or six of them, at any rate, being English; the rest for the most part, German and Italian. Some of the latter are drawn to an immense scale, and are illustrated in a lavish manner unknown to English competitions. They have been on view for some weeks in the galleries of the Brera, and have attracted great attention. On Tuesday, the 24th ultimo, the exhibition closed, and the day following the jury held its first meeting, presided over by the Marchese Carlo E. Visconti. Amongst the members of the jury Baron Schmidt represented German architects and Professor de Dartien the French. After many conferences, the jury reduced the number of designs to twenty-six, and finally (after bringing the twenty-six into juxtaposition for more critical comparison) to fifteen, the authors of which are the following:—

Daniel Brade, 5, Bridge-street, Kendal.  
Ludwig Becker, Mainz.  
Morelli Gaetano, Milan.  
Antonio Weber, Vienna.  
Hartel-Neckelmann, Leipzig.  
Rodolph Dick, Vienna.  
Giuseppe Brentano, Milan.  
E. Depertbes, Paris.  
Teodoro Ciagbin, St. Petersburg.  
Luca Beltrami, Milan.  
Tito Arolino, Bologna.  
Enrico Nordio, Trieste.  
Carlo Ferrario, Milan.  
Paolo Casebianche, Milan.  
Giuseppe Locati, Milan.

These names are given, not necessarily in the order of merit, but in the order in which they were hung in the galleries.

The authors of the fifteen designs will now proceed to compete again, the prize adjudged to the victor being no less than 40,000 francs, smaller sums being distributed to the other fourteen, three of 5,000 francs, three of 3,000 francs, and the rest of 2,000 francs.

The designs for the most part suggest the heightening and accentuation of the front. Some of the designs have lateral towers and spires. Of these, probably the best are those which are kept decidedly subordinate to the existing central spire, though there are others which are carried to a much higher elevation than it, so as to change entirely the character of the structure.

Several designs afford interesting examples of an open porch of the Peterborough type.

The nationality of the architects is very marked, both in the character of their designs and their draftsmanship; the French and German drawings being, as a rule, very carefully delineated and shaded with the pen, and show excellent knowledge of detail in many cases. The Italian designs are full of chiaroscuro and dash, with less care for detail. One Italian design, that of Luca Beltrami, attracted great attention. In it the author has collected the admirable Renaissance portals and windows of the present west front, and introduced them into a campanile in a design of great merit. This campanile he proposes to erect in an isolated position on the south-west of the Duomo, immediately opposite the central arcade of the great Galleria. The difficulty of disposing of these beautiful cinque-cento features seems to be found the great crux in any attempt to improve the west front of the Duomo.

A. WATERHOUSE.

NOTES.

It appears that M. Bouquet de la Grye, in his report to the French Academy of Sciences in regard to the Panama Canal, has expressed the opinion that the construction of locks on the canal would be quite useless, and that it is impossible that there can be any difference of level between the Atlantic and Pacific. So most of us would suppose; but it seems odd that there should be any conflict of opinion about such an easily-demonstrable matter as the sea-level at either end of a canal route, if there has been anything like a proper survey. There remains the further question, however, whether the raising of the canal level by locks is not a necessary condition of carrying out the work at all; a matter on which it would be impossible to come to a decided conclusion without seeing the section of the route.

WE have received a copy of a lecture given at the Hôtel Continental at Paris two or three weeks ago by M. Custavo Cuzman, in favour of a scheme for a canal from the Atlantic to the Pacific through the Nicaragua State, and by utilising the Nicaragua Lake as part of the passage. M. Cuzman avers that the river San Juan, with a little treatment, will afford the passage from the Atlantic to the lake, leaving only a short canal to be cut from the lake to the Pacific at the port of Brito. According to his report the rise of the ground is only 14 metres, and the canal can be worked with four locks. It is rather amusing to find that while, as observed in the foregoing note, it has just been reported that locks on the proposed Panama Canal are all a mistake and quite unnecessary, we have here another report, from a writer professing to know the ground, to the effect that there is hardly a place in America where a canal is possible without locks. As to the Panama Canal, no words of scorn, pity, and contempt seem sufficient to express M. Cuzman's feelings in regard to that project, of which his own is an intended rival, which he refers to as the "pretendu Canal du Panama," with defiant italics, and against which he quotes the opinion of an eminent engineer, "sir John Hawkshaw," whose name is not familiar to us. However, says M.

Cuzman, "La France, heureusement, est assez riche pour payer au prix de milliards l'erreur d'un de ses plus illustres enfants," and she will be rewarded for her disappointment and disbursements by the achievement of the Nicaragua Canal when the requisite funds are raised.

"A WOULD-BE COMPETITOR," who is now apparently "a won't-be competitor," has sent us a copy of the instructions issued to architects who may wish to compete for laying out a new cemetery, with mortuaries and other buildings, for the borough of Oldham, accompanied by much stringent and indignant criticism. Some of the points objected to by our correspondent are unfortunately common to nearly all competitors, e.g., that the premiated designs are to remain the absolute property of the Corporation. This generally-accepted condition is most unfair to the Profession, when (as is usually the case) the highest premium only amounts to a sum far below the usual 2½ per cent. commission on buildings designed, but not carried out, by the architect; but in this respect the Oldham Corporation are no worse than their neighbours, and their premium,—60s. for work to cost 5,500l., is higher in proportion to the work than in many cases. But one point about the "conditions" is open to strong objection. The competitor is to "state what commission he will charge if engaged to supervise the works": a request which is very much at variance with any proper idea of the dignity of the profession, and which in reality amounts only to a kind of premium to inferior people to cut in and do the work cheap. What would be thought by lawyers (or indeed by the general public) of a Corporation which sent round invitations to solicitors to say for what charge each of them would undertake the legal business of the Corporation? It would be considered an almost disreputable thing to do. And why are architects to be treated worse?

AFTER long years of consideration, the borough of Ramsgate has resolved to attempt to carry out the formation of a roadway to unite the East and West cliffs. This roadway will start at the Royal Hotel, facing the harbour, and will rise by a uniform gradient to the Smack Boys' Home, in front of Prospect-place. The roadway will be formed on a viaduct, and the arches beneath the road will be utilised as stores. A portion of the inner harbour, and some unimportant property in the neighbourhood of the harbour, are proposed to be taken, and eventually it is intended to acquire the Alhion Hotel at the foot of Harbour-street, so as to afford a continuous roadway to the East Cliff by way of Alhion-place and Wellington-crescent, but this latter proposal, we believe, forms no part of the present scheme. The cost of the works is estimated at 15,000l., exclusive of compensation. Most of the property likely to be affected belongs to the Board of Trade, and the Town Council are sanguine that they will be able to effect a satisfactory arrangement with the Board with regard to their property. The proposed improvement will go far to destroy the picturesque appearance of Ramsgate from the sea, and appears to offer but few compensating advantages. The elevation of the viaduct towards the harbour is a monumental example of the misapplication of design, and it is to be hoped that it will not be carried out.

A PAPER on "The Signs of old Lombard-street," originally read by Mr. F. G. Hilton Price before the Institute of Bankers, has now been published\* in an edition *de luxe*, making a thick and handsome volume mainly occupied with illustrations of the old signs, taken from authentic sources, and shown with wrought-iron supports, which, although not the actual supports of the sign-boards in question, are copied from work of the period or from drawings. In some cases wooden supports or brackets are shown. A comparison of these with the wrought-iron open ornament which surrounds some of the other sign-boards shows

\* London: Field & Tuer, and Stimpkin & Marshall, New York: Scribner & Welford.

very clearly how the apparently rather unmeaning curves of the wrought-iron work, in some cases, arose from the attempt to line out in outline, in thin iron, the curves of the features carved in other cases in solid wood. This will be quite evident on comparing the iron framework of the "Blew Anchor" sign with the wooden framework of the "Black Lyon" sign which immediately follows it. Among the more characteristic of the signs figured are the "Three Feathers," not treated as in the present Prince of Wales emblem, as springing from a central point and the outer ones falling over to right and left, but three parallel feathers, very conventionally cut, and each with a bend to the right at the top; the "Royal Oak," with a head and three crowns grouped around the foliage of a tree (this house, a tavern, is mentioned by Pepps): the "Three Crowns," artistic in effect, and with a curiously designed suspending bracket; and the "Royal Exchange," with a picture of the Old Exchange on the signboard. After the Great Fire, Mr. Price observes, many of the signs were carved in stone, and hilted into the fronts of the houses; but the habit of hanging them or planting them in front was gradually renewed, and between 1760 and 1770 most of them were removed by order. It is curious to find the fashion of signs coming in again to some extent, though it is for the most part only among those who have special artistic or archaeological tastes, and is not likely to become so general as to be an inconvenience. Those who have an inclination in that direction will find a great many models for the (archeologically) correct thing in Mr. Price's book, which, in other respects, is a truly desirable volume, with thick paper and wide margins, and altogether a handsome addition to an archaeological library.

ON the 15th of June next will be offered for sale, at the Auction Mart, one of the most beautifully-situated residences in Ireland. It is Rostellan Castle, the seat of the last Marquess of Thomond, and occupied since his lordship's decease by the late Mr. Wise. Overlooking the Cove of Cork, a favourite yachting station, and with some finely-wooded country to the north, the castle was rebuilt in the early part of the seventeenth century. The park extends over 1,200 acres. The property furnishes good trout-fishing and wild shooting, and includes some farm buildings, together with residences for keepers and halliffs, and other outdoor servants. The land is reputed to contain some seams of silicious clay, and productive veins of hæmatite ore. A ridge of limestone rock traverses the park.

AMONGST other properties also for sale, in England, we may instance the Barcombe House estate, on the Ouse, near to Lewes; the Oakeley estate, Shropshire; and the Franks property, in the Vale of Darenth, within a mile of Farningham railway station, in Kent. The last named carries with it an historic mansion, of whose antiquarian features an illustrated catalogue is being prepared. The Shropshire property has been held by the Oakeley family for several generations past. It lies by Bishop's Castle, to the north-west of Ludlow, and is not far from Hay Wood Forest, in which were benighted the children of Lord Bridgewater, President of Wales, who afterwards, on Michaelmas night, 1634, performed at Ludlow Castle Milton's "Masque of Comus." The mansion-house, and another residence known as the Toveries, together with thirteen farms and 3,000 acres of cultivated and preserved land, are estimated to yield a rental, in all, of 4,000l. a year. The freehold comprises the advowson of Lydham, which is worth about 400l. per annum.

A HIGHLY-PRACTICAL and solid memorial to the late Earl of Shaftesbury has just been established in Charles-street, Westminster Bridge-road. It is in shape of a new ragged school, designed to carry on the functions of one in Jurston-street, wherein that great philanthropist is said to have first entered upon his conspicuous share in ragged school work. The foundation stone was laid

by the Rev. Newman Hall on the 1st of June current. The schoolrooms, with two classrooms, having accommodation for 350 children in all, will cost not more than 1,000l. Rowland Hill laid the memorial stone of the original Jurston-street school in 1817. That building, however, was taken down some years later, and the school, augmented by another one, was removed into premises that had been popularly known as the "Penny Gaff" in the New-cut, Lambeth.

THE recent decision of Mr. Justice Stephen in the case of *Blake v. The Land and House Property Corporation (Limited)* appears to be scarcely legally sound. A cistern of the defendants, who were the owners of the premises above those of the plaintiff, overflowed, and by this overflow the plaintiff's property was damaged. The cause of the overflow was that the lid of the cistern was so arranged that the half-cock would not act properly, and that the tap being left turned on the water could not flow away in its proper channel because the escape pipe was stopped up by a piece of rag, a piece of earthenware, and two small cinders. Mr. Justice Stephen decided that there was no evidence that there was negligence on the part of any one for whom the owner of the premises was responsible,—in one word, that there was no negligence on the part of the defendant. Greater negligence than was disclosed in the management of the cistern could hardly be proved, for there were three distinct acts of negligence. If this decision is sound, what becomes of the elementary legal maxim that a man is to manage his property so as not to injure that of his neighbour? There is hardly any act of negligence which may not be the work of a malicious person, but until the person responsible for that negligence proves that it is caused by such a third party, who is not his servant, in every principle of law he is liable for the consequences. We hope this decision will be reversed by the Court of Appeal.

THE Edinburgh Architectural Association have collected into one handsome volume the contents of their Sketch-book from 1883 to 1886. The contributors of the various sketches have added some notes, which add to the interest of the work. A large proportion of the plates consist of measured drawings, and many of these are of a very high order, both in regard to execution and to the interest and beauty of the work illustrated. In the preface Mr. Gordon, the editor, mentions that the attention of members was some time ago directed to the fine plaster ceilings which remain in a few of the old Scottish mansion-houses, and a good many of these are carefully illustrated in the plates, and are well worth it; those from Pinkie House, and from Baillie MacMorran's house in the Lawnmarket, are especially noticeable. The latter is a panelled ceiling of rather unusual design (sixteenth century), and with some charming floral ornament in the centre of the panels, of which larger-sized details are given: the drawing is by Mr. J. H. Cooper. The drawings from Elgin Cathedral, and from the tomb of Bishop Dunbar in St. Machar's, Aberdeen, by Mr. Jas. C. Watt, are exceedingly good; these were placed first in the competition for prizes offered by the committee. Mr. Watt's admirable illustrations of the chapel and tower of King's College, Aberdeen University, we had the pleasure of publishing some time since. The decorative details from the ceiling of the Roman Eagle Hall, Lawnmarket, are very singular and graceful, and well worth attention (no signature is appended to the drawing). The ceiling of the drawing-room at Winton Castle, by Mr. Baillie, is another very fine example; this is a panelled ceiling of very rich design, and here, as in other examples, the decorative details are very curious and interesting, and different from anything of the same date that is usually found in England, showing a type of floral ornament which combines conventional arrangement of sprays with a great deal of realism in detail. Mr. J. N. Scott's drawings of the massive architecture of Jedburgh Abbey are equally good in the measured geometrical

drawing and in the small but beautifully-executed perspective sketch of two bays of the arcade, which is about the best bit of free sketching in the book. In general, the perspective sketching, of which there is not a very large proportion, is not the strongest part of the publication, being, in some cases, rather too scribbly in style, and in others, as in "Dunning Castle" and "Midcaldor Church," rather too tame and mechanical. That of the gallery in the transept of Pitsligo Church, again, is overloaded with line-shading. The entrance doorway and details from Huntly Castle, by Mr. F. W. Troup, are very interesting, containing very singular details, and a curious mixture of Gothic and Renaissance feeling. Altogether, the Edinburgh Association is to be congratulated on the general merit and interest of the volume, and the exceedingly good work in not a few of the plates. The details of the old ceilings alone would make the book worth possessing; they are full of hints which might be worked out further when opportunities present themselves.\*

IN the last number of the *Jahrbuch des Kaiserlichen Deutschen Archäologischen Instituts*, ii, 1 (1887), Dr. F. Dummmler, of Halle, publishes the fragment of a vase which, if his view be correct, casts an interesting light of a Homeric epithet. In the catalogue of the ships ("Iliad II," 542) we are told there came to Troy "Elephenor . . . captain of the proud Abantes, and with him followed the fleet Abantes with hair flowing behind (*ἰσθητὴν κομῶσάωντες*). Helbig ("Homeric Epos," 163) takes this simply to mean that the hair flowed abundantly behind, and as no nation, at least, no warlike nation, in their senses, would be likely to endure the inconvenience of their hair flowing freely in front, this amounts to little more than the usual epithet *κῆρ κομῶσάωντες*, with flowing hair, applied to all the Achæans,—such an arrangement as is frequent on the so-called "Apollo" statues. The scholiast takes the phrase as having a much more precise intention. Hair flowing behind means flowing behind and behind only. The source of this particular tradition seems to be Archemachus, of Euhæa. He, according to Strabo (book x., 465) says that "the Curetes had their settlement at Chalcis, but, being continually at war about the Lelantian Plain, and finding that the enemy used to seize and drag them by the hair of the forehead, they wore their hair long behind and cut the hair short in front, whence they had the name of Curetes, from *κομῶσάωντες*, the shearing they had undergone. This has the air of an aetiological myth, but possibly some one learned in savage lore may be able to parallel the precaution. Plutarch confirms the early interpretation, and adds that Theseus, when he came to manhood, shaved only the fore part of his head, after the manner of the Abantes, and, he adds, this form of tonsure was called after him Theseis. Dr. Dummmler's vase fragment gives a good monumental instance of the Theseis. On it is painted in very archaic style the head of a man. He is beardless; the front of the head is carefully shaved while behind falls a thick mass of hair gathered behind the ears into a spreading mass. This form of tonsure, if safe, is not becoming; hut, after all, then as now, "il faut souffrir pour être beau."

THE *Gazette Archéologique* (1887, 1, 2) publishes an interesting vase from the Campana collection of the Louvre, with the rare subject of the blinding of the giant Polyphemus by Ulysses. Polyphemus is recumbent in his cave. Two men approach him with a burning stake which they are about to thrust into his eyes; the flames at the end of the stake are carefully pointed red. A third man, distinguished by a sword, and probably Ulysses, is heating a second stake at a fire. The vase is a black figured oinochoë. Only four other instances of this subject are known, of which, perhaps, the most interesting, and certainly the most barbarous, is that in the *Bibliothèque Nationale* at Paris, in which Ulysses

\* The present volume, we should observe, forms Vol. I. of a "New Series."

presents a cup of wine to the Cyclops at the same moment that the blinding is about to take place. A second instance is in the Capitoline Museum, and is signed with the name of the potter Aristonophos. A third and fourth, of less interest, are in the Berlin and the British Museums. The newly-published vase is decidedly the finest work of all.

THE *Times* of Friday last week published a description of the micro-telephone patented by Dr. Cornelius Herz, a small but highly sensitive instrument, calculated to serve short distances at less cost than the ordinary telephone. As described, the visible portion of the instrument does not occupy much more space in a room than the shield of an electric bell. "There is a button to be pressed which causes a bell to ring. When the person at the other end touches the button there, the two are prepared to converse. In order to do this, the shield, which forms the receiver, and is attached to the instrument by a wire of any desired length, is removed from the wall and applied to the ear; the part exposed is a disc of carbon, and any sound uttered at or near it is conveyed to the opposite extremity. There is no need to remain close to the disc; on the contrary, one may remain a yard away from it, and speak in an ordinary tone of voice at that distance." It is remarked that this will be a very suitable instrument for household purposes, giving orders to servants from one room to another, &c.; but it appears to us that it will do nothing in that case that a speaking-tube will not do better, and at less cost. In speaking over rather longer distances, as from a house to the lodge or the stables, such an instrument may, no doubt, be very useful.

IN the *Asclepiad*, Dr. Richardson publishes an essay on "Winter Palaces of Health," suggesting the idea of having blocks of residences in various suitable localities built around a glass-covered winter-garden:—

"Each of these houses should be divided into an upper and lower flat 30 ft. deep from the front, 25 ft. wide, and fitted with every convenience for the residence of an invalid, and with every room and part at equable and adjustable temperature. The two sets of flats, upper and lower, numbering say one hundred altogether, would accommodate comfortably and luxuriously that number at least of sick people, with all necessary attendants and friends. On the roofs of these flats would be four galleries or terraces, covered in glass and laid out with flowers, each gallery twenty yards wide and upwards of one hundred long, in all a promenade round of nearly a quarter of a mile. The square, covered at a grand height with an arch of glass, like the Crystal Palace, would be the inner garden, kept always at an equable temperature."

This is for the benefit of those who are ordered to winter in a warmer climate, and for one reason or another cannot go. We fear, however, that to make these Palaces of Health remunerative, a rent would have to be charged which would make the expense nearly as great as that of going abroad, and we should very much doubt finding people very forward to embark money in the speculation; though it is, no doubt, a perfectly possible expedient, apart from the financial question. We should imagine, however, that a winter would be rather dull in a "Palace of Health."

#### ARCHITECTURE AT THE ROYAL ACADEMY.—VII.

1714. "DESIGN for a Pianoforte Case." Mr. L. Alma Tadema, R.A. A sheet of beautifully-executed coloured geometrical drawings of the pianoforte case designed by the artist for an American client, and which we have already described from the original when shown at the makers', Messrs. Johnstone, Norman, & Co. Careful as the drawings are, however, they do not convey an adequate idea of the effect of the work itself. It may be observed, in addition to our former remarks, that the inlaid wreaths on the lid, enclosing the names of the Muses, are all varied in design, and show some charming bits of decorative detail. The employment of two mimic Doric columns for the pedal rest is the only detail we should be disposed to criticise; it is hardly in place, and looks thin and hard in comparison with the



remainder of the work; but painters do not feel this, of course, in the same way that architects do.

1715, "Alterations and Additions to a Cottage, Haslemere," Mr. W. A. Pitt. A small geometrical elevation of a pretty and picturesque cottage, shaded in Indian ink, with a semi-pictorial effect, very successfully.

1716, "Design for a Stained-glass Window: Woman healed by Touching our Lord's Garment," Mr. Ion Pace. An upright circular-headed compartment, with a well-designed and effective border; the arch-head is filled up with armorial bearings on a diaper ground, of small quarries. The centre portion is occupied by the figures of Christ and the woman and bystanders,—a well-designed and expressive group. The upper portion is occupied by rather too realistic trees, and part of a hill and castle, with a deep blue ground representing the sky; this is too pictorial for glass. If the trees had been conventionalised into a decorative form, and the "hill" omitted, it would have been more satisfactory from this point of view. Two angels on either side of a tomb or altar, with a background of cinque-foiled semicircular arches, form a predella, graceful in effect, but of which the meaning is not very apparent. Altogether, however, this is a very refined little design.

1717, "Speldhurst Lodge, Kent," Mr. Mervyn Macartney. An effective monochrome sketch, representing a long run of half-timber walling, interrupted by a massive brick chimney-stack, and butting against a square block of stone building: very picturesque in effect, but, like some other drawings in the room, suggesting the question whether this is a sketch of an ancient house or a design for a modern one. If the latter, a good deal of pains has been taken to make it look grim and dilapidated.

1718, "Alternative Design, Newcastle Cathedral West Window," Mr. E. Frampton. This is not, we believe, quite correctly called "alternative design"; it should be "design submitted for," &c., as another artist has the commission. It consists of two lights, each with a single figure. St. Nicholas in the one, and the Venerable Bede in the other; the figures are treated with true feeling for decorative effect; the lower portion has a light diaper background, the heads stand out against a dark crimson ground, with a label with the name forming a semicircle, aureole-wise, round the head. The rest of the space is filled up with tabernacle work of a kind commonly employed in Gothic windows, ancient and modern.

1720, "Enlargement of Kew Church, Exterior, looking West," Mr. Henry Stock. A good water-colour drawing, hung high. There is nothing, however, to show in what the "enlargement" consists, and we have not at the moment a sufficient recollection of the church to appreciate the treatment of it shown here. A small plan, with the added portion coloured, would have rendered this plain.

1722, "Church for Rogerstone, Monmouthshire," Mr. T. M. Lockwood. Another view of the church, shown in No. 1690. A good-enough simple Gothic church, but with nothing whatever in it to justify its being illustrated twice over. It is obviously hung simply for the drawing. That is not the principle on which drawings ought to be hung in the architectural room at the Academy. The conclusion to be drawn is that if an architect can only succeed in catching a particular draughtsman who has evolved an effective method of tinting he may get as many illustrations of a commonplace design hung as he likes to send. This is capital for the draughtsman, who ought to make a good market out of it, but it is not in the best interests of architects or architecture.

1723, "Dovenby Hall, Smoking-room," Mr. C. J. Ferguson. A water-colour drawing of a pleasing wainscoted Jacobean interior with a panelled plaster ceiling. To speak correctly, it is not so much a water-colour drawing in the proper sense of the words, as a fine perspective subsequently tinted. The curves in the niches, by the way, are not all true in perspective.

1724, "The Pavilion, Charterhouse School," Mr. Ralph Nevill. A cricket-field pavilion of considerable dimensions, a single-timber construction, chiefly noticeable for the entire absence of the gimcrack kind of ornamentation which such structures too generally display.

1725, "Mansfield College, Oxford: South View," Mr. Basil Champneys. A view showing the square gate-tower, with a range of residential buildings, we presume, on either hand

shutting against it, and the chapel on the right. The chapel has the ante-chapel, forming a kind of transept across the end of it, which is recognised as the orthodox accompaniment of a college chapel; an octagonal turret is effectively placed at the re-entering angle of the chapel and ante-chapel. The buildings are of late Gothic style, and exhibit a traditional collegiate cast of architecture. It is impossible to judge without a plan, but we should imagine that some of the rooms must be insufficiently lighted, however picturesque may be the effect of these small windows in a wide expanse of wall.

1726, "New Houses, the Beach, Walmer," Mr. James Neale. A large and effective pen drawing; the houses, while preserving a certain similarity of general ideas, are effectively varied, but they still retain a little too much of the "watering-place villa" style, which is, in fact, the most unsuitable style for buildings by the seaside. A shore house should above all things appear solid, strong, impervious to wind and weather. These are lake houses rather than seaside houses.

1727, "Redesdale Hall, Moreton-in-Marsh," Messrs. Ernest George & Peto. This is apparently a public hall or market hall for a small town, with an open ground-story carried on massive piers and three centred arches for the walls, and with thick wooden story-posts and brackets under the floor-beams. The style is of very late, or what in the orthodox days used to be called "debased" Gothic (nothing is "debased" now!). The humour of making the lower lights of the two end windows very short, with two tiers of long lights over them, is noteworthy, and adds a good deal to the character of the design. We may notice at this juncture the other drawings exhibited by the same architects. No. 1731, "Glencot Wells" is a specimen of an Elizabethan house of the quietest type, with no decorative expression but what is derived from the placing of the mullioned windows and the string-courses, with a terrace in front showing a balustrade of later tendencies, with ball finials; one or two deep recesses give a strong shadow here and there. No. 1737, "Dunley Hill, Dorset," is an imitation of the architecture of a later date, and what would once have been called "debased Classic." A plan is appended to this. Both these are very picturesque in general, particularly so,—and the admirable brown ink drawings in which they are shown add very much to their charm; drawings which are touched with an artist's hand, not overworked or over-shaded. One cannot but remark, however, that in both cases the charm is mainly due to the revival of the features and manner of the architecture of a past generation; they look exactly like old houses of the seventeenth and eighteenth centuries, and whatever may be the charm of this, it is based on a false sentiment, which will not be permanent, and when the taste for this type has passed away, the charm will be dissolved. A real eighteenth-century house is one thing; a nineteenth-century imitation is another. This remark applies less, however, to No. 1741, "Alhambra Hotel, Piccadilly," for though the details here are all old, the combination of them shows so much effect and originality of grouping as to give a novel interest to the old features: the separate range of windows close under the cornice, for instance, with its little order of halaster-pilasters, is a very pretty incident in the design. This, like the others, however, owes something to the drawing, which gives it the effect and texture of an old building in keeping with the old details; and this source of charm also must vanish when the building is seen as a new structure. Mr. Ernest George has so much faculty for picturesque grouping and treatment of building, that it is to be regretted he should not employ this more in giving interest to buildings of more modern and more original detail, instead of producing what appear to the eye to be charming sketches of old town and country buildings of various dates.

1732, "Warehouses over the former Site of St. Paul's Schools, St. Paul's Churchyard," Mr. F. Hemmings and Mr. Delissa Joseph. This is a large and well-executed pen drawing of the range of buildings opposite the east end of St. Paul's, about the building of which there was a good deal of correspondence in the papers some time ago as to the advisability of setting back the street line and leaving more space around the Cathedral, instead of crowding it up anew with buildings after the demolition of the old St. Paul's Schools. The architects seem to be of the same mind, as they have sent in a view which is entirely illusory, and represents their own buildings as they never can be seen, and the angle of the Cathedral on the left a great deal further west of them than it really is. The semicircular sweep of the buildings is effective in the drawing, but they are entirely without interest architecturally.

1734, "University College, Aberystwith," Mr. J. P. Seddon. This is a large drawing of Mr. Seddon's picturesque and poetic building, erected many years ago, but there is nothing said as to the reason for exhibiting it now, nor whether it represents any addition to or reconstruction of the building, which was not long since to a great extent destroyed by fire: so we presume we are to take it merely as a representation of the building as it existed. In that sense it is of value.

THE ANNUAL REPORT OF THE METROPOLITAN BOARD OF WORKS.

The Report of the Metropolitan Board of Works for the year 1886 has just been issued, although it is dated "Spring Gardens, 31st December, 1886." Why a document of so much interest to the long-suffering metropolitan ratepayer should make so heated an appearance we are not told, nor can we conceive a sufficient reason for the delay. It is true that there are several appendices to the Report, containing statistical and other information, but there is nothing to show why this information should have taken about five months to prepare. Two of the appendices, Nos. 2 and 3, consist of the Reports of the Engineer and Superintending Architect\* respectively, but both these documents are dated "31st December, 1886."

Under the head of "Sewerage and Drainage," the Report of the Board alludes to the progress made in the construction of relief sewers supplementary to those of the existing main drainage system. These include new sewers from Putney to Chapham (cost 151,995*l.*), the Holloway and Northern High Level Relief Sewers (cost 75,500*l.*), the Queen's-road, Dalston, sewer (cost 19,850*l.*), and a small pumping-station in the Isle of Dogs (cost 6,100*l.*). Some of these works were completed, and others well advanced towards completion, at the date of the Report. The next section of the Report deals with "The Sewage of the River Thames," but it does not contain any particulars with which our readers are unacquainted. The subject is, however, more fully treated of in the Engineer's Report.

From another section of the Report we learn that the operations of the Board under the Metropolis Management (Thames River Prevention of Floods) Amendment Act, are practically completed. The Act, it will be remembered, empowers the Board to require the wharf-walls and banks of the River Thames within the metropolis to be so raised as to prevent the overflow of the river within the limits of the Board's jurisdiction.

Under the head of "Metropolitan Improvements" the completion or progress of several important new Metropolitan thoroughfares is reported. Among the completed works of this description the most important are the new street from Tottenham-court-road to Charing-cross, and the new street from Oxford-street to Piccadilly-circus. One of the most important street improvements now in progress is the new street from Gray's Inn-road to St. John-street-road, which will afford a long, needed and greatly improved line of communication between Holborn and Islington. The new street, starting from the junction of Gray's Inn-road with Clerkenwell-road, will run in a north-easterly direction, and, for the purpose of avoiding the hottle-necked and declivitous Elm-street and the wider though not less declivitous "Mount Pleasant" and Coldbath Fields, it will, for a distance of about 120 yards, be carried on a viaduct, crossing Great Warner-street with a headway of 18 ft. The new street will then cross Tysoe-street and Garnault-

\* The Superintending Architect's Report, signed by Mr. John Hebb, the Assistant Architect to the Board (who was, at the date mentioned, the temporary incumbent of the office of Superintending Architect), is, unfortunately enough, makes no mention of the death of so old and valued an officer of the Board as the late Mr. George Valliant; nor does the Report of the Board itself make the slightest allusion to that event.

Place, and, passing the "New River Head," near Sadler's Wells, will terminate in St. John-street-road. The execution of this improvement will involve the removal of dwellings occupied by no fewer than 3,416 "persons of the labouring class," to accommodate whom the Board is to clear sites for the erection of artisans' dwellings, and only when these dwellings are completed will the Home Secretary give his sanction to the completion of the improvements.

The Report next details the numerous operations of the Board under the Artisans' and Labourers' Dwellings Acts, with the object of remedying the evils arising from overcrowding in large towns. The "schemes" with which the Board has had to deal under those Acts are very numerous.

Other sections of the Report deal with the operations of the Board as the Bridge Authority for the metropolis (save and except the City proper); with "Parks, Commons, and Open Spaces"; with "Bills in Parliament"; with the Fire Brigade; with Gas and Water Supply; and with, among other subjects, the London Coal and Wine Dues. With regard to this subject the Report says that "the Board's share of the proceeds of the duties, which have been continually increasing, amounts at the present time to about 325,000l. a year; and if the duties are allowed to cease in 1889, the date to which they are at present authorised, the Board will have to make good the resulting deficiency in its income by an increase of the Metropolitan Consolidated Rate of about two-pence halfpenny in the pound." The opponents of the continuance of the dues may retort that there is a *per contra* account; but without entering into the *pros* and *cons.* of the discussion, we may here, perhaps, be allowed to repeat what we said last week in one of our "Notes," namely, that if anything could justify the retention of the Coal and Wine Dues, it would be the application of their proceeds to the purchase of such open spaces as Clissold Park, Brockwell Park, and Ravenscourt Park. The preservation of such oases and breathing-spaces in the ever-increasing desert of bricks and mortar yecept "the Metropolis" would amply repay the necessary outlay on utilitarian and sanitary grounds alone.

The Board's financial transactions are on a scale commensurate with the size of the Metropolis. The Board's expenditure during the year 1886, including 976,781l. advanced on loan to other local authorities, 1,144,952l. invested in Treasury Bills, and 325,533l. applied to repayment of temporary loans and reduction of debt, amounted to 4,619,473l., of which 1,128,108l. was defrayed out of money raised by the issue of Metropolitan Consolidated Stock. The total expenditure of the Board for the present year, 1887, is estimated at 1,794,624l.

The Report of the Superintending Architect, which forms Appendix No. 3 to the Board's Report, gives a mass of statistics as to the building operations of the metropolis, but the returns are only made up to the end of the year 1885. In that year the number of new building operations within the Board's jurisdiction (which, under the Metropolitan Building Act, includes the City proper) was 7,669, while additions and alterations and other works numbered 10,530. The Report also details the operations of the Architect's Department in regard to the construction of and means of exit from theatres and music-halls, a subject the importance of which has just been once more disastrously emphasised. The Report also shows the vast amount of work done in the Architect's Department in the valuation of property required by the Board in connexion with its various improvement schemes.

The Report of the Board, including the appendices, extends over just 201 pages, and it presents a mass of information of so much interest to the inhabitants of the Metropolis that its tardy appearance, already referred to, is only the more to be regretted.

**Machinery at the Manchester Exhibition.**—In reference to our article on this subject last week, Messrs. Browett, Lindley, & Co. write to say that "anti-friction metal" is not used for the bearings of the engines exhibited by them there, as erroneously stated in our report. Their own description of their "Australian engine," however, mentions anti-friction metal as a special excellence of their engine. It appears they have abandoned this, probably for the better.



The late Sir Horace Jones, Architect to the Corporation of London.

#### PORTRAIT OF THE LATE SIR HORACE JONES.

WE had intended to give a portrait of the late Sir Horace Jones last week by a reproducing process from a photograph, but the result (as sometimes happens with the various processes which have so much pushed engraving on one side of late years) was not such as would have been satisfactory to ourselves or to the late City Architect's friends.

Not wishing to abandon our original intention, we give a week later, rather than not at all, a portrait engraved from the same photograph,\* by Mr. J. D. Cooper, who has succeeded in producing, in a very short time, what we think will be admitted by those who knew Sir Horace Jones to be a good likeness.

#### THE INSTITUTION OF CIVIL ENGINEERS. ANNUAL REPORT.

THE Annual General Meeting of this Institution, to receive and deliberate upon the Report of the Council on the condition of the Institution, with the annual Statement of the Accounts, and to elect the Council and Officers for the ensuing year, was held on Tuesday last, June 7th, Mr. Woods, the President, being in the chair.

As the history of the Institution had been fully given in the Report submitted by the Council twelve months ago, it was remarked that on the present occasion it would suffice to deal mainly with matters which had transpired since.

The number of members on the roll of the Institution, on the 31st of March, 1887, was 4,347, of whom 20 were Honorary Members, 1,568 Members, 2,275 Associate Members, and 484 Associates. This was a net increase of 173, or 4.19 per cent., on the 4,174 members of all classes recorded last year. The elections had included 34 Members, 234 Associate Members, and 6 Associates, while the deaths, resignations, and erasures were 106. Many deaths had occurred among the older members of the Institution during the past twelve months, chief among whom must be placed Sir Joseph Whitworth, whose world-wide renown as a mechanician it was unnecessary to dwell upon. By his will he bequeathed to the Institution eighty shares, of 25l. each, in the firm of Sir Joseph Whitworth & Co., Limited.

During the twelve months under review, 211 candidates were admitted as Students. On the other hand, 82 were elected into the Corporation as Associate Members, and 106 ceased, from various causes, to belong to the class. The total number of Students on the 31st of March last was 949, as against 926 at the same date in 1886.

Soon after their election, the Council endeavoured to negotiate with Sir Joseph Whitworth for the purchase of No. 24, Great George-

street; but having failed in this, and No. 26, Great George-street, being in the market, that house was acquired for 13,000l. It was then deemed desirable to revive the option (which had lapsed) for the purchase of the freehold of No. 25, Great George-street, and this purchase was effected for 12,000l. The Council had then two designs prepared,—one for the rebuilding of No. 26, and incorporating it with the existing premises, and another for an entirely new building on the combined sites of Nos. 25, 26, and 27, Great George-street, it having been suggested that it might be desirable to acquire the latter house. After due consideration, the Council came to the conclusion that it was not expedient, at present, to enter into any large building operation, nor further to contemplate the purchase of No. 27. The intention then arrived at was to utilise the ground and first-floors of No. 26 by opening communications through the party-wall between Nos. 25 and 26, and to make these alterations during the coming recess. After the death of Sir Joseph Whitworth, on the 22nd of January last, his executors,—acting on directions given in his will,—offered the freehold of No. 24, Great George-street to the Institution for 15,000l., being about the same rate per square foot of ground as had been given for No. 26 under the hammer. This offer the Council accepted. Thereupon, the tenants in No. 26 were informed that they might remain in occupation of their several offices on short terms of tenancy. It had been decided temporarily to open communications during the ensuing recess between the basements and ground and first floors of Nos. 24 and 25, at the lowest cost, and with the least structural disturbance. By these means increased accommodation would be provided for offices on the ground-floor, and for the library on the first and second floors, as well as for other purposes.

**Sunderland Cemetery Extension.**—Dr. Hoffman, from the Home Office Burials Department, has just inspected 18½ acres of land proposed to be added to the Bishopwearmouth Cemetery, making, with the present burial-ground, 52 acres. The estimated cost for subsoil and surface drainage, roads, and boundary-walls, with an additional entrance-lodge, and inclusive of the land purchased, is 17,500l., per plans prepared by Mr. D. Balfour, C.E. Dr. Hoffman expressed his satisfaction with the proposed works, and particularly the subsoil drainage, which comprises 12-in., 9-in., 6-in., and 4-in. glazed fireclay socket-pipes laid with open joints in a stratum of gravel, the drains being 22 ft. apart regularly, or at one end of each grave, and at a depth of 10 ft. to 11 ft.

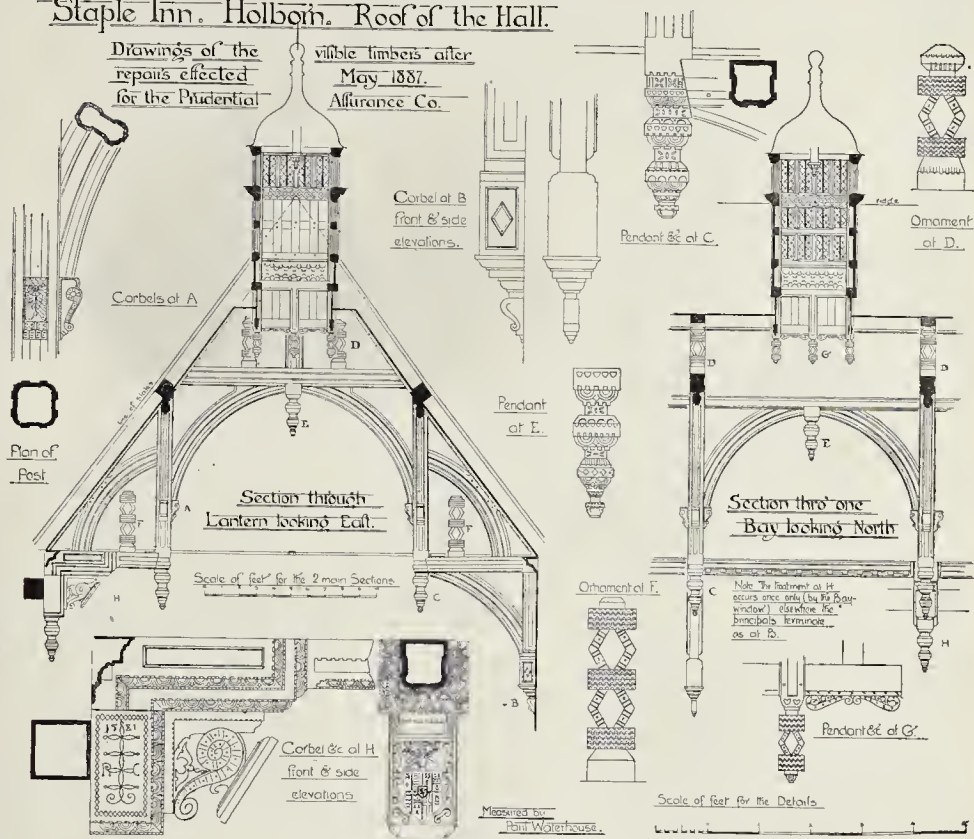
**Newgate Prison and the Old Bailey Sessions House.**—The Corporation of London are considering the question of the rebuilding of the Sessions House, but the decision they come to will turn upon the future of Newgate Prison, as to which the intentions of the Government are not yet known.

\* The photograph is by Mr. S. A. Walker.

Staple Inn, Holborn. Roof of the Hall.

Drawings of the repairs effected for the Prudential

visible timbers after May 1887. Assurance Co.



The Roof of Staple Inn Hall.—Measured and Drawn by Mr. Paul Waterhouse.

THE HALL OF STAPLE INN, HOLBORN.

The drawings of the roof over the hall at Staple Inn, which are published in this issue, consist of sections (longitudinal and transverse) through the bay in which the lantern is placed. These drawings are based upon measurements carefully taken on the spot, and represent the roof in its present condition.

The Prudential Assurance Company, who are now the proprietors of the Inn, have entrusted the necessary repairs of the Hall to Messrs. Holland & Hannen, under the direction of Mr. Alfred Waterhouse, R.A., and great care has been taken that the sixteenth-century work should remain, as far as possible, in its original state. The paint has been carefully removed from the oak-panelling of the hall.

As regards the roof the only important measure of restoration has been the insertion of highly necessary tie-rods, one to each of the principals.

The Hall was the scene on Wednesday afternoon last of the tenth annual meeting of the Society for the Protection of Ancient Buildings, Mr. William Morris in the chair. The report (to which we may return) was adopted, and Mr. Frederic Harrison read a paper on "The Sacredness of Ancient Buildings." It was incidentally stated in the course of the proceedings, on behalf of the owners of the property, that the Hall is about to enter into the occupancy of the Institute of Actuaries, who will use it, we presume, for their meetings, and the Hall might perhaps be even more largely used as a convenient meeting-place for some of the learned and professional societies. It was further stated that the other buildings of the Inn, including the picturesque gabled buildings facing Holborn, are about to be very carefully repaired. The Hall will be open to the inspection of the public until the 24th inst.

NOTES ON CRESTS.

The word "crest" is apparently derived from the Latin *crista*, a comb or ridge such as grows upon the heads of various species of birds; and Lower is of opinion that the idea (as well as the name) comes from this source.

The antiquity of crests is very great, and carries us back to the Classic ages for examples, such as the owl on the helmet of Minerva, perhaps one of the best known. Alexander the Great adopted the ram's head, the crest of Jupiter Ammon, from whom he claimed descent. Phœdrus, in his account of the battle of the mice and weasels, represents the heads of the generals belonging to the mice as wearing horns for their crests.

Military commanders added to their stature, and also to their awe-inspiring aspect, by the use of a crest, in the form, generally, of some fierce animal or imaginary monster; and at the same time this distinction served for their own followers as a rallying point in the heat of the battle. In fact, the crest is otherwise known as the cognisance, from *cognosco*, because by it the wearer was known even in the thick of the fight.

Amongst the earliest devices adopted for the adornment of the helmet, the tall plumes of birds were used, and the heads of human beings; the eagle was also a favourite.

With regard to the material that composed the actual crest, Lower gives us his experience, and that is, that iron or wood were often used for the purpose; he gives as examples a demilion rampart of the latter material, in Etchingam Church, Sussex; and "a peacock in his pride" of iron at Laughton, being the well-known cognisance of the Pelham family. In both these instances the helmets themselves are preserved, and the crests are therefore of undoubted authority.

Although crests are of such great antiquity,

they were not adopted in heraldry for some time after the introduction of shields or coats of arms, and Edward III. was the first monarch to wear one, as it appears on his great seal, taking the form of the lion statant guardant, which has ever since done duty as the crest of England. Edmund Crouchback, Earl of Lancaster, was one of the earliest users of an heraldic crest, his seal being nearly half a century earlier than that of our warlike Edward.

Originally considered of even greater honour than coats of arms, and permitted to be worn by commanders or chieftains alone, in our own day the crest has, to a great extent, been adopted to the exclusion of the more elaborate shield for the adornment of writing-paper, &c., by modern families wishing for some distinction of this nature.

Towards the close of the thirteenth century (according to Cassans) the practice arose of affixing a crest to the head of the charger, as well as to the helmet of its rider, which would doubtless add to the imposing appearance of both man and horse.

A remarkable crest was borne by the Bulstrodes of Buckingham, viz.—"A hull's head, crased gules, attired argent, between two wings of the same," said to be derived from an ancestor, who, mounting his followers on bulls, attacked a camp of the Norman invaders, and carried all before him through the terror created amongst the enemy by this unaccustomed display of cavalry. Lower, who tells the tale, thinks it a fine cock-and-bull story.

To the Crusades we are indebted for some most interesting and historic examples of crests. The Newtons of Barr's Court, Gloucestershire, bore "a King of the Moors, habited in a robe and crowned, kneeling and surrendering with his dexter hand his sword, all proper." This dates from Richard I., and was adopted by his follower, Sir Ansel Gornay, who took prisoner

a Moorish king at the siege of Ascalon. The Newtons inherited this crest through marriage.

The Minshalls, of Cheshire, have a somewhat similar crest, with a like derivation, and many instances could be given of the same nature.

The crest borne by the very ancient De la Bere family is one of exceeding historic interest. It represents a ducal coronet or, therefrom issuing a plume of five ostrich feathers per pale argent and azure," and was conferred by Edward the Black Prince upon Sir Richard de la Bere, a knight-banneret, after the battle of Cressy, in recognition of his bravery in rescuing the prince at a moment of imminent danger. In the whole range of heraldry it would be hard to find a more honourable bearing, or one in which its possessors could take more pride.

The crest of the Luttrells of Somerset is a white bear charged with a red rose,—a notable instance of the happy blending of the rival houses of York and Lancaster.

Sir Palmes Fairborne, who was knighted by Charles II. for his gallant defence of Tangiers against the Moors, was granted the following crest, "An arm in armour, couped at the elbow, lying on a wreath sustaining a sword; on the point thereof a Turk's head, turbaned, all proper." This commander lies in Westminster Abbey, and his epitaph was written by Dryden.

Sir John Lyon, having married a daughter of King Robert II. of Scotland, was allowed to bear the following as a crest:—"On a wreath vert and or, a lady couped below the girdle, enclosed within an arch of laurel, and holding in her right hand the royal thistle, all proper," a picturesque and most appropriate device, and afterwards borne by his descendants, the Earls of Strathmore.

The crest of the poet Drayton,—“Mercury's winged cap amidst sun beams proper,”—although opposed to the true spirit of heraldry, seems peculiarly appropriate for its bearer.

The crest of the Earls of Kildare is “an ape proper, girt about the middle, and chained or.” It is recorded of Thomas FitzGerald, the father of the first Earl, that when an infant he was taken out of his cradle by a tame baboon that carried him up to the top of a neighbouring steep, but brought him safely down again: hence this most singular bearing.

The Davenport of Cheshire rejoice in the crest of “A man's head couped below the shoulders in profile, hair brown, a halter about his neck, proper.” A family tradition says a Davenport was vanquished at a conflict of the rival Roses, and was spared his life on condition that he and his descendants should bear this humiliating device.

Sir John Hawkins, on being made Paymaster of the Navy by Queen Elizabeth, had granted him for a crest, “A demi-negro proper, manacled with a rope,” in allusion to his distinguished services in the slave trade. It was considered in those days as a grant of honour.

The crest of John, Lord Lysle, one of the founders of the Order of the Garter, is of extraordinary character,—“A millstone argent pecked sable, the inner circle and the rim of the second, the fer-de-moline or.” Boutell gives a sketch of this in his popular work on heraldry.

The hereditary wardens of the Scotch Marches had for crest, “a horse's head, bridled.” Another was “a spur erect between a pair of wings,” both denoting a readiness to issue forth and pursue at any moment.

The celebrated Admiral Drake had a grant of a very fanciful though appropriate crest: “Out of a wreath a ship drawn round a globe with a cable rope by a hand issuing out of clouds, all proper” in chief, the motto “Divino auxilio.”

The family of Hope may claim for themselves an equally appropriate if fanciful cognisance or crest: “Out of a wreath a broken globe surmounted by a rainbow issuing out of a cloud at each end, all proper.”

The “Iron Duke” had as crest: “Out of a ducal coronet or a demi-lion rampant, gules, holding a swallow-tailed pennon of the last, the fly to the sinister, and at the head charged with the ensign of St. George.”

The crest of the Viscount Downe is one of the most remarkable ones derived from that fruitful source the Crusades. It is thus blazoned: “A demi-Saracen in armour, holding in the dexter hand a ring, gold stoned azure, and in the sinister a lion's gamb erased or.” It was granted to an ancestor, Sir William d'Aunay, who slew a Saracen prince and afterwards a lion, and then cut off the paw and gave it to the king, who gave the hero his ring in return

and ordered him to bear the above device as a record thereof. The ring is said to be still in the possession of the family.

The dun bull's head of the Nevilles and the Percy lion are associated with our country's annals, as is also the lion of the Howard family.

As examples of punning crests, we may quote the Bacon family, who wear the boar; the Wolseleys, with their wolf's head; and the Warrenders, who display the rabbit in their helm.

According to Ellen J. Millington, Richard III. adopted six crests, but none of them of any particular interest. The Colonna family (Italian) bore a siren, according to the same authority. In the cathedral church at Manchester a curious oak carving exists on the stall of James Stanley, bishop of Ely, representing the tree, the eagle, and the infant, the well-known crest of the Stanleys that is said to record the carrying away of a child by the king of birds, and its marvellous rescue from the very nest of the depredator. An old Scotch ballad on Flodden Field alludes to the “swaddling child,” and the *avoc* that was there wrought by one of its race.

Some of our modern crests are absurd in the extreme. The one borne by the Tetlows, of Lancaster, is of this class: “On a hook erect gules, clasped and ornamented or, a silver penny on which is written the Lord's Prayer; on the top of the book, a dove proper, holding in the beak a crowquill pen sable.” It is said that this strange conglomeration was the reward to one of the family for writing the Lord's Prayer on the space of a silver penny.

The Tongue family crest is another heraldic curiosity. “On an oak tree, a nest with three young ravens fed with the dew of Heaven, all proper.”

The national crest of England is a crown surmounted by a lion statant guardant crowned or. That of Scotland is an imperial crown surmounted by a lion sejant guardant, displaying two sceptres or. The Irish crest is an ancient diadem surmounted by an embattled tower, a crest conant issuing from the portal. The crest of Wales is a dragon passant guardant gules.

Ruskin says the crest represents personal character and valour, as distinguished from the shield, the indication of race or family. It is only in the later days of heraldry that crests have been considered hereditary.

#### THE REGISTRATION OF PLUMBERS.

The fourth meeting of the General Council for the Registration of Plumbers was held on Monday afternoon at the Mansion House, the Lord Mayor (Sir Reginald Hanson) in the chair, supported by Alderman Stuart Knill (Master of the Plumbers' Company), Mr. George Shaw, C.C. (Chairman of the Registration Committee), Mr. F. Machin (Warden of the Plumbers' Company), Mr. W. H. Bishop (Renter-Warden), Messrs. W. Digby Seymour, Q.C., C. Hudson, and W. Dent (Past-Masters of the Company); Mr. George Gowin, F.R.S., Sir Philip Magnus, F.R.S., Mr. H. Phillips, Mr. W. Braithwaite (Leeds), Mr. J. Sanders (Newport, Mon.), Mr. G. Evans (Shrewsbury), Mr. S. C. G. Fairchild, Mr. J. Underwood, Mr. F. Scott (Manchester), Mr. W. Titmas, Mr. C. T. Mills, Mr. John Smeaton, Mr. Geo. Davis, Mr. R. A. Narse, and others.

The minutes of the previous meeting having been read and confirmed.

Alderman Knill, the Master of the Company, presented a report on behalf of the Court of the Company. That document stated that since the last meeting of the General Council was held progress had been generally satisfactory. Further evidences of public confidence in, and sympathy with, the movement had been manifested, and the movement had received increased assistance and support from the several interests which were specially represented on the General Council. Support from the side of Municipal Authority had been rendered in a conspicuous manner since the Council's last meeting, by the hearty co-operation of the present Lord Mayor (Alderman Sir Reginald Hanson), following his predecessors (Alderman Sir John Staples and Sir Robert Fowler). The Company had also received the support of the Mayors of Oxford, Bedford, Cardiff, Worcester, Brighton, Scarborough, Southampton, Rochdale, and West Ham; and the Provost of Dmde

had recently lent valuable assistance in promoting the registration of plumbers in Scotland. Since the last meeting of the Council the support of the medical profession had been accorded by persons no less distinguished than Sir James Paget and Sir Andrew Clarke; while other medical practitioners, specially conversant with sanitary matters, had given their cordial encouragement to the efforts of the Plumbers' Company. The co-operation of architects had been expressed in the very practical form of their making it a condition that new works should be executed by registered plumbers. On the side of technical education, the City and Guilds Institute had given further aid to the movement by the establishment of additional plumbing classes, and the extension of technological examination of plumbers. The Durham College of Science had also established plumbing classes; and from the communications which the Plumbers' Company had had with Sir Philip Magnus, there was every reason to expect, that through the provincial organisations of the City and Guilds Institute, working in harmony with affiliated institutions and with local organisations of plumbers, an efficient system of plumbing classes would be provided throughout the kingdom, and facilities would at the same time be secured for holding local examinations, to decide upon the qualification of plumbers, whose admission to the Company's register would be hereafter dependent upon their passing a satisfactory examination in the theory and practice of their craft. The communications which had been received by the Company since the last meeting of the Council had been sufficient to prove that strong and increasing support was accorded to the movement by both master plumbers and journeymen throughout the kingdom. But while the progress of the registration movement has been thus generally successful, the financial burden of it has been very onerous upon the Plumbers' Company, which was by no means a rich one, and it had other claims upon its funds besides those connected with the registration of plumbers. He had, therefore, to recommend, on behalf of the Company, that the Council should now fix the amount of annual fee which should be payable by plumbers enrolled upon the register, as contemplated by the resolution of the Council of 27th January, 1886. The Court of the Company desired that the fees should be moderate, but it is necessary that the annual expenditure should be in part, at any rate, provided for by annual fees, in order that the system of registration might be efficiently developed, and the names and addresses of registered plumbers made readily accessible to the public by means of advertisement and otherwise. On behalf of the Plumbers' Company, he had the pleasure to nominate the following gentlemen as Members of the General Council:—The Lord Mayor, and Messrs. S. Jennings, A. Common, J. Smith, J. C. Asbdown, George Davis, and R. A. Narse, the latter representing the United Operative Plumbers' Association of Great Britain and Ireland, whose members number upwards of 4,000, distributed over the whole of the United Kingdom.

Mr. George Shaw, C.C., Chairman of the Registration Committee, next presented a statement showing that since the last meeting of the Council the number of plumbers registered had reached 776, divided as follows:—125 masters in the London district, 353 journeymen in the London district; 155 masters in the provinces, 142 journeymen in the provinces; 308 further applications had been considered by the Committee, and there was a considerable number of applications still to be dealt with. The applications received showed that the system of registration was growing in favour with plumbers in all districts. The system of dealing with applications and examining applicants for registration was now in fair working order in London. But some of the applications came from parts of the kingdom where it was difficult to obtain satisfactory information; and, pending the establishment of local organisations of plumbers to deal with examinations and obtain other evidences of applicants' qualifications, delay in dealing with those applications unavoidably arose. Negotiations were now in progress and action was in contemplation which would, he hoped, eventually secure adequate management of the registration system throughout the provinces. In cases where applicants for registration were unable to produce satisfactory evidence of their experience in the

trade, they were required to pass an examination by a Board of Examiners (composed of practical plumbers, one-half the number being masters and the other half journeymen); and those examinations had disclosed the fact that men engaged in the trade and desirous of being registered as qualified plumbers were actually unable to pass the most simple test in any branch of the craft. The examination returns were not yet complete, and he could not, therefore, state the precise proportion of successful to unsuccessful candidates examined. The numbers had varied considerably. At some examinations nearly every applicant had passed; at others, 5, 10, and in one case 50 per cent. of the applicants failed, although the examinations were purposely made so moderate as to prevent the exclusion of any man of average ability fairly entitled to be considered a plumber. The examination of plumbers in the provinces would, he anticipated, be considerably facilitated by the development of the City and Guilds Institute system of plumbing classes and examinations. In order to bring the development of this system as far as possible into harmony with the Company's system of registration, it had been decided that plumbers passing both the theoretical and practical examinations of the City and Guilds Institute should be qualified for registration upon compliance with the Company's regulations.

Mr. W. H. Bishop, Renter-Warden, next made a financial statement to the General Council. From this it appears that the gross expenditure incurred by the Plumbers' Company up to May 31st, in connexion with the movement which has resulted in the establishment of the system of registration of plumbers, amounts to 2,017. 8s. 8d. Against this expenditure, 849. 19s. 6d. has been received by the Company as the registration fees payable by plumbers upon enrolment on the register. The net balance of expenditure incurred by the Company up to May 31st is 1,167. 9s. 2d. The estimated expenditure in connexion with registration for the year 1887-8 is 866l. If annual fees were paid to the Company by the plumbers now registered, at the rate of 10s. 6d. from masters and 2s. 6d. from journeymen, the total amount would equal 209l. 8s., leaving a deficiency of 656l. 12s. to be provided by the Company. The cost of publishing lists and advertising the names and addresses of registered plumbers must, of necessity, be exceptionally heavy in the early stages of the system.

The Master, Mr. Alderman Stuart Knill, next formally moved, "That the Reports of the Master and Chairman of the Registration Committee now presented to the meeting be adopted."

Mr. George Godwin, having been invited to second the motion, said he did so with great pleasure. He had taken much interest in the subject, as the Committee knew, for many years. He was sorry that he could not find so much satisfaction in the Reports as others did. The progress was terribly slow, and it was obvious that something more must be done to enlist, not merely the masters and the men, but the public. After all this time, expenditure, and effort to have registered only 495 of the army of journeyman plumbers existing in the country was almost disheartening. It was most difficult to make a thing known in London, and advertising was costly. But it must be done, nevertheless, if they wished to succeed. He was not casting the slightest slur on the work of the Worshipful Company of Plumbers: their proceedings had been most praiseworthy, and they had already disbursed a considerable sum of money. It seemed to him that the public should now aid in the matter. It was a subject of national concern. The lives that had been lost through had plumbers' work were uncountable; and had work continued to be done in every direction. He was not surprised to hear that so small a proportion of those who came up for examination had been unable to pass. Knowledge of the way in which work was being done showed that this inability must exist. As to the examining body, he was not quite sure that it should consist wholly of plumbers, unless they were exceptional men. He thought it should include a couple of scientists; doubtless, however, the Committee had given this consideration. He said he would make only one other observation, and that was to express his regret that any fee, however small, should be asked from the journeymen on registration. He

thought no obstacle should be opposed to it, at any rate, at present.

It was moved by the Master of the Company, seconded by Mr. George Shaw (Chairman of the Registration Committee):—"That the annual fees payable by master plumbers be 10s. 6d., and by journeymen plumbers 2s. 6d., upon renewal of the lists of Registered Plumbers, on the 21st of July in each year." This was carried, and the proceedings terminated.

Illustrations.

NEW MAIRIE, ARCEUIL-CACHAN, FRANCE.

WE give this week a view of another of the new Mairies or local town-halls which are springing up in the environs of Paris. The architect is M. Ulysses Gravigny. The style of the building is described as that of the Louis XIII. period; it is an example of the semi-playful manner in which the modern French architect makes use of the material of Renaissance detail. The general grouping of the building is such as to suit the nature of the site, which, from its triangular shape, is an awkward one to deal with. The stone dressings are of the "pierre de pays" in the lower part of the building and of Châtillon stone above, the hard stone used for the steps, &c., being "Roche de Bagnenx." The carving has been executed by M. Damé.

The chief feature of the interior is the grand staircase of iron, with treads of "roche de Chassignelles." The council-chamber, the library, and the Mayor's private room occupy the first floor, leaving the rest of the building for the remaining offices.

All the floors are of iron construction, and the principal timbers of the roof, as well as the dormers, &c., are of oak. The cost of the building has been about 300,000 fr., or 12,000l.

CHAPEL AT THE ROYAL HOLLOWAY COLLEGE.

THE chapel, of which we give an illustration in the present number, is 125 ft. from east to west, 30 ft. wide, and 30 ft. high. The ceiling, which is elliptical, is decorated with alto-relievo of the prophets and evangelists, and attendants. These groups are placed in the spandrels between the six semicircular-headed windows.

The half-domed ceiling of the apse contains the "Creation of Eve," the central figure being "God the Father descending from Heaven," supported by angels. The whole of this work, together with the sculptured panels in the pilasters, keystones, &c., in the chapel, was designed by Signor Facigna, who also designed all the carving for the college. His death occurring before the completion of the building, the small portion remaining to be done was executed by Signor Boldini, his assistant.

The whole of the interior has been decorated in oil colour and gold, by Messrs. Clayton & Bell, the warm-tinted freestone used in the construction forming the ground. The key of the colour is high, after the manner of the Sistine Chapel in Rome, the lower part of the walls being the strongest in colour, and forming a rich dado from the floor to the window-sills. The flat wall spaces above this are of a soft green, broken by deep red in the niches between the windows.

The wagon-vault of the ceiling is treated with gold as a groundwork, but this is divided into panels by longitudinal and transverse belts, corresponding to the architectural lines below, and the panels thus formed contain figures in medallions of the six Archangels, with their attributes. These, like the subject in the semi-dome of the apse, are on blue grounds.

The groups on the ceiling already mentioned in alto-relievo, are delicate in colour, somewhat in the manner of old ivories, folds and hollows being emphasised and the colour rubbed off the prominent parts, thus avoiding heaviness.

Chapels are provided at both ends. Those at the east end being for invalid students, and those at the west end being intended for visitors.

The grilles and balcony in the chapel, which are of wrought and welded iron, without rivets or screws, and gilt, together with a wrought-iron gate at the door of the chapel, have been carried out by Mr. Barford, of Maidenhead.

The baldachino and organ-case, in low polished oak and walnut, which were specially

designed by the architect, were executed, together with the oak seating and stalls, by Mr. Thompson, the contractor for the College. The floor of the chapel is of black and white marble. The lamps and brackets of brass, from the architect's design, were made by Messrs. Verity & Son.

GRAYTHWAITE HALL.

GRAYTHWAITE HALL, proposed to be rebuilt for Lt.-Col. Myles Sandys, M.P., is situated at Windermere, midway between the Ferry and Lakeside.

The present Hall, which does not possess any special points of architectural interest, is placed at so low a level in the park as to lose much of the beauty of the surrounding scenery.

To remedy this, the new building will be erected on a terrace raised some 10 ft. above the present floor-line. The internal arrangements comprise the usual requirements of a country mansion. The materials proposed to be used are, blue local stone quarried on the estate for the walls, with red sandstone for the dressed work; red tile roofs, and red brick chimneys. By this combination warmth of colouring is secured, in which the buildings of this district are generally very deficient.

The woodwork in the more important parts will be of English oak, felled on the estate. Alterations in the park will involve the erection of new gate-lodges, &c., which, with the stables, have been designed to harmonise in character with the Hall.

The architect for the work is Mr. R. Knill Freeman, F.R.I.B.A., of Manchester and Bolton, the illustration published being from a drawing in this year's Royal Academy Exhibition.

THE NEW (R.C.) CHURCH OF ST. JAMES, SPANISH-PLACE.

We this week give an interior view of Messrs. Goldie, Child, & Goldie's revised design for this fine church. We gave the exterior view of it last week.

ABERDEEN ROYAL INFIRMARY.

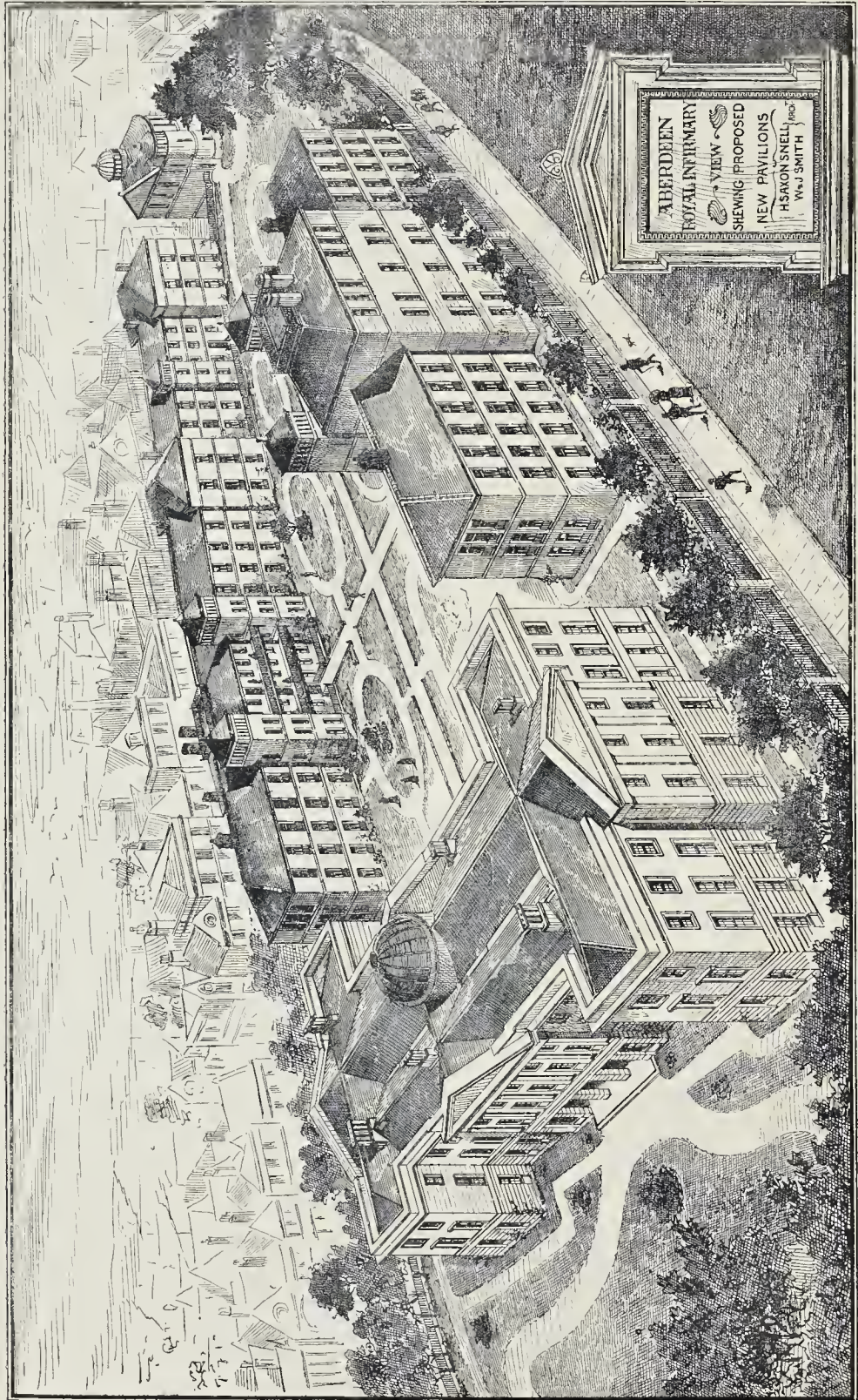
THE proposed alterations and additions to the Aberdeen Royal Infirmary buildings are the result of long and careful consideration given to the question by the Committee of Management during the last two years. Various schemes have been discussed and plans prepared with a view to avoid, as far as possible, interfering with the present structures, while at the same time preserving the essentials of good hospital construction as laid down by the most eminent modern authorities. Ultimately it was determined that the truest economy would be to adopt the design of Mr. Saxon Snell for converting the present front main building to administrative and clinical purposes only, and removing all patients into new pavilions to be erected at the rear of the ground facing respectively Spa-street and Woolmanhill. The plan, which will be carried out under the superintendence of Mr. Saxon Snell and Messrs. W. & J. Smith, have been so arranged as to preserve (as a portion of the wards for ordinary patients), the building erected some few years since for the purposes of a typhus fever ward, it having been determined that all patients suffering from diseases of a contagious or infectious nature shall in future be treated at the buildings expressly erected for their reception in another part of the city. No alteration whatever will be made on the exterior of the present front main building, but the interior will be entirely rearranged.

The sick-wards are distributed in such manner that the surgical patients will occupy the southern portion of the west rear block, running parallel to Spa-street, whilst the northern portion of this block will provide accommodation for eye and lock patients, as also a ward to be specially devoted to the diseases of women. The medical patients will be located in the east rear block, running parallel to Woolmanhill.

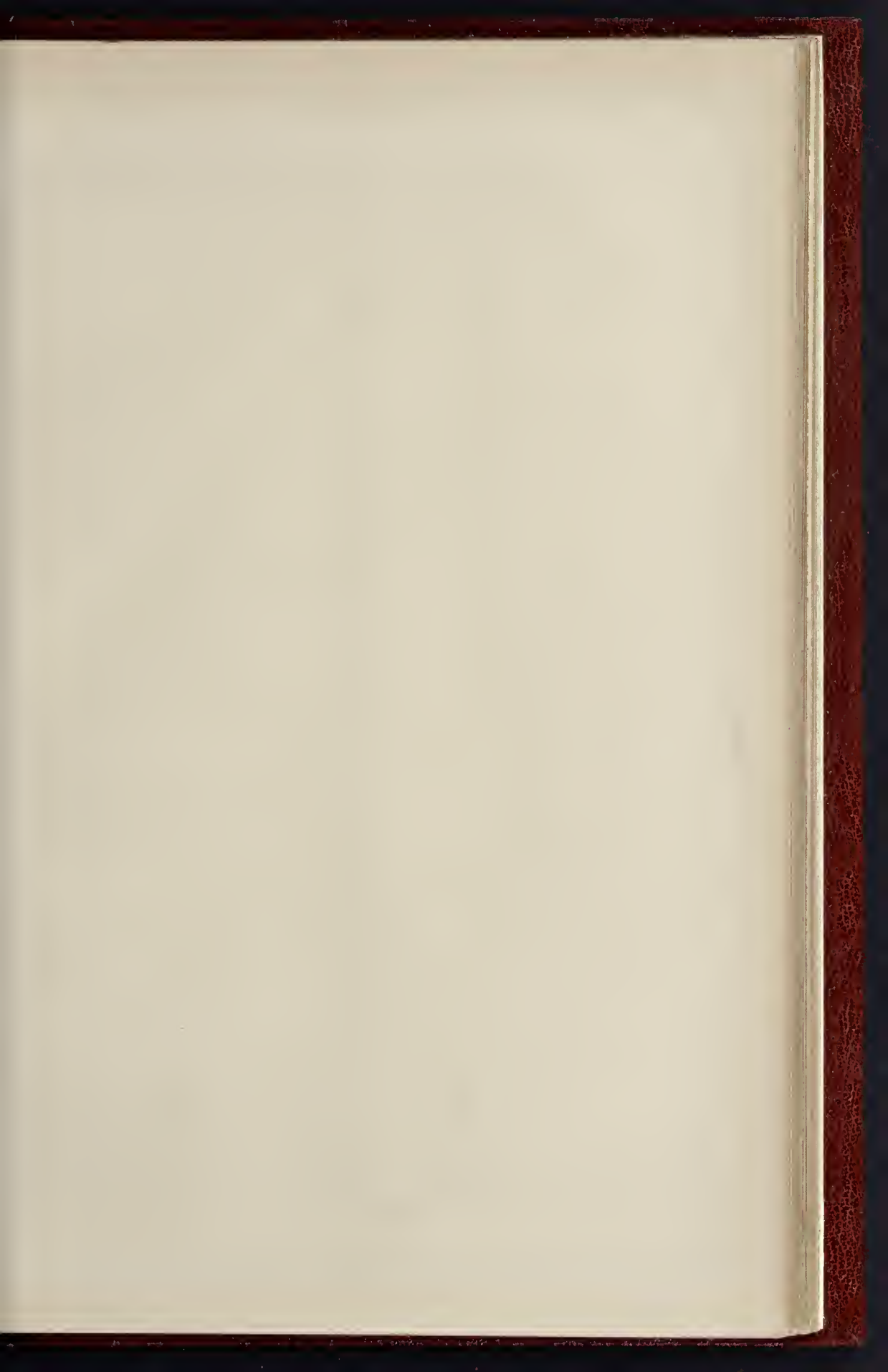
The space allowed for each bed is 90 superficial feet and 1,400 cubic feet. There will be 108 beds for surgical cases, 12 for eye patients, 13 for lock patients, 7 for diseases of women, 8 for erysipelas cases, and 84 for medical cases. The medical cases will be located in the east block.

Adjoining the wards are w.c.'s, lavatories, sinks, bath-rooms, sister's and surgeons' rooms, and linen-closets.

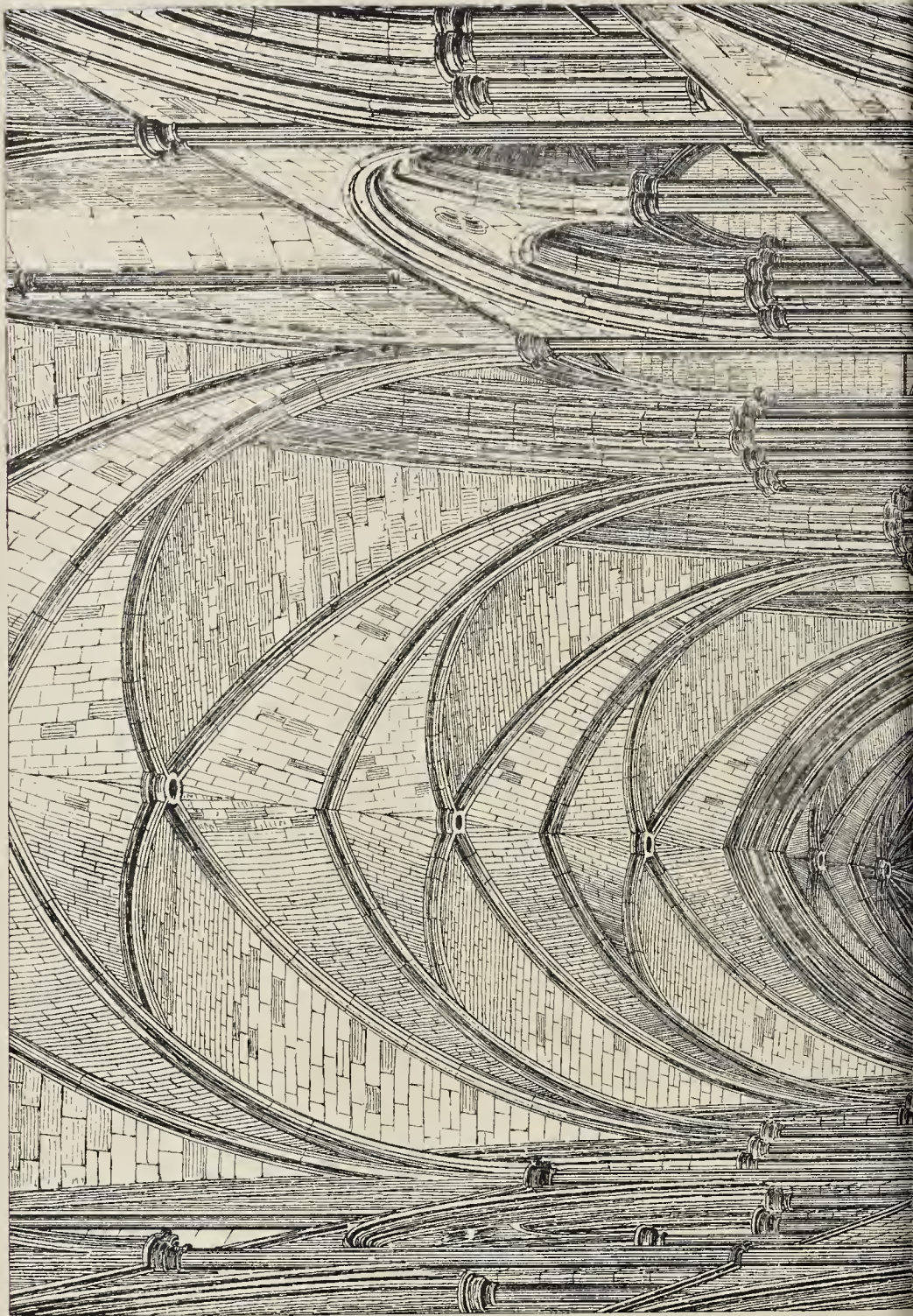
By the arrangement proposed, in the West



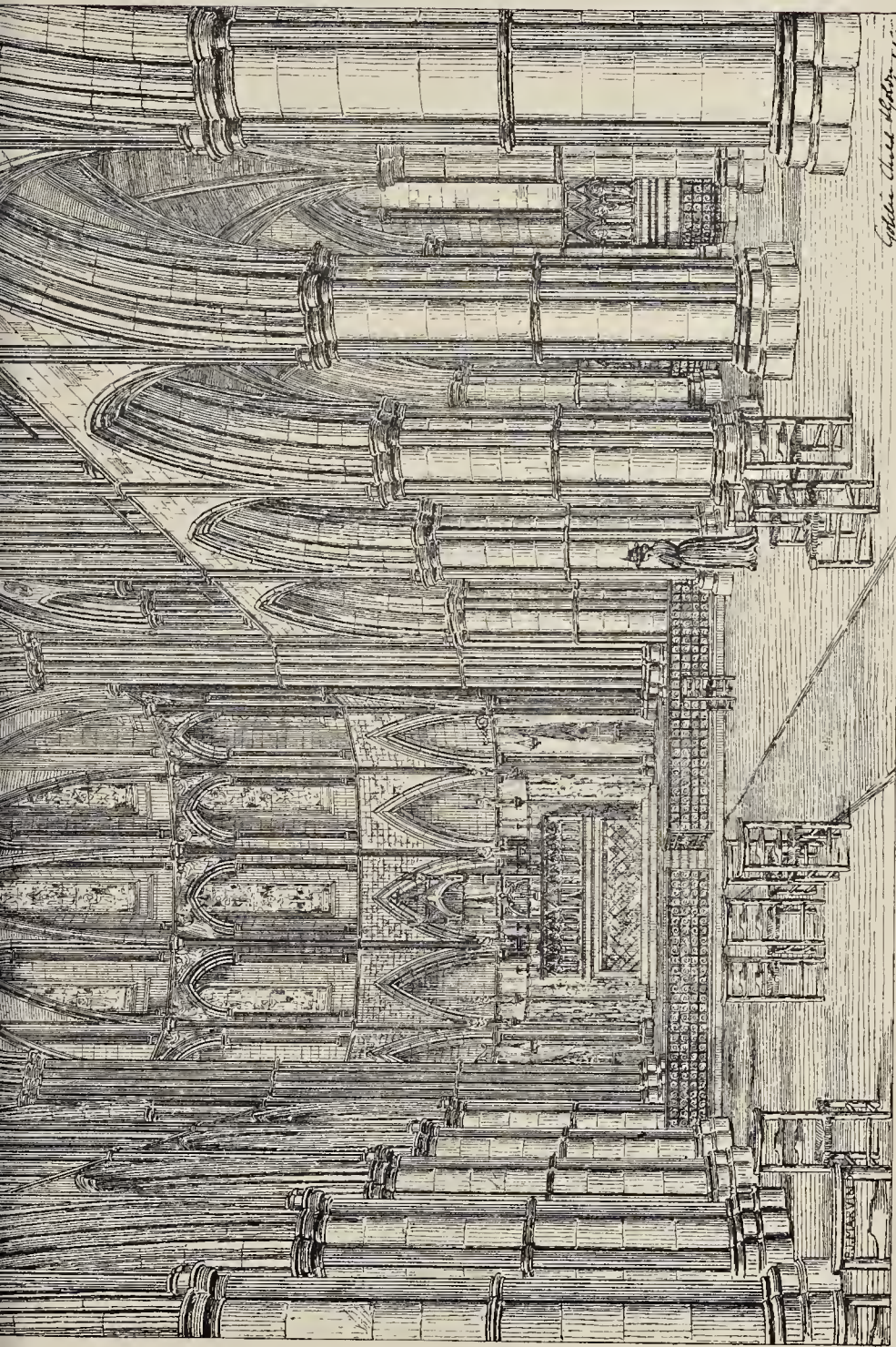
W. & J. SMITH, ENGRS., 11, NEW STREET, S.W.



THE BUILDER, JUNE 11, 1887.







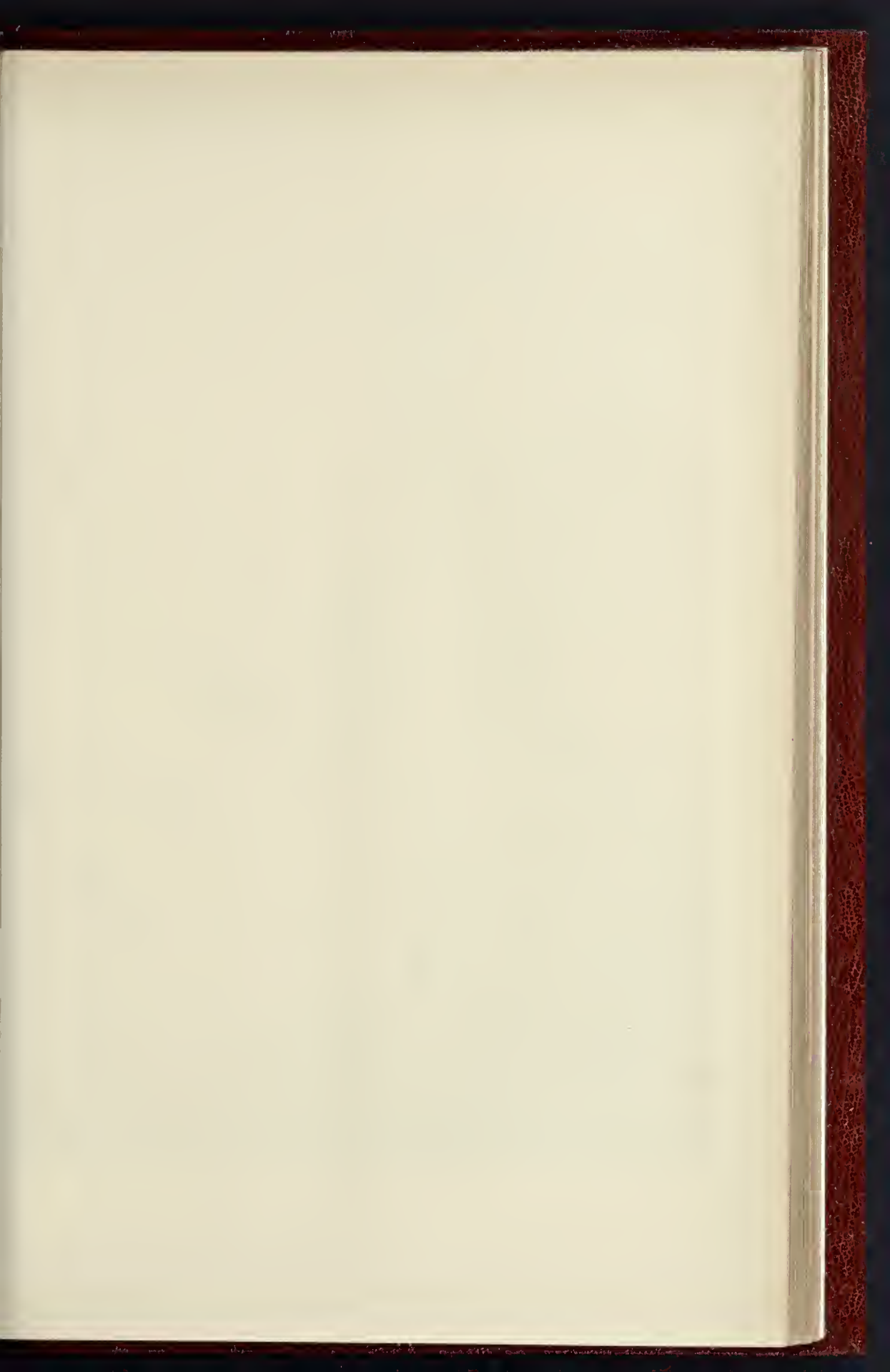
*Golden Child & Goldie*

3, Furnival St, Holborn London, E.C.

CHURCH OF ST. JAMES, SPANISH PLACE; REVISED DESIGN.—MESSRS. GOLDIE, CHILD, AND GOLDFIE, ARCHITECTS.

C. F. Keil Photo-Lith. & Engraver

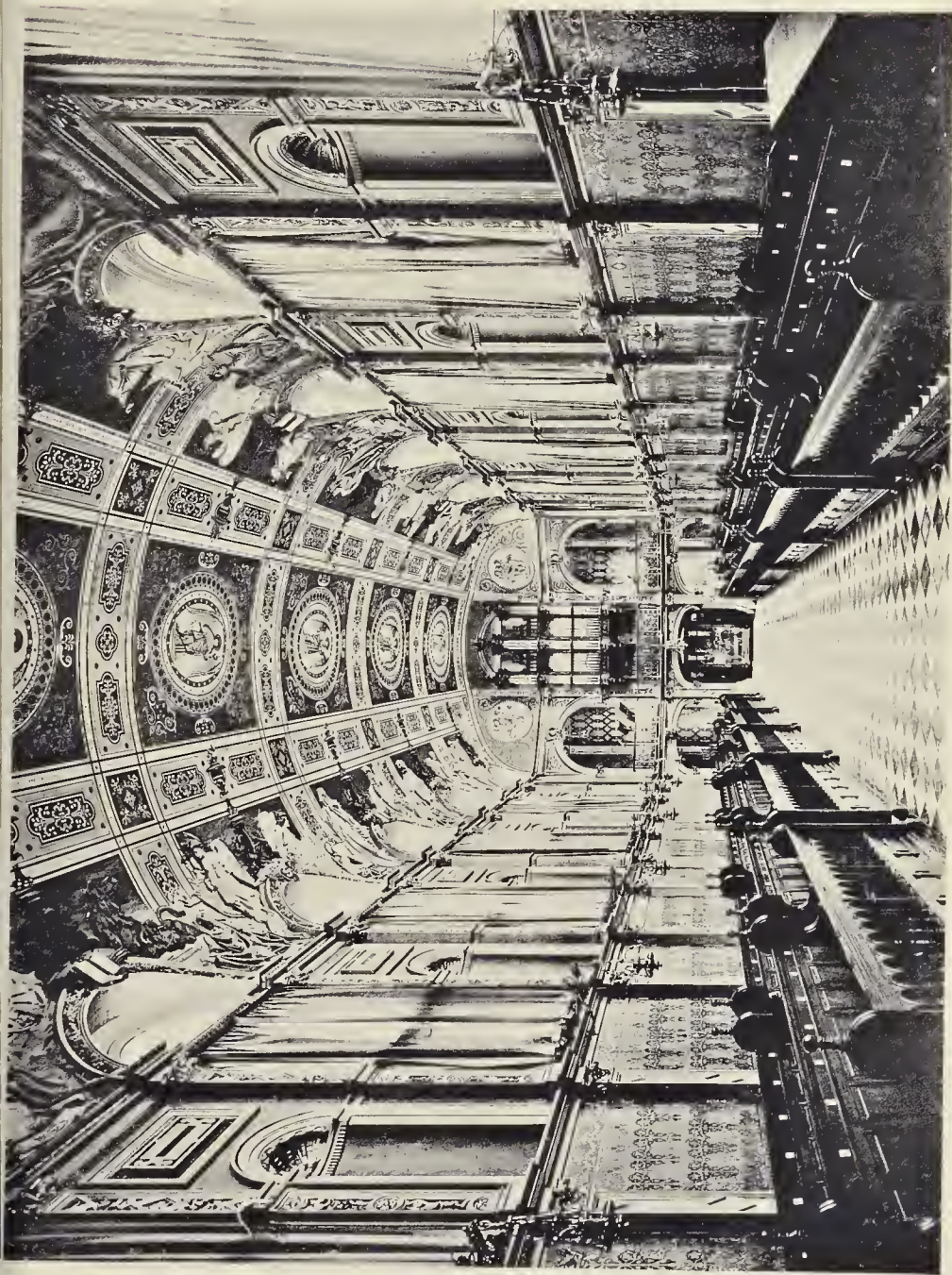






The Phototype Co., 808, Strand, London.

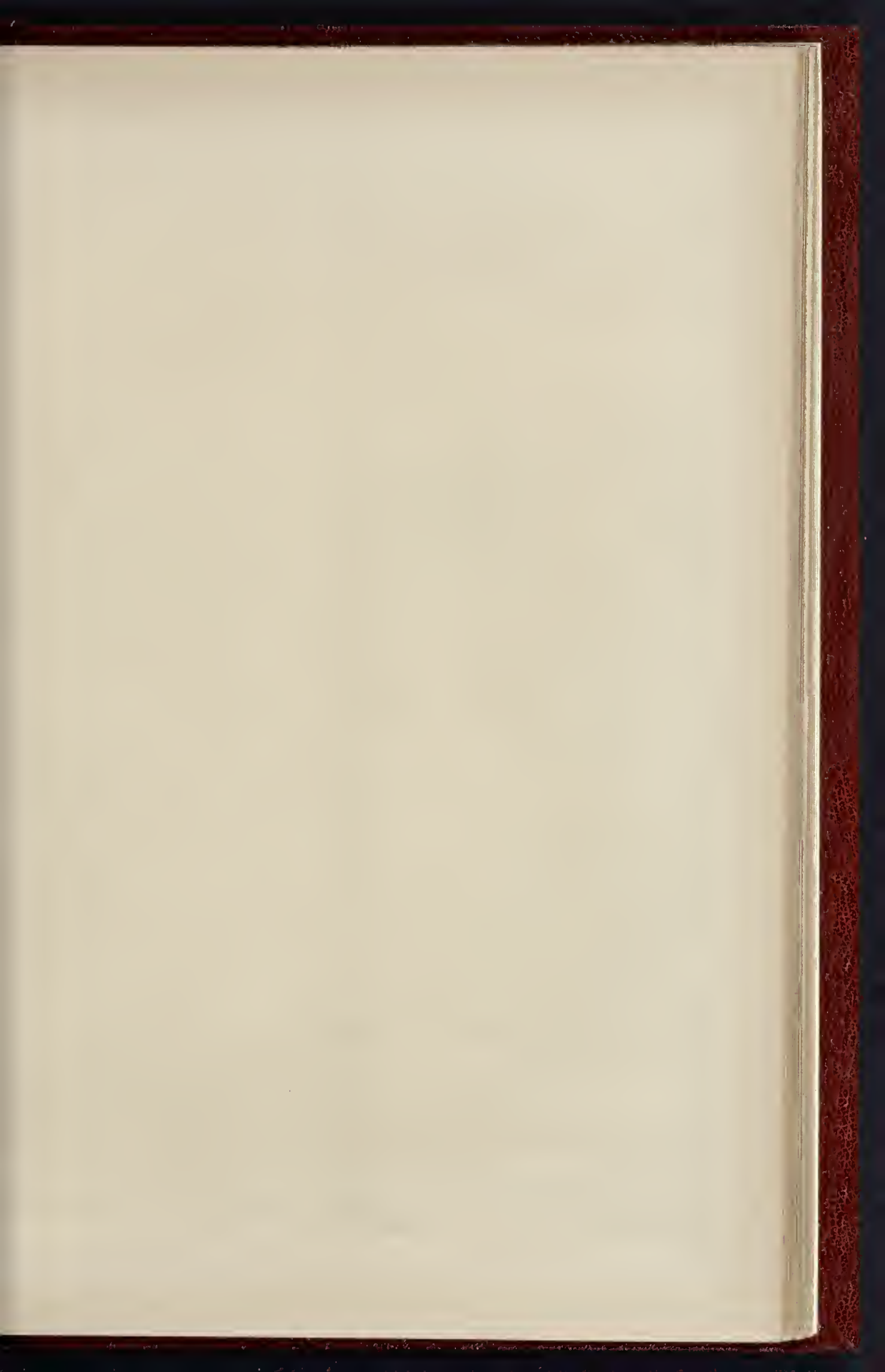
THE NEW MAIRIE AT ARCUEIL-CACHAN (SEINE).  
M. ULYSSE GRAVIGNY, ARCHITECT.

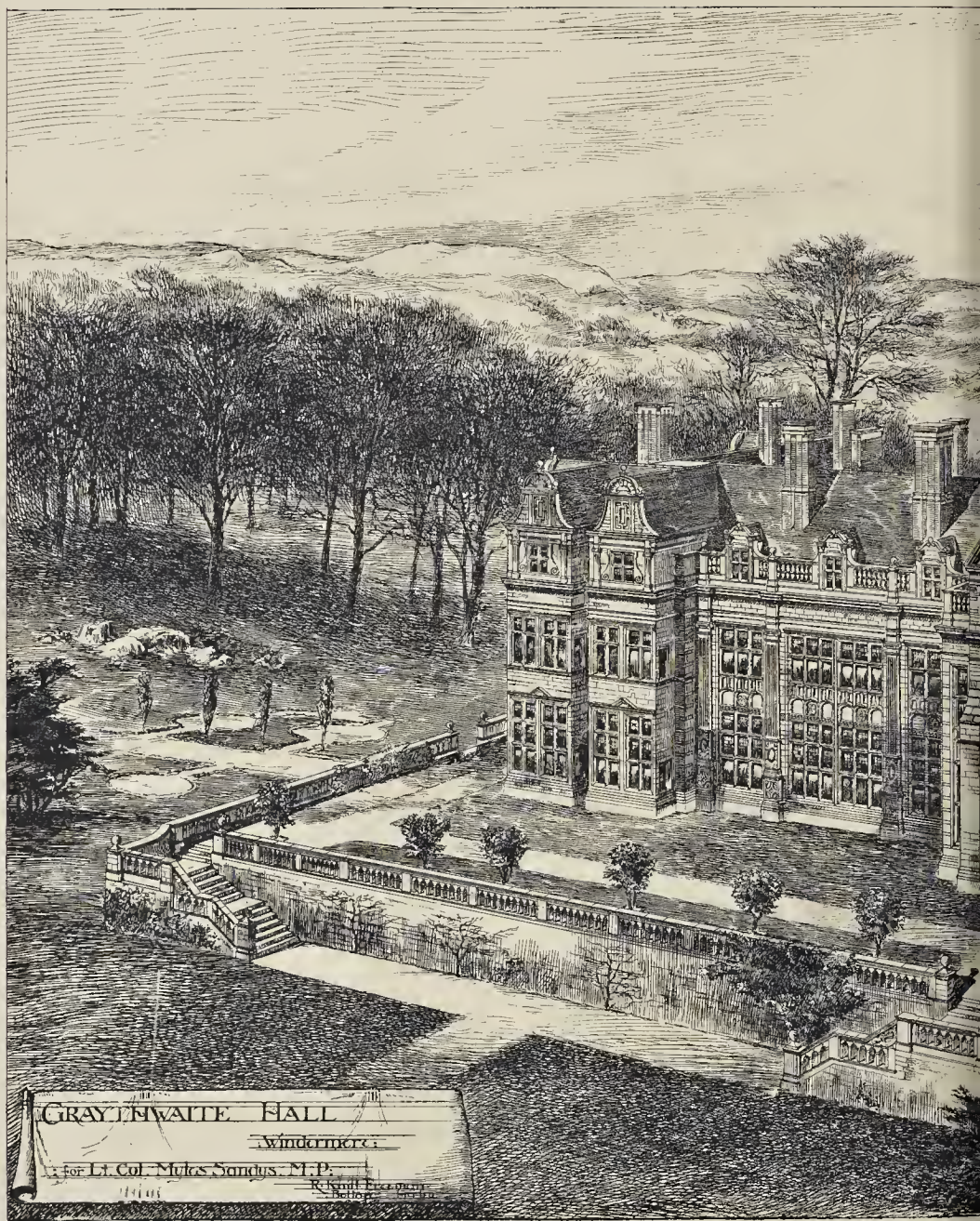


The Phototype Co., 200, Strand, London.

INTERIOR OF CHAPEL, HOLLOWAY COLLEGE.—MR. W. H. CROSSLAND, ARCHITECT.







GRAY'S INNE HALL

Windermere

for Lt. Col. Myles Sandus M.P.

R. Knill Esq. engraver

W. Bellamy del.



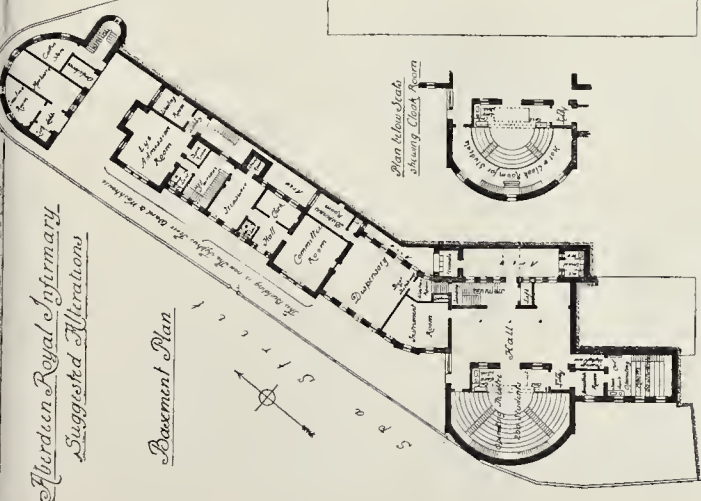


PHOTO LITHO, SPRAGUE & CO. 22, MARKING LANE, CANNON ST. LONDON. E.C.



*Aberdeen Royal Infirmary  
Suggested Alterations*

*Basement Plan*



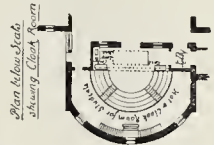
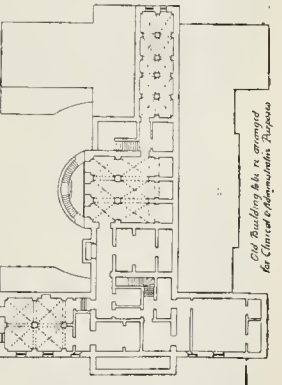
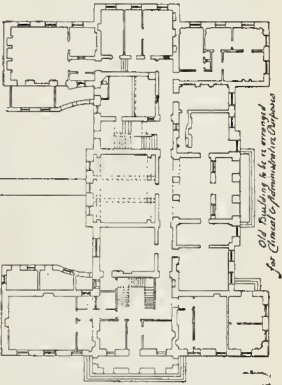
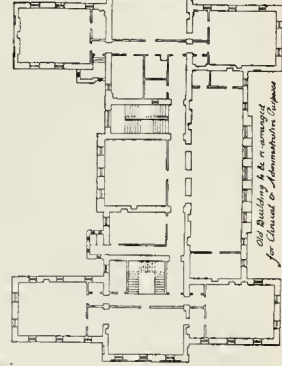
*Ground Plan*



*First Floor Plan*



W o o l m o o n h i l l



*2 Storey Staircase  
Plan 1/2000  
Scale*

*Old Building to be arranged  
for Clinical & Administrative Purposes*

*Old Building to be arranged  
for Clinical & Administrative Purposes*

*Old Building to be arranged  
for Clinical & Administrative Purposes*

*Scale of 1/2500*

Block, each of the three surgeons, with one sister, will have under their charge on one floor 20 male and 14 female patients, or 34 patients each in all, except on first floor, where there are six extra male patients. In the East Block each of the three medical officers, with one sister, will have under their charge, on one floor, 14 male and 14 female patients, or 28 patients each in all.

Accommodation has been provided for 233 patients.

With regard to the clinical department, the accompanying plans show the main building as it at present exists, the design for its re-arrangement, which will be the last part of the work to be carried out, not having yet been fully determined upon.

It is estimated that the cost of carrying out the building works, including the clinical and administrative departments, will amount to the sum of 30,900*l.*, or about 130*l.* per bed.

#### KING'S CROSS STATION ROOF.

SOCIETY OF ENGINEERS.

At a meeting of this society, held on Monday evening last at the Westminster Town-hall, Professor Henry Robinson, President, in the chair, a paper was read on the "Renewal of Roof over Departure Platform at King's Cross Terminus, G.N.R.," by Mr. R. M. Bancroft.

A brief history and description was given of the construction of the old laminated timber roof, erected in 1851-2, according to the system introduced by Colonel Emy, a French military engineer.\* After pointing out the entire absence of ventilation in the old roof and other causes of decay, the author described the movable staging now being employed in the erection of the ribs for the new iron roof, the way in which it is moved from bay to bay as the work proceeds, and the means adopted for supporting the superstructure of staging so as to give a clear bendway for locomotives, &c., and not to interfere with the departure passenger traffic. Reference was then made to a similar roof over the old G.N.R. passenger station at Bradford, its span, distance apart of main ribs, the weight per bay of 20 ft. being given. The construction, hoisting, and fixing in place of the new wrought-iron ribs were described; and it was pointed out that they have to be made to fit the existing cast-iron spandrels and stanchions built into station walls. The construction and fixing of the lattice and trussed purlins, and the gangways adopted to give greater facilities for workmen in repairing and cleaning the glass covering, were also described. The author remarked on the absence of wind-bracing, and gave the reasons for not using it. He also described the method of glazing, both with putty for the roof generally and with Helliwell's patent puttyless glazing at the louvre. Diagrams were exhibited showing the general form of the roof and the movable staging, and the working drawings were also laid upon the table for reference by the kind permission of Mr. Richard Johnson, M. Inst. C.E., Chief Engineer of the G.N.R., under whose instructions the work is being carried out by Messrs. A. Handyside & Co., contractors, of Derby and London.

#### THE SURVEYORS' INSTITUTION.

ANNUAL REPORT OF THE COUNCIL.

The nineteenth annual report of the Council of the Institution, presented to the general meeting, held on Monday last, June 6th, states that

"The steady progress which has so happily characterised the career of the Institution from its earliest days has never been more apparent than during the past year. There have been elected during the last twelve months 1 Honorary Member, 32 Fellows, 31 Professional Associates, 7 Associates, and 40 Students, or 111 in all; from which have to be deducted 1 Honorary Member, 8 Fellows, 2 Professional Associates, and 1 Associate who have died; 3 Fellows, 2 Professional Associates, and 1 Associate who have ceased to be members; and 12 Students who have passed out of the class by effluxion of time, leaving, as shown by the subjoined statement, a net increase of

\* Its construction was illustrated in the *Builder* at the time.

81 of all classes since the date of the last Report.

|              | Hon. Members | Fel. lows | Prof. Assoc. members | Students | Totals |
|--------------|--------------|-----------|----------------------|----------|--------|
| May, 1887... | 16           | 725       | 339                  | 89       | 1,277  |
| May, 1886... | 16           | 700       | 316                  | 84       | 1,196  |
|              |              | 25        | 23                   | 5        | 23     |

It is gratifying to observe that out of the 111 of all classes enrolled during the year, upwards of seventy are a direct result of the system of professional examinations. . . .

An opportunity having offered itself of purchasing the residue of the lease (expiring in 1892) of a house in Little George-street, abutting on the eastern side of the Institution premises, it was thought that the chance should not be lost of providing for that extension of the Lecture Hall and adjoining rooms which will, before long, be necessary for the convenience of members. The purchase of the existing leasehold interests, which was effected for the sum of 1,300*l.*, placed the Council in a position to negotiate for a new lease of the premises continuous with the lease under which the Institution premises are held, at a ground-rent of 135*l.* per annum, the corporation undertaking to expend the sum of 200*l.* in improvements to the premises as a condition precedent to the granting of the new lease. It is not proposed for the present to utilise the new premises for the contemplated extension of the Lecture Hall; but alterations necessary for adapting them for use in other ways will be set about immediately after Michaelmas, when the last of the tenancies granted by the late lessee will expire.

The success which has attended the system of examinations may fairly be called remarkable. The number of candidates has been larger each successive year, as will be seen by the subjoined statistics. It is satisfactory to note that the increase has been perfectly spontaneous, the conditions of candidature being designed to limit rather than augment the number offering themselves for examination.

The following table shows the results of the examinations for the seven years since their establishment:—

| Year.       | Preliminary Examination. |         | Professional Examinations. |         |
|-------------|--------------------------|---------|----------------------------|---------|
|             | Candidates.              | Passed. | Candidates.                | Passed. |
| 1881        | 13                       | 6       | 2                          | 1       |
| 1882        | 30                       | 17      | 0                          | 2       |
| 1883        | 44                       | 22      | 23                         | 22      |
| 1884        | 61                       | 30      | 36                         | 23      |
| 1885        | 46                       | 37      | 43                         | 31      |
| 1886        | 46                       | 34      | 59                         | 33      |
| 1887        | 63                       | 39      | 68                         | 45      |
| Totals..... | 283                      | 185     | 220                        | 160     |

The standard reached by the candidates in the recent Professional Examination was, on the whole, distinctly higher than on any previous occasion. An analysis of the results shows that the fifty-eight candidates of all classes obtained among them upwards of sixty-one per cent. of the possible marks."

#### THE DRAINAGE OF PORTSMOUTH.

On Saturday last, at Portsmouth, there was a large and very successful meeting of the Home Counties District members of the Association of Municipal and Sanitary Engineers and Surveyors, who were received in the Council Chamber by the Mayor, Mr. King. The visitors included the President, Mr. Lobley (Hanley), Mr. Lewis Angell (Borough Engineer of West Ham, and formerly Borough Engineer of Portsmouth), Mr. Charles Jones (Ealing), Mr. J. Gordon (Leicester), and other well-known members of the Association, with Mr. Thomas Cole, the Secretary.

The Mayor, in welcoming the visitors to Portsmouth, said he was glad to see amongst the members present that day the former Borough Engineer of Portsmouth, Mr. Lewis Angell, to whom was due the credit of having initiated the system of sewerage now amplified and extended so as to meet the wants of an increasing population and to be abreast of the more advanced requirements of the present day.

Mr. Bouinso, the present Borough Engineer of Portsmouth, then read the following paper:—

There have been already two papers presented to this Association upon the subject of the drainage of Portsmouth. One of these papers was contributed by Mr. Lewis Angell, M.I.C.E., our first President, and the other by

Mr. Greatorex, who was then the Borough Engineer of Portsmouth, but who has since died. These papers will be found in the fourth volume of our "Proceedings."

It might, therefore, appear almost unnecessary to present a third paper upon this subject for the consideration of the Association, were it not for the fact that considerable additions and alterations to the original works have been recently carried out; and it is these works which I shall now endeavour to describe to you, and ask you presently to inspect.

If you refer to Mr. Angell's paper, to which allusion has been made, you will find that the Borough of Portsmouth is there described as being situated on an island, that its formation is of the Tertiary period, and that it is nearly a dead level all over. "The highest, huest, and most densely populated portion of the borough is elevated only about 12 ft. above the tidal range, while about one-third of the borough is very little above the level of ordinary spring tides, and includes a large extent of marsh."

These are Mr. Angell's exact words, and under such conditions we all know the difficulties and obstacles there are to a gravitation system of drainage.

Mr. Angell, however, made the best of a most difficult task, and laid out a scheme of drainage which was submitted to and approved by Sir John Hawkshaw, the Admiralty and War Departments, the Secretary of State for the Home Department, was adopted by the Corporation of Portsmouth, and eventually carried out the works, being commenced in the spring of 1865.

This scheme was shortly as follows:—a high-level sewer commencing at what is known as North-end, passing through the Commercial-road, part of Somers-road, and Elm-grove, into Albert-road, Highland-road, and Henderson-road, to the pumping-station at Eastney. There is now a further branch, a portion of which I have myself recently extended, commencing at Copnor, and also at Inebland, passing along the Copnor and Milton roads, and joining the main high-level sewer close to the pumping-station. The total length of the high-level main sewer is about eight miles. The low-level commenced in Portsea, passing through Portsmouth, across Southsea Common, along Lump's-lane and Henderson-road to the pumping-station. A branch commencing in the Commercial-road, at Landport, connected with it near the Pier Hotel, Southsea. The total length of the low-level sewer is about six miles. In the Henderson-road the high and low level sewers were constructed one above the other in the same trench, for a distance of 800 yards, before entering the pumping-station. Here the sewage in the low-level was lifted by a pair of 25-h.p. rotative, condensing beam engines into the high-level sewer, and from the pumping-station both sewers discharged by gravitation to a point most judiciously selected by Mr. Angell, near the entrance to Langstone Harbour, the only point upon the seaboard of the island of Portsea where sewage could be discharged with the least nuisance.

On account of the levels of the outfall sewer the sewage of the borough could only commence to discharge at about one hour after high water, at which time the high-level sewer commenced to discharge by gravitation, and the pumps were put into operation to lift the sewage from the low-level sewer; thus, during some five or six hours out of every twelve the low-level sewer was tide-locked, and for a slightly shorter period the sewage in the high-level sewer was also pushed back.

When it is added to these drawbacks that the gradients of the sewers were necessarily very flat, some of the mains being only 1 in 5,280, whilst the arterial drains only 1 in 650, it is scarcely to be wondered at that deposits took place in the sewers throughout the borough. In the year 1882 the state of the sewers had become so bad that the Corporation, after inviting competition schemes for the effectual dealing with the system, called in the aid of Sir Frederick Bramwell, M.I.C.E., F.R.S., &c., who, with the assistance of Mr. Harris, M.I.C.E., his chief assistant, prepared and presented to the Corporation an exhaustive report upon the condition of the sewers, and advised certain works being carried out with regard to them and also a scheme for ensuring a constant flow through the outfall, at the same time securing that the flow of the sewage into the sea should be on the ebb tide only. These are the works which are now just completed, and which I shall presently

ask you to inspect, but before doing so it will be well to give you the following description of them, this description being partly taken from a report presented to the Town Council at the recent ceremony of opening the works.

The new works consist of a sewage-collecting tank, constructed on a piece of ground which the Corporation obtained from the Governmental authorities near Fort Cumberland. This tank, or rather series of three tanks, is competent to contain all the sewage produced in the district during any one tide, not only from the present population of about 138,000 inhabitants, but also from the population of twenty years hence, estimated to increase at the rate of the last decennial period from 1871 to 1881, and competent also to contain (with the same increase) the sewage of that portion of the borough, i.e., Stanshaw, lately drained, the sewage of the Government establishments, and a proportion of the surface-water from those districts where the surface-water is not separated from the sewage proper. The tank has, therefore, been made capable of containing, when full, as much as four and a half millions of gallons, and it covers an area of nearly three acres and a quarter.

In this tank the sewage will be stored during those hours when the tide is rising, and also during those hours when it has fallen so low as to render it inexpedient to discharge into the harbour,—that is to say, for about eleven hours out of every tide. With the object of allowing the outflow to begin at such early period after high water as may be found best in practice, the sloping bottom of the tank has been placed only 1 ft. below ordinary high water.

The tank is divided into three distinct and practically equal compartments, any one of which can, if necessary, be thrown out of use for repair. Advantage has been taken of this construction to make the tank self-flushing, that is to say, it has been so arranged that the contents of any full compartment can be used to flush an empty compartment, and although, as the tank is filled by pumping, and not by gravitation, there should not be any sewage in excess of its capacity pumped into it, yet each compartment of the tank is provided with an overflow into the outlet culvert.

At the request of the military authorities, a provision has been made for ventilating the tank by means of a chimney having in it a furnace kept continually burning, so as to cause an efficient draught, the inlet of the air for this ventilation is at the shallowest end of the tank, the chimney through which the air is carried being 90 ft. in height.

In order to ensure the rapid discharge of sewage, which is essential in this scheme, the outlet culvert has been made 7 ft. by 6 ft., from which proceed three lines of cast-iron pipes, each 3 ft. 6 in. in bore, standing out from the shore into the entrance to Langstone Harbour a distance of nearly 600 ft., and have their open ends placed slightly below low-water mark and delivering well into the tidal stream. The laying of these pipes has been a work of great difficulty and of some danger, owing to the swiftness of the tidal current and to the exposed nature of the shore at this point.

The arrangement for lifting the discharge valves in the tanks is of an ingenious kind, it is effected by the action of the sewage itself upon turbines which raise the valves. Thus considerable time and labour are saved, and I hope when we inspect you will direct particular attention to this point.

A long series of experiments were made under Sir Frederick Bramwell's directions during the winter and spring of 1883 and 1884 in all states of the tides, and during all sorts of weather, to determine, by means of floats, to what points the sewage would be taken, if delivered at the proper time from the new outfall pipes, and in every case in these experiments the floats were carried many miles to sea,—never approaching the shore: thus confirming Mr. Angell's selection of this point as the best in the borough.

The tank has been constructed with Portland cement concrete walls lined with brick set in Portland cement mortar, there being a straight, thick water-tight joint between the face of the concrete and the brick lining. The floor is in Portland cement concrete, worked to parallel inverted slopes towards the outlet culvert and "rendered." The roof is composed of brick arches carried on brick piers, and on the lining walls, with concrete backing to the haunches, the whole earthed over and sown with grass

and clover seed. The discharge-culvert, and the flushing-culvert and the discharge-chamber, are of Portland cement concrete similarly lined with brickwork.

The height at which the tank is placed is such that the supply connexion to it from the pumping-station is under pressure, and thus the connexion between the two is made by a cast-iron main or pipe. In order to allow for the irregular flow of the sewage and of rain water, and so as not to sacrifice power by undue friction, this main, which is nearly 1,500 yards in length, has been made as much as 3 ft. 6 in. diameter of bore. The load on the new pumping engine is equalised, and accidents are guarded against by providing a standpipe in the engine-house premises, into which the sewage is pumped, and from which it passes into the cast-iron main. This is carried underground, generally parallel with the present brick outfall sewer, until a point is reached about 500 yards from the engine-house, when it runs to the N.E., so as to approach the tank at its N.W. angle, and is then extended along its west wall, being connected to the tank so as to fill all three compartments.

Having regard to the elevation of the tank, the whole of the sewage will have to be pumped, and having regard to the fact before stated that the sewage comes down in unequal quantities, and not by an average flow, and also that surface water has, to some extent, to be allowed for, the pumping power is very considerably in excess of that previously in use.

The two new pumping engines are each capable of developing 150 indicated horsepower. They are compound condensing beam engines, with cranks and fly-wheels, the pumps (two to each engine) being worked direct from the beam.

The pumps are double-acting plunger pumps, and draw from two sumps outside the engine-house. Into these sumps the main high-level and main low-level sewers fall, the invert of the high-level sewer at this point being about 15 ft., and the invert of the low-level sewer about 20 ft. below the surface of the ground. By an arrangement of sluice-valves on the suction-pipes it is possible for each pump of each engine to draw either from the high-level sump or from the low-level sump, or from both sumps together. The deliveries of the pumps lead to a stand-pipe, 24 ft. high from ground-level, and from this stand-pipe a cast-iron main, 3 ft. 6 in. in diameter, conveys the sewage to the collecting tank.

The general dimensions of the engines are,—high-pressure cylinders, 20 in. diameter, 4 ft. 6 in. stroke; low-pressure cylinders, 30 in. diameter, 6 ft. stroke; length of beams, 23 ft.; stroke of cranks, 6 ft.; diameter of fly-wheels, 15 ft. The diameter of the pump plungers is 2 ft. 6 in., and the stroke, 3 ft. 3 in. The total displacement of the pumps of each engine, when running at twenty revolutions per minute, is about 500,000 gallons per hour, but a much less quantity than this only is pumped with the ordinary flow of sewage. The pump-valves are rectangular leather-faced clack valves on inclined seats. There are three suction and three delivery valves for each end of each pump.

The boilers, which are in a house adjoining the engine-house, are four in number. They are double-fueled boilers, each 7 ft. in diameter, and 27 ft. long, set in the usual manner, the flues being connected to a circular chimney-shaft, 120 ft. in height.

The engines and boilers are by Messrs. James Watt & Co., of Soho, Birmingham.

The principal dimensions of the engine-houses are,—length inside, 40 ft.; width inside, 30 ft.; total height from basement to ridge of roof, 72 ft., of which 23 ft. is below floor-level. The roof, which is high-pitched, is partly supported on the two lattice "lifting girders," one of which is over each engine. On the lower flange of each of these girders is a small lifting carriage, which may be fixed in any position in the length of the girder by a brake-block taking against the bottom of the girder; to these lifting carriages may be attached blocks or other lifting tackle.

The existing engines have yet to be altered so as similarly to receive their pumping supply from the high and low level sewers, and to deliver into the new outflow main. When the whole scheme is completed the two new engines, or one of the new engines in conjunction with the existing engine, will suffice for the work, thus giving a stand-by engine to go to work when needed.

The engines, or one of them, will be kept continually at work, night and day, from one year's end to the other, so that the sewage will be taken away to the collecting-tank as it arrives at the pumping-station, and will not be allowed to "back" up in the sewers of the town, as it now does for hours together; thus all evils attendant upon the present state of things will, it is believed, gradually disappear.

A large amount of reparation and renewal of the sewers in the borough has also been done during this last four years, but much has yet to be performed, and there is no doubt but what, as soon as the new scheme is put into operation, a systematic flushing of the sewers and drains will have to be commenced in order to put them into a satisfactory condition.

To convey some idea of the magnitude of the works which have been performed, it may be stated that about two hundred thousand cube yards of earth have been excavated, over of which has, of course, been refilled in some of the work; nearly six million bricks have been used; seven thousand tons of Portland cement, for the making of concrete and mortar, with about thirty thousand tons of gravel and eight thousand tons of sand; altogether also there will be something like three thousand tons of iron, of which about 350 tons, more or less, will be in the engines and boilers, and pipes, &c., in connexion with these, the remainder being in the cast-iron main from the pumping-station to the tank, in the outlet pipes into Langstone Harbour, and in the screw pipes, &c., for securing these, and in the valves, covers, and plates, &c., throughout the works.

In conclusion, I need scarcely tell you that this is only a mere sketch of the large works which have been carried out. I hope to be able to furnish a more detailed account of them to be entered in our Minutes of Proceedings, but I felt that a longer paper would only have detained you from the inspection, and my intention was to give you only a short outline of the principal points of the work, so that you should more clearly understand them when you visit them, which I now ask you to do.

The members subsequently visited the pumping-station and outfall works, and after being entertained at luncheon by Mr. John Mowlam Bart (of the firm of John Mowlam & Co., the contractors for the works), inspected the Corporation stables, the new public baths, and the new Town-hall now in course of erection. As to the latter we will say something in our next.

### New Underground Railway at New York.

In view of the ever-increasing railway traffic, but more especially the demands for further facilities for local travelling in New York and its suburbs, it is stated that the New York Central Railway Company has determined to undertake an enterprise almost as great as the construction of the Fourth Avenue line to Harlem a few years back,—a work which cost something like 7,000,000 dollars, or 1,400,000. The new project is that of an underground railway, about three miles and a half in length, from the Grand Central Depot, in Forty-Second-street, to Brooklyn Bridge. The course of the tunnel will be under Elm-street, which in consequence will have to be considerably widened and extended at one end to the bridge, while the other end will be lengthened to Lafayette-place and Fourth-avenue, and no pains or money will be spared to accomplish the undertaking as soon as possible. It is calculated that the railway will be completed and opened for public traffic a year next autumn, or about sixteen months from the present date. There will be four lines, two of which will be employed for through travelling. The company has not stated how or when they obtained from the city or the Legislature the authority to appropriate the streets for the purpose of a railway, and on this account it is presumed in New York that the authorities are acting in accordance with the New York Central original charter (known to be a very elastic one), allowing the company the right to extend their lines in almost any direction, and to any distance at any moment. Under any circumstances, however, the new line cannot fail to be a very appreciable acquisition to the general public.

**Obituary.**—We regret to hear of the death of Mr. Caleb Holden (of the firm of Holden & Co., contractors for zinc roofing, &c.), which took place very suddenly at Wood-street, Westminster, on the 13th ult. Deceased was in his seventy-third year.

### CASE UNDER THE METROPOLITAN BUILDING ACT.

At the Lambeth Police Court a few days since, Mr. W. A. Smees, of 89, Finsbury-pavement, builder, was summoned by Mr. George Elkington, jun., the District Surveyor for Fenge, for not giving notice of his intention to build a tobogganing slide, erected by him at the Crystal Palace, contrary to 18 and 19 Vic., c. 122, sec. 38. Mr. Thomas Burton, solicitor, instructed by the Metropolitan Board of Works, appeared for the District Surveyor, and Mr. Willey Wright for the defendant.

Mr. Burton stated the defendant had erected a slide 458 ft. long, and attached thereto was an engine-house for bringing up the unused sleights, a store-room, and a ticket-office, and these being considered formed a building within the meaning of the Act, and, therefore, required notice to be given to the District Surveyor, and that he relied upon the case of *Stevens v. Gourly* in support, and called Mr. Elkington, who proved the dimensions of the various buildings.

Mr. Willey Wright contended that the slide was not a building, and that if it was it was exempted under the Special Act of the Crystal Palace, 44 Vic., c. 36, sec. 21, which enacted that the main buildings, conservatories, and waterworks, and the conveniences and other works immediately connected therewith, were to be exempted from the operation of Part I. of the Building Act.

Mr. Byron said he should find that the slide was a building, but was exempted under the Crystal Palace Act, and dismissed the summons.

Notice of appeal was given.

### RECONSTRUCTION OF THE STRATFORD RAILWAY STATION.

AMONGST the several costly new works which the Great Eastern Railway Company are at present carrying out at several points of their system is the entire reconstruction and enlargement of the station at Stratford. One of the most difficult portions of the engineering connected with the undertaking has been the designing and construction of the underground approaches to the different platforms above from which the trains are dispatched from Stratford to the many suburban and other localities embraced in the Company's system. In consequence of the peculiar conformation and levels of the station area, these platforms are, in several instances, only reached by underground subways. The reconstruction of the whole of these subways, together with staircases leading up from them to the platforms above, has been accomplished without any interruption to the traffic on the line. The subways are all about 12 ft. in width, and are light and airy, the walls being faced with white enamelled brick, and covered in with wrought-iron roofs immediately under the railway metals above. A feature in the carrying out of the works is an improvement which is being made in the approaches to the station from different parts of the town. In place of the former inconvenient approach from the Broadway, on the south-east side of the town, a new block of booking-offices and waiting-rooms has been erected at this point, approached direct along one of the main thoroughfares from Broadway, from which the platforms are reached along the subways and staircases already referred to. At the north-west side of the town, from the locality known as Stratford New Town, a carriage-way, about 40 ft. in width and upwards of 900 ft. long, is being formed on the street level. This carriage-way leads to a spacious open area immediately in front of an extensive block of new booking-offices, waiting, and refreshment-rooms, station-master's offices, and other apartments, which are at present in course of construction. Several of the platforms approached from these new booking hall and offices are reached without the aid of the subways, the floor of the offices being on the railway level. All the platforms are from 800 ft. to 900 ft. in length, and are intended to be covered with iron roofs. Immediately opposite to the booking-office block, another block is also in progress of construction, intended as general offices for the clerks and other employes of the company. The works are in the main being executed by the company's own workmen under the superintendence of Mr. Wilson, engineer-in-chief, and his assistants; the brick-work of the several new blocks of office and other buildings being in the hands of Messrs. Atherton & Latta, builders, of Poplar. It is stated that the works when completed will have cost from 200,000l. to 250,000l.

### IMPROVEMENTS IN RAIN-WATER SEPARATORS.

We have on two or three previous occasions noticed the ingenious rain-water separators invented by Mr. C. G. Roberts, of Haslemere, and we return to the subject in order to mention some material improvements lately made in those appliances.

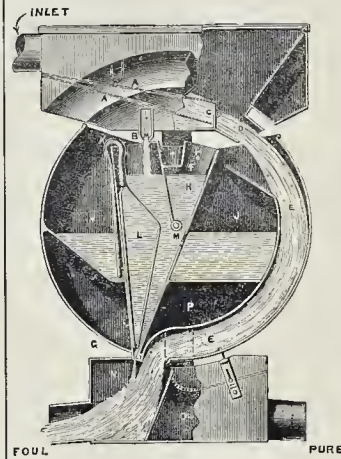


Fig. 1.

In order to insure a thorough washing of the roof, it is deemed desirable by the inventors that in a smoky town no water should be stored before two gallons of rain have fallen on each 100 square feet of the roof; in other localities, one gallon or 1½ gallon of rain on each

light rains that took an hour to yield the requisite quantity, and until recently all the water that came in still lighter rains was of necessity allowed to run to waste. By the recent improvement it is claimed that perfect regularity of action is obtained in much lighter rains, and that in a town the separator with the slide marked "2" will be certain to run water to storage as soon as two gallons have fallen upon each 100 ft. of roof, even if it has occupied two hours' time in descending. This improvement is effected by the introduction of the funnel-shaped chamber, H, shown in the two accompanying illustrations. Fig. 1 gives a section of the horizontal separator, and fig. 2 a section of the vertical separator. While the inlet and outlet boxes differ, it will be seen that the centre part, or center, which turns upon the pivot M, is the same in construction in each drawing, but different in position. Fig. 1 shows it before it has canted and while it is still running foul water to waste. Fig. 2 shows it after it has canted and is running the clean water to storage. In the earlier form of separator (see illustration in *Builder* for April 10, 1886) the water that came through the slide B fell direct into a large chamber, with a hole at the bottom of it rather smaller than the hole at B, and as soon as this chamber filled to a certain height the centre canted. In the new form of separator, the water from B falls into the funnel F, and only a small proportion passes thence by the holes H into the chamber J. There is no aperture at the bottom of this chamber, but when the rain has ceased it is emptied by the action of the siphon L. It will be noticed that the longer leg of the siphon has been enlarged; by this very simple and, as it is believed, original contrivance, the air in the top of the siphon is prevented from interfering with its action, being made to take the shape of a short and broad instead of a long and narrow bubble.

### ARTERIAL DRAINAGE.

SIR,—As my grandfather, the late Mr. John Grantham, sen., reported to the late Mr. John Rennie in 1822, on the condition and improvement of the river Shannon, and his report was printed by the then Government, and as my father, Mr. R. B. Grantham, and I have since carried out many works of arterial and agricultural drainage in this country, perhaps you will kindly allow me space for a few remarks on the subject of your leading article on "Arterial Drainage in Ireland."

In the first place, the opinion of the Royal Commissioners appointed in October, 1886, that the climatic conditions arising from large tracts of wet land cannot fail to have effects prejudicial to health, will be supported by all who have had experience of lands liable to frequent inundation. In 1873, a report made by my father, and presented to the House of Commons by the Inclosure (now the Land) Commissioners, upon the floods in certain valleys in Somersetshire, which were very severe at that time, contained the following passage:—"The results of my inquiries among the medical men of the country show that during the wet weather of last winter the public health was generally good, but that ague set in early in the spring, and is now very prevalent on the verge of the moors. Neuralgia in various forms prevails, and is attributed to the malarious exhalations of the moors. These diseases cause a decided vital depression and diminution of energy for work, and are a source of affliction to the poor, preventing men from working and driving them to seek parochial relief. Rheumatism is generally prevalent in the neighbourhood at all times of the year." The floods in the districts referred to extended over an area of 69,000 acres in the valleys of the Rivers Parrett, Brue, Axe, Tone, and Carey, the aggregate watershed of which amounted to 609,000 acres.

I cannot but think that the recommendation by the Royal Commissioners of the adoption of the principle of a Conservancy Board for the control of the main river (in the case of the Shannon, represented by the Government), with District Boards for the management of the tributary rivers, will be hailed with satisfaction by all those interested in the conservancy of rivers; and that their apportionment of the rating powers over the lowlands, midlands, and uplands of a watershed will be regarded by many people with approval.

It is perhaps not very generally known that

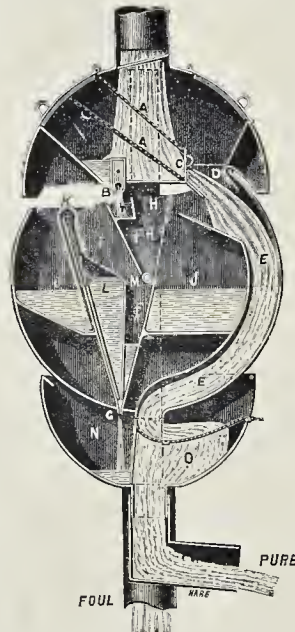


Fig. 2.

100 square feet will be enough to wash it. By the insertion of a slide marked "1," "1½," or "2," the requisite amount of washing for each locality was secured in the old form of the appliance, and the separator was canted as soon as that amount of rain had fallen, whether it came in five minutes of storm or in sixty minutes of steady rain. There was comparatively little difficulty in securing the automatic action with heavy rain, but it was more difficult to ensure an unfauling action in

the principle of Conservancy Boards has to a limited extent been already established in the upper Thames Valley, and in the Somersetshire valleys already mentioned.

In 1871, the Thames Valley Drainage Act was passed, and this Act appointed a body of Commissioners, with jurisdiction over the valleys of the river Thames and its tributaries above Oxford. The area under their control was divided into seven districts, each, or a combination of them, having its separate District Board. The operations of the Commissioners themselves were confined to the beds, soil, and banks of the River Thames, and its tributaries, while the District Boards were to maintain and improve the internal drainage of their own districts, always, however, submitting their plans to the Commissioners. After the appointment of the first Commissioners the District Boards could elect Commissioners from their own body. The first Commissioners were directed to ascertain all lands which would derive benefit from the exercise of their powers, and those subsequently elected were to levy rates according to the probable or actual improved value of the lands within their jurisdiction.

The flooded areas in the Thames valleys previous to 1871 amounted to 71,100 acres from an aggregate watershed area of 826,900 acres.

An Act similar to the Thames Valley Drainage Act was passed in 1877 having for its object "the more effectual drainage and irrigation of lands in the county of Somerset and for other purposes." This Act referred to the valleys in Somersetshire previously alluded to.

Both Acts were initiated by those interested in the land in their respective valleys, and under both of them considerable works of improvement have been carried out. It will be seen that they embody the principle of Conservancy Boards, although their methods of rating are not those proposed by the Royal Commissioners.

As the report of the Royal Commissioners refers to the Fens in Lincolnshire, and as I am acquainted with the system of rating in one of the districts there, a short description may be of interest.

The jurisdiction of the Black Sluice Commissioners extends from Boston up to the river Glen, over an area of about 70,000 acres, drained by what is known as the South Forty-foot River. The district does not extend beyond the fen lands, and therefore does not include any uplands, and it is upon the fen lands within the district that the rate is levied, and this rate provides for the maintenance of the South Forty-foot River and of all streams bringing down water from the high lands so far as those streams lie within the Black Sluice District. Those streams generally have straight courses, and discharge at right angles into the South Forty-foot River. Between those streams lie the fens, each within its own parish, and discharging its drainage by what are called "interior" drains, through sluices, into the Forty-foot. For the proper drainage of each fen "interior" officers are annually appointed by the Black Sluice Commissioners, and have the power of rating for that purpose; so that, besides the Black Sluice rate, there is also the "interior" rate, on each fen. The system appears to work fairly well, although there is difficulty sometimes in getting the "interior" officers to maintain the "interior" drains in proper condition.

I fear I have made this letter too long already, but I would add that, with regard to the question of embanking, as compared with deepening the channels of rivers, it appears to me impossible to form a judgment without a close investigation of every case, although, no doubt, the deepening of the channel, as a question of principle, is the method to be preferred.

RICHARD F. GRANTHAM, M.Inst.C.E.

Northumberland-avenue, June 4.

**Temple Bar.**—The *City Press* says that the statement which we quoted last week from the *Pall Mall Gazette* to the effect that the Corporation are about to sell the stones of Old Temple Bar, to be erected in private grounds, is a *canard*. As a matter of fact, no decision has been come to with regard to the disposal of the stones. The subject is still under the consideration of the City Lands Committee, and nothing can be done without the sanction of the Court of Common Council.

LIFTS.

SIR,—In your issue of May 21st there is a communication from Messrs. Archibald Smith & Stevens which has escaped my attention until now, and which requires a word of reply. With much of that which is written by Messrs. Smith & Stevens I fully agree, but they have fallen into an error. They express a wish to show Mr. Slater "Lifts of English manufacture which comprise all the precautions by which the Otis lift is absent." The English lift, being absolutely controlled by its valve, cannot run down if overloaded; in it overwinding must be carried to the fracturing point before danger can arise."

Mr. Slater did not ascribe any danger to the Otis lift. On the contrary, not only in the course of his remarks, but in the discussion after his paper had been read, absolute safety was in the most explicit terms conceded by him. The statement that "the English lift, being absolutely controlled by its valve, cannot run down if overloaded," might be taken by the unwary reader as meaning by implication that the Otis lift could run down if overloaded. Such an idea needs no words from us with any who understand the matter. If all our readers were engineers and acquainted with lift machinery, we should not deem it necessary to trouble you, but for the benefit of such of your readers as have not gone into a critical investigation of this matter, we desire simply to correct the wrong impression calculated to be produced by Messrs. Smith & Stevens's letter. Wm. Arct. Gussow, President American Elevator Co.

\* \* \* Our correspondent is not quite correct: Mr. Slater did say that a lift on the Otis principle was exposed to three dangers. He then went on to point out that these possible dangers had been completely guarded against. The expression used by Messrs. Smith & Stevens was verbally accurate; but it was, no doubt, liable to be misunderstood.

THE JUBILEE HOLIDAYS.

SIR,—Perhaps it may not be out of place to ask what the jubilee holiday will be in the building trades as regards us clerks. I am afraid some of our firms, not knowing other firms' intentions, may only give us the day, and a lot of us will lose the chance of an extra day or two entirely through our principals' ignorance as to what is to be the general rule.

I think, myself, that we ought to have the three days, viz., Monday, Tuesday, and Wednesday, and those clerks who are not entitled to any regular summer holiday should have the week.

I hope that some of our leading firms will take this matter up and let us know their intention in your next issue. A BUILDER'S CLERK.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

7,069, Flushing Water-closets, &c. W. Smeaton, sen.

The object of this invention is principally to limit the quantity of water used for flushing the closets. The apparatus is actuated by the movement of the seat, or in the case of lavatories or urinals by a foot-plate.

8,081, Casement Fasteners. F. A. Morgan. By this invention the casement is secured to the frame by a screw, the plate affixed to the casement two legs are formed; between these is a joint with one end of a screw. On the other part of the screw is placed a thumb nut, and on one side of this thumb nut is formed a boss. A slotted plate fixed on the casement-frame is jointed so that it can be folded like an ordinary hutt hinge. The action is such that when closing the casement the jointed screw of the plate fixed on the casement is brought into the slot of the plate which is fixed on the casement-frame.

8,593, Wall Paper, &c. John Luke.

According to this invention the paper is treated in a special manner in order to render it more durable and suitable for use as a covering for walls, floors, &c. A duplex paper prepared after a formula given in a previous specification is passed before finishing through a sizing machine, in order to give it a coat of size, after which the paper is made waterproof by means of paint or oil. It is then printed with any impressed pattern and dried by heated air or some such like process.

12,331, Firegrates. C. Swindell.

Instead of the ordinary horizontal bars, wire of zigzag pattern is, according to this invention, passed from the top to the bottom bar, and laced so as to prevent the fuel from falling out.

15,904, Wood Block Flooring. R. Davison and W. T. Creed.

According to this invention, the blocks are bonded on all sides. What are called by the inventors "wood-keys" are used. The blocks have dovetail joints worked on two or more sides, and have recesses into which the aforesaid "wood keys" are inserted. The bed is made in the method common

to wood-block flooring, and it is claimed that the block flooring gives a perfectly level and well-bounded floor.

3,850, Shop Fronts. J. Gooch.

By this invention a wheeled or movable arrangement is made so that goods may be better displayed, and so also that the frontage between side and party walls may be better utilised for the display of goods.

NEW APPLICATIONS FOR PATENTS.

May 27.—7,696, W. Hays, Ventilating Fans.—7,708, N. Foster, Kilns and Drying Floors for Cements and Limes.—7,757, C. Rabitz, Construction of Walls, Ceilings, Roofs, &c.—7,767, A. Clark, Window-sash Fastener.

May 28.—7,774, G. Nussbaum, Flushing Apparatus for Water-closets, Drains, &c.—7,777, W. Phillips, Pivot for Windows, &c.—7,808, L. Sunter, Screws and Screwdrivers.—7,810, C. Irwin, Anger-bits.

May 31.—7,846, J. Anderson, Dovetailing Machines.—7,856, W. Dickson, Cooking Ranges.

June 2.—7,959, G. Lewis, Flooring, Wainscoting, &c.—7,965, J. Ogg, Cutting and Dressing Stone, &c.—7,966, W. Boelling, Inlaid Floors.—7,970, A. Eastlake, Sash Fasteners for Windows and Casements.—7,976, W. Haworth, Chimney Pots.

PROVISIONAL SPECIFICATIONS ACCEPTED.

2,685, R. Adams, Door-closing Appliances and Checks.—4,683, B. Holmes, Fastening for Windows and Doors.—6,027, A. Rhodes, Window Fastener.—6,045, Attaching Door-knobs to Spindles.—6,256, W. Kneeny, Door Latches, &c.—6,582, P. Holmstedt, Paint.—6,616, L. Marguerite, Vitro-Metallic Material for Glazing, &c.—6,887, J. Jackson, Water-waste Preventing Syphon Cisterns.—7,057, T. Boothroyd and S. Brooke, Ventilator.—5,732, J. Martin, Pans and Seats of Closets.—5,828, J. Ward and W. Jones, Window-sashes.—6,122, H. Wake, Machinery for Lowering and Depositing Concrete under Water.—6,513, A. Itter, Facing Bricks, Tiles, &c.—6,545, S. Fisher, Wall or Ceiling Coverings.

COMPLETE SPECIFICATIONS ACCEPTED.

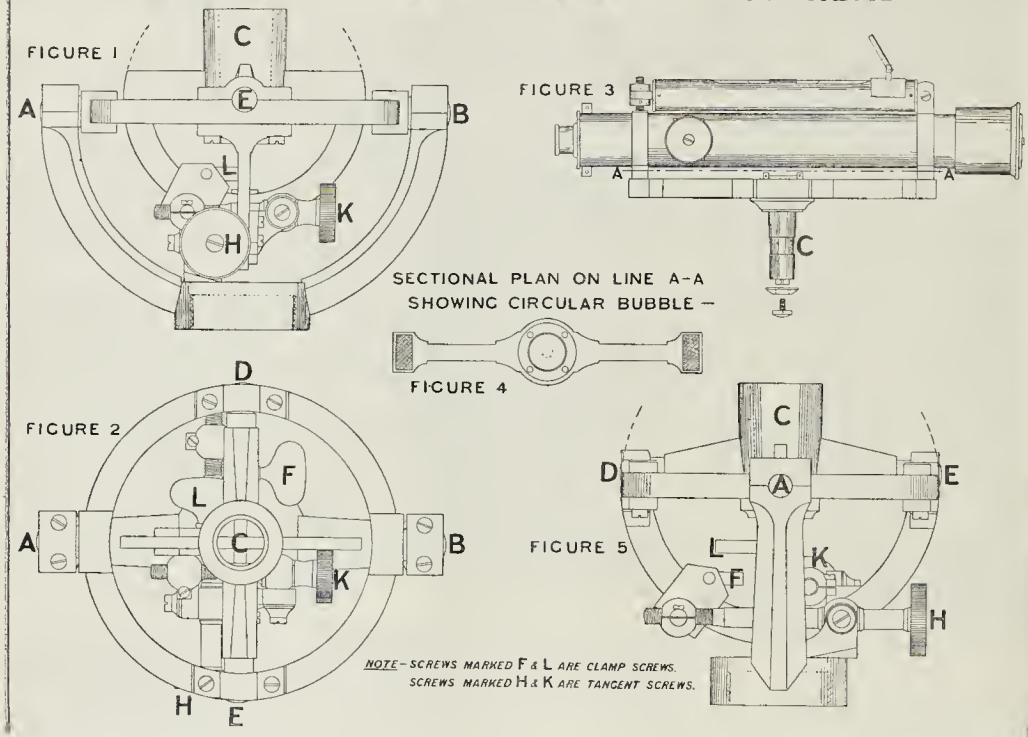
Open to Opposition for Two Months.

9,987, T. Whitaker, Pile-driving Machines.—6,075, F. Tuerk, jun., and Others, Water Meters.—6,494, L. Saengerdorp, Sheets for Metallic Roofing.

**The Sunday Society.**—On Saturday afternoon the twelfth public annual meeting of the supporters of the Sunday Society was held in the Freemasons' Hall, Great Queen-street. Sir George A. Macfarren, Mns. Doc. (President of the Society), took the chair. There were about 200 persons present. Mr. Mark H. Judge (the Hon. Sec.) read the annual report. Mr. Judge, in the course of his statement, said that it was twelve years since the society had been inaugurated, and each year some progress had been made. The Society of British Artists, the Institute of Painters in Oil-Colour, and the Grosvenor Gallery had all been opened on one or two Sundays during the past year. The Chairman then proceeded to deliver his presidential address, after which the Rev. Septimus Hansard (Rector of Bethnal-green) moved the first resolution, accepting the report as eminently satisfactory, and authorising the Chairman to sign a petition to Parliament in favour of Sir Henry Roscoe's motion for the opening of public museums. Mr. Oscar Wilde seconded the resolution, which was then unanimously carried. Mr. George Godwin, F.R.S., proposed the second resolution, expressing gratification that Her Majesty had signified the jubilee year of her reign by opening the People's Palace,—the first great institution in the metropolis to be opened on Sundays,—and urging that in further commemoration of the event a memorial should be presented to the President and Council of the Royal Academy requesting them to solicit the sanction of the Queen to the opening of Burlington House on Sundays before the close of the present exhibition. He said that the Sunday opening of public institutions was now merely a matter of locality, for the principle had been conceded in many of the large provincial towns. It was stated that Sunday opening would be an unfair call upon the curators and officials of the museums and galleries, but it was a fact that many of the curators themselves were earnestly in favour of the change. Mr. Thomas Powell (of the London Trades Council) seconded the resolution, which was carried unanimously.

**Ecole des Beaux Arts.**—Some American architects, to mark their sense of gratitude for the training they have received at the Ecole des Beaux Arts at Paris, have presented a sum of 35,000 francs to found a prize, for French students exclusively, of architecture at the school.—*Athenæum*.

## DOERING'S GIBBAL JOINT TRIPOD HEAD



## The Student's Column.

FIELD WORK AND INSTRUMENTS.—XXIV.  
Levelling Instruments.  
X.—DOERING'S LEVEL.

ANOTHER form of gimbal-joint action in a tripod head is that shown in figures 1, 2, and 5, illustrating Doering's level. This method of supporting a levelling telescope is similar to the system adopted for a ship's compass, with the addition of vertical arcs at right-angles to one another respectively, which are clamped to each other by the thumb-screw marked L, and by the thumb-screw marked F to the frame which is fastened upon an ordinary tripod stand. In the field when setting up the instrument, should the ground be very uneven, the legs of the tripod can be put down anywhere in the most convenient manner, irrespective of level, and the telescope afterwards adjusted by moving the vertical arcs which connect it with the tripod stand. Fig. 3 illustrates the telescope, the vertical axis of which is connected at C in the socket bearing shown in elevation in figs. 1 and 5. As shown in fig. 4, a central circular bubble is substituted for the ordinary transverse bubble. Figs. 3 and 4 are here drawn to half the size to which figs. 1, 2, and 5 are drawn: hence the socket-bearing marked C in figs. 1, 2, and 5 appears double the diameter indicated by figs. 3 and 4. Fig. 2 shows in plan the relative positions of the elevations illustrated by figs. 1 and 5.

In setting up the instrument upon irregular ground, the clamps marked F and L which hold the telescope rigidly to the tripod stand are first slackened and the longitudinal bubble is set approximately level by hand. The clamps F and L are then tightened and the final adjustment made by the two milled-beaded tangent screws marked H and K working in directions at right angles to one another. These screws are connected respectively to each arc at the clamps, as shown in figs. 1 and 5. Should the ground be moderately level and firm, it is unnecessary to unclamp the vertical axis of the joint. The instrument is first set up approximately level in the ordinary manner by the legs and brought to a perfect adjustment for taking levels by means of the tangent screws.

The substitution of the gimbal joint tripod head for parallel plates enables the telescope to be rapidly set level in rough country, but it has a greater area exposed to the action of the wind, and more wearing surfaces. In adjusting the telescope by the gimbal joint, telescope should be held round the body beneath the compass-box, before the clamps are slackened. One of the arcs may be divided into degrees for measuring vertical angles, if desired.

It is stated that Huygens, in the seventeenth century, was the first to apply a telescope to an instrument which was set up level by means of a plummet, and that Dr. Hooke was the first to apply an air-bubble to an instrument for setting up a line of sight in a horizontal direction. Later on, M. Le Bion combined the telescope of Huygens with the air-bubble of Dr. Hooke. The introduction of parallel plate-screws was the invention of Sisson, prior to which all instruments were adjusted by a ball-and-socket joint. The clamp and tangent screw movement for traversing small distances was originally suggested by Ramsden. The inventor of the circular bubble is not known, but it is certain that it was employed in the early part of the eighteenth century, upon surveying instruments known as plane tables. The transverse bubble used to facilitate the approximate setting up of the instrument was the idea of Mr. Gravatt. Messrs. Troughton & Simms, Messrs. Elliott, and other well-known makers have also made several improvements in the detail arrangement of the various parts of the instrument. The annexed illustration is taken from one of Messrs. Elliott's patterns, at whose works in London several different forms of instruments are kept in stock.

**Association of Municipal and Sanitary Engineers and Surveyors.**—A Midland Counties District Meeting of this Association is to be held at Kidderminster this Saturday, June 11. Members will assemble in the Council Chamber, Town Hall (by kind permission of the Mayor), at 11 a.m., when several papers on the sanitary works of Kidderminster will be read and discussed.

## CHURCH-BUILDING NEWS.

**Coventry.**—St. Michael's Church, Coventry, was lately re-opened, after partial restoration (a work still in progress), under the direction of Mr. John Oldrid Scott. It seems that in 1833 a fruitless effort was made to induce the Coventry Corporation, as lay proprietors, to repair the chancel. In June, 1884, a scheme of restoration was launched, the estimated cost of which was 35,000l. Mr. George Woodcock started the subscription list with a donation of 10,000l., and a formal appeal to the public was made. On Christmas Day the same year, the Vicar announced that the restoration fund amounted to 30,335l. Early in the following year Mr. Scott was instructed to prepare the necessary plans, and a contract for the execution of the greater part of the work was entered into with Mr. John Thompson, of Peterborough, for 31,853l. The work was commenced in June the same year, and the portions which are completed and which were lately opened on Sunday, are the nave, chancel, sanctuary, and south aisle. The re-casing of the tower and the other departments of the work are being steadily proceeded with. A new organ has been built by Messrs. Henry Willis & Sons, London. With regard to the tower, one of the first things undertaken was the underpinning of the foundations, and since this was done no movement on the part of the steeple has been detected, and it now rests perfectly secure on the new foundations. Its symmetrical lines are hidden by the scaffolding surrounding it on every side, and the removal of 54 ft. of the upper masonry, which was exceedingly insecure, gives to it a rather stunted appearance at present. About 5,000l. more than has been yet subscribed is required to complete the work now in hand.

**Egg Buckland (Devon).**—A new reredos has just been placed in St. Erasmus's Church, Egg Buckland. It is the gift of Mr. James John Elliott, of Leigham, and is the work of Mr. Harry Hems, Exeter. It is Perpendicular in style, the architectural framework of Beer stone enclosing a sculptural representation of "The Last Supper," carved in high relief in fine-grained Caen stone. Mr. Hems has also executed a statue of St. Erasmus, which has



been placed in the niche above the south-west porch.

Failand.—The new church at Failand, an outlying district of the extensive parish of Wraxall, has been opened under licence of the Bishop of Bath and Wells. This church, which is a chapel of ease to the ancient parish church of Wraxall, has been erected, together with a residence for the curate, at the sole cost of Mr. Richard Vaughan, elder brother of the present rector of Wraxall, from designs furnished by Mr. Edward Barnes, architect, of Bristol, the builders being Messrs. Newton & Co., Wraxall. The building comprises nave, transept, chancel, and porch. The spire is 120 ft. in height. The seats are of solid oak, and there is a reredos and a pulpit of varied stone and marbles. All the windows are of stained glass. The large one at the east end, the two rose-windows, and those at the sides of the church, have been supplied by Bell & Son, of College-green, Bristol.

Guyhirn.—In excavating, a few years since, for the new church here, the foundations of the supposed original Norman church were brought to light, and numerous fragments of early Norman work, such as capitals and mouldings, were found embedded in the foundations. The Rev. W. Carpenter, the vicar, had them carefully removed, and taken care of, with the view of having a cross erected in the churchyard in commemoration of the erection of the new church and parsonage. The cross (the design of which has been entrusted to Mr. W. Adams, architect, of King's Lynn) is early Norman in character, 10 ft. high, with a base 4 ft. square, which will be surmounted with a new cross of elaborate design. The four sides of the cross will have recessed panels for inscriptions, and sun-dial with arch mouldings springing from clustered shaftings.

Leek (Staffordshire).—St. Mary's Church, Leek, which was opened on the 12th ult., is finished complete in every respect, and is erected on the local rock in the Early Decorated style of architecture, from the designs and under the superintendence of the architect, Mr. Albert Vicars, of London. It is faced with local coursed rubble, with Donlinton stone dressings, the spire being visible from nearly all parts of the town. The plan consists of nave and two aisles, sanctuary arranged for spirited choir, two side chapels, baptistry, nuns' choir, priests' sacristy, working sacristy, organ gallery, confessionals, with priests' room communicating, and heating-chamber under. The interior length of the church is 103 ft. 9 in., the width 50 ft., and the height to the apex of the nave ceiling 53 ft. 3 in., and to the gable 64 ft. The ceiling is of yellow pine, panelled, and has moulded ribs and stop-chamfered principals, every alternate one being cusped and supported on red stone wall shafts with carved caps and moulded bases. The columns in the nave and sanctuary, and the shafts to the chancel arch, are of red Scotch stone, with Portland stone carved caps and moulded bases. The spire is built of Donlinton stone, with red stone hands at intervals; its height is about 150 ft. above ground level. On the east side of the tower there is a large stone statue of the Blessed Virgin, standing under a canopy upon a moulded and carved corbel. The floor of the church has been laid by Messrs. Duffy & Son with their prepared wood block paving. The stained glass is by Messrs. Mayer & Co., of Munich and London. The vane to the spire and the wrought-iron gates and railings have been supplied by Messrs. Brown & Co., of Birmingham, and Messrs. Barker & Son, of the same town, were the contractors.

Table listing real estate transactions with columns for address, years, and ground-rent. Includes entries for 80 and 92, Rutland-street, 113 years, ground-rent 72, and 17 and 18, Smith-street, 26 1/2 years, ground-rent 67.

Table listing real estate transactions with columns for address, years, and ground-rent. Includes entries for Spitalfields-38 and 39, Hanbury-street, freehold, and Bayswater-Ground-rent of 28 1/2, term 50 years.

Table listing real estate transactions with columns for address, years, and ground-rent. Includes entries for Fitzroy-square-45, Whitfield-street, 13 years, ground-rent 17, and Bedford-square-69, Huntley-street, 38 years.

Table listing real estate transactions with columns for address, years, and ground-rent. Includes entries for Reigate, Crescent-road, 2 1/2, plot of freehold land, and Balmesdale-road-Two freehold cottages.

Table listing real estate transactions with columns for address, years, and ground-rent. Includes entries for Watford-Freehold residence, with armoury, and Barnaby-39 and 41, Copenhagen-street, freehold.

Table listing real estate transactions with columns for address, years, and ground-rent. Includes entries for Chelsea-4, Halsey-street, 56 years, ground-rent 57, and 5 to 10, Wood-street, 13 years, ground-rent 15 1/2.

Table listing real estate transactions with columns for address, years, and ground-rent. Includes entries for Beckland, near Dover-Rith Cottage, freehold, and 43, Chapel-place, freehold.

Table listing real estate transactions with columns for address, years, and ground-rent. Includes entries for Hornsey-Ground-rents of 12 1/2, a year, reversion in 94 years, and Peckham-Ground-rents of 32 1/2, a year, reversion in 89 years.

Table listing real estate transactions with columns for address, years, and ground-rent. Includes entries for Roxeth, London-bill-Three freehold cottages, and Greenhill-Copyhold cottage and garden.

Table listing real estate transactions with columns for address, years, and ground-rent. Includes entries for Soho-47, Gerrard-street, freehold, and 47, Beckett-street, freehold.

Table listing real estate transactions with columns for address, years, and ground-rent. Includes entries for Bakers-street-11 and 12, Crawford-street, 17 years, ground-rent 22 1/2, 10s., and Kenish Town-1, Willow-walk, 39 years, ground-rent 32 1/2.

MEETINGS.

SATURDAY, JUNE 11. Architectural Association.—Visit to Banstead Park, the residence of the Hon. Francis Baring. (See advertisement on p. xvi.)

Association of Municipal and Sanitary Engineers and Surveyors.—Midland Counties District Meeting at Kidderminster.

Edinburgh Architectural Association.—Annual excursion to Norham Castle, Norham Church, and Ladykirk.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Mr. T. G. Jackson, M.A., F.S.A., on "The Art of Dalmatian."

ROYAL STATISTICAL SOCIETY.—Mr. Joseph Rabino on "The Statistical Story of the Suez Canal." 7 45 p.m.

WEDNESDAY, JUNE 15. Society of Engineers.—Visit to Messrs. Aveling Porter's Works. Royal Meteorological Society.—7 p.m. Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting. 8 30 p.m. SATURDAY, JUNE 18. Architectural Association.—Visit to Cambridge. (See advertisement on p. xvi.)

Miscellaneous.

Free Library, Bethnal Green.—The Corporation of London have voted a donation of 100 guineas to the 1,000, required by the Bethnal Green Free Library Committee for the further development of the Institution.

Smethwick.—A new Primitive Methodist Chapel and schools are about to be erected in Regent-street, Smethwick, from designs by Messrs. J. P. Sharp & Co., architects, Birmingham.

A New Water-Bar for French Casements.—Mr. Samuel Elliott, of Newbury, is introducing a new water-bar for French casement sills, which is likely to prove absolutely reliable and effective.

Monument to Haydn.—A statue to Haydn, by Herr Natter, was unveiled at Vienna, in the presence of the Emperor, on the 31st of May. It is of rather more than life-size, executed in Carrara marble, with a pedestal of Tyrol faun-coloured stone, on steps of granite. The monument stands in front of the Church of the Marian-Kirche.

Frimley (Sussex).—The Rural Sanitary Authority have adopted the scheme of sewerage prepared by Mr. James Lemon, M. Inst. C.E., F.G.S., &c., and application will be made to the Local Government Board for their sanction to carry out the works. The principle adopted is that of filtration, the effluent being discharged into the river Blackwater.

The Sixth International Congress of Hygiene.—It is announced with regard to the special exhibition to be held in connexion with the sixth international congress of hygiene and demography, to which reference was made in the Builder of January 29 last, that intending exhibitors should send in applications for space not later than June 30, to the "Ausstellungs-Comité, Wieu, I., Renngrasse 20." The exhibition will be held in the rooms of the Imperial University, I., Franzensring, from September 26 to October 2.

A New Museum at Liege.—A new museum, somewhat on the plan of the proposed Imperial Institute, has just been opened at Liege, called the Musée Commercial de Liege. Its object is to promote and develop the commerce of Belgium with foreign countries by always exhibiting such wares as are in demand abroad to the manufacturer. The museum is in consequence divided into two parts, viz., one for imports and one for exports, both embracing 386 classes in forty-four sections. With the museum is connected a bureau, the function of which is to give general commercial information of every kind to those who may apply for such, and to supply books, reports, &c., connected with the subject.

A Correction.—Mr. Aldridge writes to us in reference to a letter from a German architect (Herr Honssell) which he read at the Conference Meeting on Registration, and which was printed in our Conference Supplement (p. 759, ante), to say that in the titles "Kaiserlich-Regierung's-Bauführer" and "Kaiserlich-Regierung's-Baumeister," the word "Königlicher" should have been written in each case instead of "Kaiserlicher," as the architectural regulations mentioned were confined to the Kingdom of Prussia, and do not concern the German Empire. The mistake, we should add, is in the original letter as handed to us.

Lymington Sewerage Works.—The Local Government Board and the Board of Trade have approved of the scheme of sewerage prepared by Mr. James Lemon, M. Inst. C.E., F.G.S., at an estimated cost of 13,000*l.*, and we are informed the works will be proceeded with directly the necessary details and specifications can be prepared. The principle adopted is, that of conveying the sewage to the sea by means of an iron outfall on piles across the mud for a length of about a mile and a quarter. The high-level will be drained by gravitation, and the low-level lifted by centrifugal pumps and Crossley's gas-engines above the level of the high-water spring tides. A large flushing-tank is provided to flush the outfall, and six smaller tanks are provided to flush the main sewers.

RECENT SALES OF PROPERTY.

Table listing estate exchange reports with columns for date, description, and price. Includes entries for May 23, By JOHN LEES, and May 27, 19 1/2, By RICH BEES.

Table listing estate exchange reports with columns for date, description, and price. Includes entries for May 31, By RICH BEES, and May 31, By DALE & SON.

Table listing estate exchange reports with columns for date, description, and price. Includes entries for Hackney-50 and 52, Mare-street, copyhold, and North Bow-Ground-rents of 17 1/2, reversion in 52 years.

**Sewage Sludge at Lincoln.**—The Corporation of Lincoln, having been troubled for some time about the disposal of their sewage (more particularly the sediment), last year requested their City Engineer, Mr. L. A. MacBrair Assoc-Mem. Inst. C.E., to report upon the best steps that could be taken in the matter, at a moderate cost, as in these times they felt unwilling to incur the cost of purchasing additional land several miles out of the borough, which would be necessitated if they embarked solely in farming. After visiting and carefully comparing numerous sewage works in different parts of England, Mr. MacBrair recommended precipitation and the pressing of the resultant sludge by presses of the Brentford type, made by Messrs. Manlove, Alliott, Fryer, & Co., of Nottingham. The Sewage Committee, after consideration, approved of precipitation and pressing, and also being anxious, as fresh inventions are continually being produced, of having the best machinery for the latter purpose,—pressing,—visited the works at Wimbledon, Chiswick, Maidstone, Brentford, &c., the latter two places twice, and received detailed reports thereon from Mr. MacBrair and Mr. Teagus, the latter being the Waterworks Engineer to the City. These investigations resulted in the Brentford presses being selected. Messrs. Manlove, Alliott, Fryer, & Co. have consequently received the order for the presses at a cost of 1,450l. The detailed building and other plans are nearly ready, and the machinery has been put in hand.

**The Acton Drainage Scheme.**—The Acton Local Board, at its usual meeting on Tuesday night last, resolved to adopt the magnetic ferrous carbon system of precipitation in the treatment of the Acton sewage, and to enter into a contract, under certain conditions, for five years and a half with the International Sewage Purification Company, which has been recently formed for the working of this system. The experiments conducted at Acton several weeks ago, and fully reported in the *Builder*, were so satisfactory as to induce the Board, after visiting many other works in the Thames Valley, to adopt the above-mentioned system, though the Board retains the option to cancel the agreement at the end of the first six months and end of three years. It was stated by the Chairman of the Board that in consideration of the facilities which the Board had given the company to publicly try their system at the Acton Works special terms had been offered the Acton Board, and the request was made that these terms should not be published. The company undertakes to produce an effluent which will be at all times satisfactory to the Thames Conservancy Board. It is contended for the system that, as there is no lime used, the full manurial qualities of the sludge is retained, while no smell is created during the process of clarification.

**Southampton Deep Water Dock.**—Good progress is being made with the works in connexion with the dock, for which Mr. A. Giles, M.P., is the engineer. The sea-hank, necessary to reclaim an area of about forty acres of mud-flats, has been closed, and the contractors, Messrs. S. Pearson & Son, of Westminster, are now able to proceed with the work of the dock proper, the site of which was formerly under water. Plant to a very considerable extent has been placed on the ground, and employment will be found for many hundreds of labourers and others. It is contemplated having the whole of the works completed in about eighteen months,—a very short time for works of such magnitude. Night-work will be required and used to a large extent, and artificial light employed for illuminating purposes. The dock, of which the water area is to be eighteen acres, will be an open dock, i.e., tidal, and will have a depth at low-water ordinary spring-tide of 25 ft. Nearly 4,000 ft. of concrete wall has to be erected, 51 ft. 6 in. high, from the foundations, which are to be at a depth of 6 ft. 6 in. below the dock bottom. The approaches to the dock will be dredged to the same level as the dock, so as to give every facility to the largest vessels afloat for arrival and departure at every state of the tide.

**The Coldbath Fields Prison Site.**—The City Press states that Captain Panton, M.P., has received a letter from the Lords of the Treasury, stating that "part of the site of Coldbath Fields Prison is to be reserved for Post Office purposes, and until it is decided what part is to be thus utilised no decision can be come to with regard to the remainder."

**Large Sales of Building Land in Surrey and Middlesex.**—On Thursday week, the first portion of an ancient baronial estate, situated in the county of Surrey, at Byfleet, near Weybridge, was offered for sale in building plots, by Messrs. Baker & Sons. The property, which for many centuries past has belonged to Lord Pigot's family, and is adorned with choice specimens of cedars and various other species of ornamental timber, is at present being laid out for building upon. It is known as the Dartnell Park Estate, and is bounded on the east side by the river Wey, and on the north by the London and South-Western Railway and the Basingstoke Canal. The railway company are at present erecting a new station at Byfleet, close to the estate, which is to be opened in July, bringing the estate within half an hour's run from London. New roads, intersecting the estate, are now being constructed by Mr. Neal, road contractor, of Battersea. These roads are 50 ft. in width, and are all pipe-drained and metalled. Service water-pipes are all laid on, and, in addition, the owner is willing to provide an artesian supply. The number of plots offered on Thursday week was forty-three, the several plots having frontages ranging from 110 ft. to 140 ft., and containing an area of from three-quarters of an acre to an acre each. They were all submitted for sale without reserve, the stipulations providing that not more than one residence shall be built on any one lot, and that the cost of each house, exclusive of outbuildings, shall not be less than 700l. No trades or manufactories of any kind are to be allowed on the estate. The vendor undertakes, when half the entire estate is sold, to lay out a lawn tennis court, and to construct a boat-house and baths for the public convenience of the owners. All the plots offered were sold, the first lot submitted, consisting of a corner plot an acre in extent, realised 405l., the whole of the other lots, three-quarters of an acre in extent each, averaging from 130l. to 180l. each. The total proceeds of the sale amounted to about 7,200l.—On Monday last the same auctioneers offered for sale, in sixtynine lots, the Staines Lodge Estate, occupying a central position in the town of Staines, immediately opposite the station of the South-Western Railway. The plots offered have frontages to the main Kingston road, and to intended new roads, the frontages varying from 25 ft. to 35 ft. each. They were sold at prices ranging from 60l. to 80l. each, an hotel plot having a frontage of 50 ft. to the Kingston road and a return frontage of 165 ft., realising 200l. The total sum realised by the sale was 3,460l.

**The Local Government Board and Thames Valley Drainage.**—The Local Government Board has given formal notice of its intention to issue a Provisional Order forming the urban and rural sanitary district of Richmond into a united district for the purposes of sewerage and sewage disposal, and constituting a Joint Board as the governing body for the same; and that a clause will be inserted in the confirming Bill relieving the Urban and Rural Sanitary Authorities of Richmond, for three years after the date when the order comes into operation, of any liability for penalties under the Thames Conservancy and Navigation Acts for allowing crude sewage to flow into the Thames. It is not expected that there will be any opposition to the formation of this new Joint Thames Valley Sewerage Board, as it is formed simply for carrying out a definite scheme at a cost of 100,000l., designed by Mr. Melliss, C.E., and approved by the Local Government Board, for the drainage of the five parishes of Richmond, Mortlake, Barnes, Petersham, and Kew, which were among the twenty-one parishes included in the area of the now dissolved Thames Valley Main Sewerage Board. A considerable section of the people of Shirley memorialised the authorities, urging them to close the manholes in connexion with the sewerage system of the town, where there is at present an insufficient supply of water to enable these openings to be properly flushed. An official of the Local Government Board has, after inquiry, recommended that seventeen ventilating shafts should be erected on the side of the road to replace these manholes. The Sanitary Authority had already closed many of these manholes, and it seems the result has been there as it has been in many other places, some of the sewage gas was driven into the houses of the poorer classes where disconnected sinks, waste soil-pipes, and soil-pipe ventilators are the exception rather than the rule.

PRICES CURRENT OF MATERIALS.

| TIMBER.                                           |          |          |
|---------------------------------------------------|----------|----------|
|                                                   | £. s. d. | £. s. d. |
| Greenheart, B.G. ....                             | 5 10 0   | 7 10 0   |
| Teak, E.I. ....                                   | 8 0 0    | 12 0 0   |
| Sequoia, U.S. ....                                | 0 2 3    | 0 3 0    |
| As Canada .....                                   | 0 2 0    | 4 0 0    |
| Birch " .....                                     | 2 0 0    | 3 10 0   |
| Elm " .....                                       | 3 10 0   | 4 10 0   |
| Fir, Danisic, &c. ....                            | 1 10 0   | 4 0 0    |
| Oak " .....                                       | 2 10 0   | 4 10 0   |
| Canada " .....                                    | 10 0 0   | 6 0 0    |
| Pine, Canada red .....                            | 2 0 0    | 3 10 0   |
| " yellow .....                                    | 2 10 0   | 4 10 0   |
| Lath, Danisic .....                               | 3 0 0    | 5 0 0    |
| St. Petersburg .....                              | 5 0 0    | 10 0 0   |
| Wainscot, Riga .....                              | 0 0 0    | 0 0 0    |
| " Odessa, crown .....                             | 2 15 0   | 3 0 0    |
| Doals, Finland, 2nd and 1st, std. 100             | 7 0 0    | 8 0 0    |
| " " 4th and 3rd .....                             | 5 10 0   | 8 10 0   |
| Riga " .....                                      | 5 10 0   | 7 0 0    |
| St. Petersburg, 1st yellow .....                  | 8 0 0    | 13 0 0   |
| " 2nd " .....                                     | 7 0 0    | 8 0 0    |
| " white " .....                                   | 10 0 0   | 8 10 0   |
| Swedish " .....                                   | 0 0 0    | 0 0 0    |
| White Sea " .....                                 | 7 0 0    | 18 0 0   |
| Canada, Pine, 1st .....                           | 16 0 0   | 24 0 0   |
| " " 2nd " .....                                   | 10 0 0   | 15 0 0   |
| " " 3rd, &c. ....                                 | 6 0 0    | 9 0 0    |
| " Spruce, 1st .....                               | 8 0 0    | 9 0 0    |
| " " 2nd and 3rd .....                             | 5 0 0    | 7 0 0    |
| Doals—New Brunswick, &c. ....                     | 6 10 0   | 15 0 0   |
| Battens, all kinds .....                          | 4 0 0    | 10 10 0  |
| Flooring Boards, sq. 1 in., prepared, First ..... | 0 8 0    | 0 11 0   |
| " Second .....                                    | 0 6 0    | 0 8 0    |
| Other qualities .....                             | 0 5 0    | 0 6 0    |
| Cedar, Cuba .....                                 | 0 0 0    | 0 0 34   |
| Honduras, &c. ....                                | 0 0 3    | 0 0 34   |
| Australian " .....                                | 0 2 0    | 0 3 0    |
| Mahogany, Cuba .....                              | 0 0 4    | 0 0 7    |
| St. Domingo, cargo average .....                  | 0 0 4    | 0 0 6    |
| Mahogany, Mexican, cargo av. ....                 | 0 0 34   | 0 0 4    |
| Tobacco " .....                                   | 0 0 4    | 0 0 64   |
| Honduras " .....                                  | 0 0 34   | 0 0 64   |
| Maple, Bird's-eye .....                           | 0 0 6    | 0 0 8    |
| Rose, Rio .....                                   | 8 0 0    | 11 0 0   |
| Balsa " .....                                     | 5 0 0    | 12 0 0   |
| Bor, Turkey .....                                 | 5 0 0    | 12 0 0   |
| Satin, St. Domingo .....                          | 0 0 5    | 0 0 9    |
| Porto Rico .....                                  | 0 0 6    | 0 0 10   |
| Walnut, Italian .....                             | 0 0 34   | 0 0 64   |

METALS.

|                               |          |          |
|-------------------------------|----------|----------|
| IRON—Bar, Welsh, in London .. | 4 7 6    | 4 15 0   |
| " " in Wales ..               | 4 7 8    | 4 15 0   |
| " Staffordshire, London ..    | 5 10 0   | 8 0 0    |
| Sheets, single, in London ..  | 6 15 0   | 8 10 0   |
| Hoops " ..                    | 8 0 0    | 7 0 0    |
| Nail-roads " ..               | 6 15 0   | 6 10 0   |
| COPPER—                       |          |          |
| British, cake and ingot ..    | 42 10 0  | 43 0 0   |
| Best selected ..              | 44 0 0   | 44 10 0  |
| Sheets, strong ..             | 65 0 0   | 6 0 0    |
| Chili, bars ..                | 39 0 0   | 39 7 6   |
| YELLOW METAL ..               | 0 0 0    | 0 0 0    |
| LEAD—                         |          |          |
| Pig, Spanish ..               | 12 5 0   | 0 0 0    |
| English, common brands ..     | 12 10 0  | 0 0 0    |
| Sheet, English ..             | 13 10 0  | 13 15 0  |
| SPRUCE—                       |          |          |
| Silesian, special ..          | 14 7 6   | 14 10 0  |
| Ordinary brands ..            | 14 5 0   | 14 7 8   |
| TIN—                          |          |          |
| Straits ..                    | 103 0 0  | 103 12 6 |
| Australasian ..               | 10 5 0   | 0 0 0    |
| English ingots ..             | 108 10 0 | 10 0 0   |
| ZINC—                         |          |          |
| English sheet ..              | 0 0 0    | 0 0 0    |

OILS.

|                           |         |        |
|---------------------------|---------|--------|
| Linseed ..                | 21 17 6 | 22 5 0 |
| Cocunut, Cochin ..        | 31 0 0  | 33 0 0 |
| " Ceylon ..               | 25 0 0  | 25 0 0 |
| Palm, Lagos ..            | 21 0 0  | 0 0 0  |
| Espesced, English pale .. | 24 10 0 | 0 0 0  |
| " brown ..                | 23 0 0  | 0 0 0  |
| Cottonseed, refined ..    | 20 0 0  | 0 0 0  |
| Tallow and Oleine ..      | 25 0 0  | 45 0 0 |
| Lubricating, U.S. ....    | 5 0 0   | 6 0 0  |
| " refined ..              | 5 0 0   | 12 0 0 |
| TERRAZINE—                |         |        |
| American, in casks ..     | 1 9 6   | 1 9 9  |
| TAR—                      |         |        |
| Stockholm ..              | 0 14 0  | 0 14 6 |
| Archangel ..              | 0 11 6  | 0 12 0 |

TENDERS.

**BETHNAL GREEN.**—For new factory and stabling in Mount-street, Bethnal Green, for Messrs. G. H. Nicholson & Sons. Mr. C. R. Winter, architect:—

|                             |            |
|-----------------------------|------------|
| Higgs, Bethnal Green ..     | £8,987 0 0 |
| Thomson & Son ..            | 7,945 0 0  |
| Boyer, Hackney ..           | 7,449 0 0  |
| Wall Bros., Kentish Town .. | 7,067 0 0  |
| Shurmur, Clapton ..         | 6,975 0 0  |
| J. Anley, Dalston ..        | 6,370 0 0  |
| J. & J. Greenwood ..        | 6,273 0 0  |
| Perry & Co., Stratford ..   | 6,285 0 0  |
| Brass & Son, Old-street ..  | 6,773 0 0  |
| Morter, Stratford ..        | 6,743 0 0  |
| Jackson & Todd ..           | 6,449 0 0  |
| J. R. Hunt, Bow ..          | 6,100 0 0  |

**BETHNAL GREEN.**—For houses, White-street, Bethnal Green-road, E., for Mr. F. J. Dixon, Messrs. T. & W. Stone, architects, 2, Great Winchester-street, London, E.C.1.—

|                           |          |
|---------------------------|----------|
| G. W. Beale ..            | £380 0 0 |
| B. Wire ..                | 550 0 0  |
| G. Knight & Sons ..       | 518 7 0  |
| C. Forrest ..             | 538 0 0  |
| J. Godfrey & Sons ..      | 479 0 0  |
| F. G. Higgs (accepted) .. | 453 0 0  |

COMPETITIONS AND CONTRACTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

| Nature of Work.                      | By whom required.       | Premium.             | Designated to be delivered. | Page. |
|--------------------------------------|-------------------------|----------------------|-----------------------------|-------|
| Club Premises, &c., Scarborough..... | Constitutional Club Co. | 25 gs. and 10s. .... | July 16th                   | i.    |

CONTRACTS.

| Nature of Work, or Materials.                 | By whom required.      | Architect, Surveyor, or Engineer. | Tenders to be delivered. | Page. |
|-----------------------------------------------|------------------------|-----------------------------------|--------------------------|-------|
| Forming an Aree, and other Alterations ....   | Whitechapel Union..... | Official .....                    | June 14th                | ii.   |
| Steam Pipes.....                              | Windsor & Clapham Un   | T. W. Aldwinckle.....             | June 16th                | ii.   |
| Drainage Work.....                            | Stroud Union.....      | Official .....                    | do                       | ii.   |
| New Sewers.....                               | Conn. of Sewers.....   | Official .....                    | June 17th                | ix.   |
| Tar Pavement.....                             | Coblenham Local Bd.    | C. Pertwee.....                   | June 20th                | ii.   |
| Making-up Road, Stoneware Pipe Sewers, &c.    | Tottenham Local Board  | De Pape .....                     | June 22nd                | ii.   |
| Alterations, &c., to Post-Office, Falmouth .. | Com. of H. M. Works    | Official .....                    | do                       | ii.   |
| Sewage Works.....                             | Gt. Yarmouth Cor.....  | J. W. Cooker.....                 | June 24th                | ii.   |
| Reconstruction of Jetty .....                 | Lowestoft Town Council | G. H. Hauby .....                 | June 25th                | ii.   |
| Covered Service Reservoir .....               | St. Marylebone Grims,  | H. Saxon Snel & Son..             | June 27th                | ix.   |
| Painting and other Works, Darenth Asylum.     | Leicester Corporation  | A. & C. Hawkey ..                 | do                       | ii.   |
| Movable Street Fire Stations .....            | Met. Asylums Board ..  | T. De Courcy Misade ..            | do                       | ix.   |
| Sawing, Leveling, &c., to Road .....          | Horsley Local Board..  | Official .....                    | June 28th                | ii.   |
| Wooden Drill Shed, Island of Lewis .....      | Hawell Local Board..   | Admiralty .....                   | July 1st                 | ii.   |
| Sewage Works .....                            | Kingston R. S. A.....  | B. Latham .....                   | July 6th                 | ix.   |
| Enlarging, &c., Repairs .....                 | Schl. Board for London | Official .....                    | Not stated..             | ix.   |
| Completion of Tower and Erection of Spire ..  | St. Paul's Church,     | do .....                          | do                       | ix.   |
| Exhibition Buildings, Glasgow .....           | Forsbridge .....       | R. Griffiths .....                | do                       | ix.   |
|                                               | The Executive Council  | Official .....                    | do                       | ix.   |

**BICKLEY (Kent).**—For building new mission church at Widmore. Mr. E. Newton, architect:—  
 C. Hooley .....

**BROCKENHURST.**—For alterations and additions to house and stabling at Whitley Ridge, Brockenhurst, for Major Talbot. Mr. W. H. Mitchell, architect, Southampton:—  
 H. Sanders, Southampton .....

**CAMBERWELL.**—For additions and alterations to laundry, Camberwell House, S.E. Messrs. John Giles, Gough, & Trollope, architects:—  
 H. Ingram, Woking .....

**CREDITON (Devon).**—For re-seating and new floors in nave and aisles of the Parish Church of Holy Cross. Messrs. Hayward & Son, architects, Exeter:—  
 Hill Devonport .....

**DURLEY.**—For the erection of house, stabling, and lodge at Snakermore, Durley, for Mr. E. B. Bernard. Mr. W. H. Mitchell, architect, Southampton:—  
 Dyer & Sons .....

**EAST HAM.**—For new roads and sewers at East Ham. Messrs. Philip D. Tuckett & Co., surveyors:—  
 Rogers & Dickens .....

**HARGRAVE (Berks).**—For alterations and additions to the Little House, Hargrave, for Dr. Morell Mackenzie. Mr. Arthur Ardron, architect, 6, Poultry, E.C.4:—  
 Silver & Sons, Maidenhead (accepted) £297 0 0

**KENSINGTON.**—For the erection of a house, No. 1, Chaloners-street, West Kensington. Mr. Fras. L. Pither, architect:—  
 P. Edwards, jun., 262, Cambridge-road, £2,205 0 0  
 H. Ingram, Goldsworth - road, .....

**KINGSTON-ON-THAMES.**—For new roads and sewers at Kingston-on-Thames. Messrs. Philip D. Tuckett & Co., surveyors:—  
 Rigby, Croydon .....

**LEICESTER.**—For the supply and erection of about 925 yards lineal of a five-rail and post wrought wooden fence, bounding the road from the Catherine-street Viaduct to the Corporation Sanitary Depot, Leicester, on the Great Northern Railway land. Drawings, specification, and quantities by Mr. J. Gordon, M. Inst. C.E., Borough Surveyor:—  
 E. Taylor & Sons, Hinckley .....

**LEICESTER.**—For the supply and erection of about 710 lineal yards of wrought-iron hurdle fencing for the Corporation of Leicester at the Victoria Park. Drawings, specification, and quantities by Mr. J. Gordon, M. Inst. C.E., Borough Surveyor:—  
 H. Black, Barrow-on-Soar .....

**LEICESTER.**—For the construction of a Macadam roadway about 490 yards long, and consisting of a width of 14 ft. of Macadam, and dressed granite random channels 2 ft. wide from the Catherine-street Viaduct to the Leicester Corporation Sanitary Depot on the Great Northern Railway land. Plans, specification, and quantities by Mr. J. Gordon, M. Inst. C.E., Borough Surveyor:—  
 James Evans, Birmingham .....

**LONDON.**—For alterations at the Brecknock, Camden-road, for Mr. Williams. Mr. R. J. Brode, architect:—  
 Gould & Brand .....

**LONDON.**—For stabling, &c., at Arch-street, New Kent-road, for the London General Omnibus Company, under the superintendence of Mr. G. T. Latham. Quantities by Mr. A. J. Bolton:—  
 Lawrence & Sons .....

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 J. Barnes & Co., Stamford Hill .....

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 Knight, bricklayer .....

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 T. Heath, Orpington .....

**ORPINGTON (Kent).**—For the erection of new Sunday schools in the rear of the Baptist Chapel. Mr. St. Pierre Harris, architect:—  
 Higgs & Hill, South Lambeth .....

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 H. Somerford & Son, Clapham .....

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 Salter, London .....

**SHEPHERD'S BUSH.**—For alterations and additions to Brocragro Villa, 29, Goldhawk-road, for Dr. Campbell Pope. Mr. J. H. Hayes, architect:—  
W. H. Ashford & Co., St. Andrew's Estate, West Kensington..... £710 0 0  
[No competition.]

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H. Smith..... 498 0 0  
W. H. Smith..... 485 0 0  
Simmonds Bros..... 483 0 0

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T. Pick, Spalding..... 1,543 0 0 ... 851 4 6  
J. Moore, Jun., Spalding..... 1,527 0 0 ... 848 6 3  
C. Harrison, Spalding..... 1,507 0 0 ... 837 4 4  
S. Dawson, Spalding..... 1,498 10 0 ... 832 10 0  
E. A. Watson, Spalding..... 1,439 0 0 ... 800 0 0  
S. Hipwell, Wisbeach..... 1,420 0 0 ... 827 0 0  
J. Rowe, Peterborough..... 1,395 0 0 ... 785 0 0  
H. J. Osborne, Preston..... 1,382 10 0 ... 768 1 3  
J. Holmes, Wainfleet..... 1,355 0 0 ... 759 0 0  
W. Greenfield, Boston..... 1,290 0 0 ... 730 0 0  
E. Bowman, Stamford..... 1,290 0 0 ... 734 0 0  
W. H. Lyon, Stamford..... 1,170 0 0 ... 670 0 0  
\* Accepted.

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Prestige & Co., London..... 1,377 0 0  
Macey & Sons, London..... 1,370 0 0  
G. Almond, Burnham..... 1,348 0 0  
Silver & Sons, Maidenhead..... 1,350 0 0  
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T. King, Otlands Park, Surrey..... 508 0 0  
A. Newland, Cobham, Surrey..... 500 0 0  
H. Ingram & Son, Woking, Surrey... 480 0 0  
R. Wood, Cobham, Surrey..... 463 0 0  
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**WEST HAM.**—For house, West Ham Park, for Mr. W. R. Dodson. Messrs. T. & W. Stone, architects, 2, Great Winchester-street, London, E.C.:—  
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J. Walker..... 1,313 0 0  
G. W. Beale..... 1,225 0 0  
R. Edwards, Jun..... 1,125 0 0  
Dahls..... 1,090 0 0  
J. Howlett (accepted)..... 995 0 0

**Alterations, Alliance Bank, Battersea.**—In reference to the list of tenders which appeared in the *Builder* for May 21, we are asked to state that the amount of Mr. F. R. Turtle's tender was 1,163*l.*, and not 1,155*l.*

\* **SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 45, Catherine-street, W.C., not later than 12 Noon on THURSDAYS.

TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

J. S. (too late for this week).—E. A. R. (should send amounts in all cases).—"Pro Bono Publico."—R. B.—Sanitary Institute (too late this week).—D. M. W. B.—H. O. C.—A. G.—E. G. H.—W. F. B.—T. G. W. (cannot say at present).—F. T. B.—H. C. W. E.  
All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.  
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# The Builder.

VOL. LII. No. 2213.

SATURDAY, JUNE 15, 1887

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### The Edinburgh Library Competition.



HE exhibition of the competitive designs for the Edinburgh Public Library, in the Galleries of the Royal Scottish Academy, has been an event of some interest, both from the number and general quality of

the designs exhibited, and from the public attention which the exhibition has excited in Edinburgh.

The site is a somewhat peculiar one. It is a plot of ground to the westward of George IV. Bridge, but on the level of the Cowgate, which runs east and west under the bridge and at right angles to it. The main entrance and the main floor would almost necessarily be on the Bridge level, but the foundation of the building itself is two or three stories below this level. The site is thus a very suggestive one for bold and picturesque treatment. The natural way to treat it would seem to be as a building with more or less ornate stories at and above the level of the Bridge, with a lofty but plain basement rising from the narrower street below. A strong element of architectural effect and contrast is thus almost provided for the architects, though it is noticeable that few of the competitors have accepted this natural suggestion from the nature of the site, and hardly any of those have treated it with the boldness and thoroughness of which the site is susceptible, though there are several very fine designs among the number.

The main requirements are a lending library, a general reading-room and news-room, and a reference library, with subsidiary smaller rooms for ladies and juvenile readers, more or less separated from the main rooms, but in connexion with them. It seems an almost necessary consequence that the lending library, which is likely to have the most business, should be on the entrance level, and all but one or two competitors have treated it so; and the position of the reference library as the upper floor and the architecturally principal room has been accepted by every one. We will comment on the designs, as far as space allows, in the order of hanging; only omitting altogether some half dozen or so which are hardly worth consideration on their merits.

"Mark."—This, which comes first in the order of hanging, is one of the few Gothic designs in the room. The lending library and reference library over are placed in a block on the left; the entrance to the lending library, through a porch and vestibule and then by a

door to the left, is hardly sufficiently direct; and the whole of the public traffic to this and to the reference library above and the news-room below, passes over one not very large landing of the staircase,—not a very desirable arrangement. The design, in a heavy type of Gothic, has not much to recommend it, and the two towers on either side of the central gable do not arise out of any feature in the plan. The reference library would be deficient in light for readers.

"Progress."—Also a Gothic design, with suggestions of Scotch castellated Gothic, mingled with inspirations from Mr. Waterhouse. It is amusing to observe, since this eminent architect became so much accepted as a competition assessor, the practical appeals that are made in competition designs to what are supposed to be his architectural sympathies. This design has more refinement than the last-named, however, as far as the external architecture is concerned, but that is all. The plan is so full of absurdities as to arrangement and lighting that it is unnecessary to discuss it.

"Pro Bono Publico" shows a good deal of merit in plan. The large rooms are in a block parallel to Cowgate. The public access to the lending library is well arranged for the public, but badly for the attendants, who are too far from the books, and would be jostling each other in and out of the narrow door. The external design is of "Queen Anne" type, unpretending, and not unsuitable, and might look more attractive in a better drawing than in the hard mechanical perspective exhibited. Some supplementary light is obtained for the reference library through the side panels of the wagon ceiling; but this being a top floor, it might have been more effectively managed.

"Aldus" places the main block along George IV. Bridge, where it shows as a low block with two projecting wings, the sky-line entirely unbroken; there is some pretty treatment of the front wall in detail, but a total absence of architectural effectiveness as a mass: the section is better than the plans, and shows good arrangements for lighting the upper reading-rooms; the plan has a want of method, and is cut up with side passages and corridors in an awkward manner. The Cowgate façade is an absurd jumble.

"Triumphant Democracy."—This is one of the best of the designs. The author bestows a wider area on his library block than most of the designers, placing it at right angles to George IV. Bridge, and he has separate entrances for men and women at the opposite sides of his front, not, as in another case, two doors labelled "ladies" and "gentlemen," opening into the same small vestibule, but a completely separate door and a separate staircase for ladies. The front has two slightly

projecting wings with an area between, and the front space between these wings on the entrance-level is occupied by a large borrowers' lobby or ball, with the delivery counter along the inner side, the ladies' and gentlemen's lobbies opening into opposite ends of this hall. Above this hall, on the next floor, is the ladies' room, reached by its own staircase, which also gives them access by a separate door to the reference library on that floor. The reference library, of which one interior perspective is given, is a fine and effective room; the bookcase blocks, at right-angles to the wall, are made, so to speak, part of the architectural design, instead of being merely furniture; each block is terminated by a wide pilaster towards the room, connected longitudinally by a series of arches springing from corbels, and matching the arches of the side windows; the main cornice of the room runs along the inner edge of the projecting bays, which form a series of deep arched recesses. Ample light is provided from the large cove of the ceiling, entirely pierced with windows, with curved ribs between them, leaving a flat centre boldly treated in large panels. For the convenience of setting out the main ceiling ribs, they are made to spring from corbels on the keys of the arches, instead of from the intermediate pilasters, which are the real piers of the design; this has rather an odd effect, but it gets over the difficulty of treating the cove at the angles. For ventilation, the author proposes mechanical propulsion of warmed air by a Blackman propeller. The exterior is a dignified Italian design, in two stories, rusticated piers below and pilasters above; the wings would be much better with some kind of finish above the balustrade line, but considerations of cost probably prevented this. The lending library is a large room with a row of square piers and four-way bracket capitals forming an aisle on each side, under the piers of the reference library above; the room is left very empty in the perspective, probably to show it better, but we presume the central area is supposed to be available for bookcases.

"Bibliothèque."—This, again, is a different plan in method from the majority, the author occupying a great proportion of his area with the library rooms, arranged on a Greek cross plan, with staircases and subsidiary rooms at the angles. The main entrance is into a loggia across the front, with the main staircase occupying a large square pavilion to the right, and the staircase down to the general reading-room on the left; the public enter the lending library by a door immediately opposite the street entrance, and have the whole centre space of the Greek cross to manoeuvre in, with counter running all round, and the book-cases

in the arms of the cross. This gives very long counter space, and keeps the attendants close to the book-cases. The plan does not commend itself so much in the newspaper room below, where there is necessarily a deficiency of light in the centre space, the windows being all in the four bays of the room.\* In the reference library at the top, ample light is given by a glass dome over the central space. The ladies' room is got over the ground-floor corridor, a mezzanine between them affording a board-room, and on the same mezzanine are lavatories for the ladies' room and the librarian, cleverly got in and connected to the rooms by two small circular staircases. The style is Jacobean, or what we may most intelligibly denominate as "The prevailing style" at present. It looks as if it were meant to be carried out in terra cotta. It is shown in a very nicely sketched pen perspective, with the George IV. Bridge partly removed or cut through in section, in order to show the Cowgate elevation from ground to cornice. The interiors are not so effective nor so well drawn as in "Triumphant Democracy," nor are they so pleasing in treatment as the exterior, with which they are not entirely in keeping. For heating and ventilation, the author proposes low-pressure steam-pipes, with air passed over them, the heating being by direct radiation, and "a powerful exhaust-shaft" to remove the air, and this part of his report is somewhat vague.

"Habet."—As a bit of architecture this is one of the most pleasing designs in the room, shown in a very well executed pen perspective. It is a rather curious mixture of Gothic and Classic feeling; mullioned windows with Elizabethan ornamental pediments over them on the ground story; the upper story divided into bays by Classic pilasters, between which are circular-headed windows with geometric tracery in the heads. The projecting voussours in the archivolts of the windows would be much better omitted, and the mouldings carried round unbroken. A clock dormer, or what the French call a *fronton*, of graceful design, breaks the skyline in the centre. The lower part of the Cowgate front is treated very plainly, but still not with the marked character which the situation suggests, as aforesaid. The plan is not so satisfactory. The reading-room, not the lending library, is placed on the entrance level, on the left of a wide vestibule, and the ladies' room on the right, with no connexion with any of the rooms where books are kept except across this central corridor, or up or down the public stair at the back of it. The lending library is reached by going through the corridor and down the staircase at the back of the building; much too circuitous a route. The reference library runs in an L-shape, on the top floor, along both front and side of the plan, and is a very prettily treated room, with ample side light everywhere from large windows carried much lower than in most of the other designs, the author apparently thinking that with the long wall-space in his L-shaped room he could keep the bookcases low and yet give the necessary space. Our impression is that the shelf-room would be found deficient eventually.

"Non sibi sed Patrie."—A capital set of drawings, showing a front in what may be called a very Wren-nite manner; circular windows with square architraves in the mezzanine; circular windows without architraves in the attic; a projecting centre with rusticated ground story, and an order of pilasters above, with floral festoons between, and a segmental pediment over. The library area is square, and kept nearly unbroken as far as walls are concerned, iron columns and low partitions being used; thus, the magazine room is only a space partitioned off from the lending library

\* In reference to this question of light, we notice that Mr. Waterhouse observes in his Report:—"Which ever design is chosen, it would be as well if sections were prepared to show the amount of direct light coming through the windows of the lowest public room. It is clear that no direct light can reach the centre of a room, 60 or 70 ft. wide, the tops of the windows of which are 50 ft. below the cornice of the house opposite,—35 ft. distant. A contraction of the floor-space may therefore be wise under the circumstances, even though it involves somewhat decreased accommodation."

by a low screen between iron columns; good for light and air, but not conducive to quiet. The reference library is divided into two aisles by coupled iron columns on surbases, and carrying a semicircular arcade. There is ample top light, and the excellent interior perspective gives a most favourable idea of this room, as spacious, dignified, and well lighted. The news-room, with its large square area and side windows, must, we fear, be very deficient in light in the centre. The plan has practical merits in the way of simplicity and spaciousness, however, and the architectural treatment is exceedingly well carried out.

"R. S. A."—This has some merits of plan; the main library rooms are in a square form with an aisle and colonnade round them; a good interior sketch showing the proposed treatment of the news-room in Burmantofts faience is very pleasing, but the exterior, both in drawing and design, says but little for the artistic accomplishments of "R. S. A." The external treatment of the main central staircase is spirited in idea, but the detail and execution of the whole is poor.

"Space and Light."—The competitor under this title has shown immense diligence and energy, and sends in no less than three modifications of his design, filling quite a length of wall space. His design A 1 enters from George IV. Bridge with a large porch and vestibule in the centre of the front; the ladies' reading-room is on the right, and a staircase with an octagonal end facing to Cowgate on the left. The general reading-room is immediately behind, occupying most of the area, the ladies' reading-room having what is apparently a borrowed light from the main one,—not a good arrangement. The reference library is above, with the ladies' room in the same position, the lending library below; the public are admitted into the centre of the latter, with a counter running round, but the storage room for books seems insufficient, and the "juveniles," instead of having a separate room, have seats allotted to them in the general room; perhaps with the idea of their being better under surveillance. In connexion with the reading-room proper a special room for juveniles is provided. The reference library, the main compartment of which runs parallel to George IV. Bridge, has a paneled wagon ceiling, with skylights down the centre, which will give ample light. What is the sense of the capitals half way up the pilasters we cannot make out. It is lucky the author did not trust to his elevation, and that he had the well-executed pen line perspective to fall back upon. The elevation looks so wiry that it would be enough to condemn the whole set; but the perspective shows it in a much more favourable light. It is a curious design, mainly Gothic in feeling, though with a considerable smattering of Renaissance in detail; the large elliptical windows at the top are not very happy in effect; but the whole thing is marked by undoubted originality. A 2 shows a nearly similar plan, only with the staircase square-ended instead of octagonal, and a Classic design, which looks a great deal better in elevation than the other, and not so well in perspective; but the perspective sketch is an exceedingly rough one. A 3 is a somewhat more economical design on the same general lines, the elevation being cut down to a more level skyline. The author has shown a great many extraction-fines for vitiated air (we presume those coloured yellow are extractors), of a larger area than necessary for practical purposes; he proposes to exhaust by a fan driver, and says that "numerous openings for admission of fresh air are provided in all the rooms," but he says nothing about warming these indraughts of fresh air, only that he proposes to heat the building by means of steam-pipes placed round the rooms, &c. According to all we can gather from this, the occupants of the rooms would be exposed to overheating from a coil on one side and to a draught of cold air from another side, and the conclusion is that the author has made a show of ventilation and heating provisions in the drawings, without properly understanding how it is going to work. According to the state-

ment in the report, there are four alternative designs, not three; but these ramifications must have proved too much for us, or the committee have not hung the fourth one.

"For Health and Culture."—This is a prettily Renaissance building in front, with a back portion which does not seem the least to belong to the front, but to be another building. The library rooms run along the George IV. Bridge front, with entrance and staircase at the south-east angle; the rooms are rather small, the lending library far too small, but there is a large "well" storage apartment at the back of the building, for books, with a stair running from top to bottom of it, which is a feature in the plan; its usefulness depends very much on the way in which it is proposed to arrange and work the library. If there is supposed to be a large proportion of books to be carefully kept but only very seldom referred to, it is good; otherwise not.

"Study" deserves mention for the pretty Classic composition, with dome over the centre, shown in the brown ink perspective. The plan has nothing particular to recommend it. It is amusing to read on the corridor leading from the door marked "entrance for staff," the words also "separate entrance for ladies," the same corridor leading to the ladies' door of the lending library. If writing "separate entrance" on a plan made it separate, planning would be easy work.

"Index" is a very curious design of some ability, with some odd faults. A great deal of space is consumed on corridors and staircases, and the library rooms are somewhat limited in consequence, but generally the plan is well arranged. The front is of Roman Classic design, with a colonnaded portico on the main story, flanked by very massive blocks of rusticated masonry at the sides; but under these weighty angle masses is where the author has chosen to cut his main entrances, thus weakening the effect of the whole. Between the doorways is a rusticated arcade, and above the arches (and below the colonnade) break out three Classical bow-windows, as one may meet them, which light the ladies' room,—very inefficiently, it may be observed. At the Cowgate side appears to be another group of columns with rusticated surbases, standing apparently upon nothing; at least, there is no indication of anything on the plan. Altogether a design with a good deal of humour.

"Athenia" is to some extent an inspiration from the Bank of Scotland, which faces the end of George IV. Bridge, and may, therefore, be supposed to supply a kind of *genius loci*. The main block of the library portion is in a basilica form, running east and west, with the apse of the basilica facing George IV. Bridge, and the entrance and staircase of the right of the block. In the lending library the side counters are advanced in front of the line of the "basilica" colonnade, leaving a long, narrow alley for the public, an inconvenient shape, and we observe that in the perspective view this counter is omitted. The interiors of the lending and reference libraries look well architecturally, but the reference library would be sadly deficient in light for readers. The good point in this design is that the author has taken the hint from the circumstances of the site, and has made the whole of his building below the level of the bridge roadway one great mass of rusticated basement, with good effect.

"Supervision."—A design showing a kind of mingling of Queen Anne detail with Gothic effect; at least, the ponderous corbelled-out turret at the angle savours more of Gothic than of any other style. This feature is designed as a "well" book store, which gives a practical meaning to it. The library block is at the back, at right angles to Cowgate; the access to the rooms rather tortuous; the rooms themselves would be good ones; the reference library is both a well-arranged and (with its three glass domes in the ceiling) a light room. The author appears from the plans to have paid a good deal of attention to warming and ventilating, and to know what he is about in that respect, but his descriptive report is not attached to the drawings.

"Liber."—This is a design showing a good

deal of artistic feeling, so far as external architecture is concerned. The perspective sketches are executed in pen and ink, on a rather strong-toned tracing paper; the sketch looking from George IV. Bridge shows a solid ground-floor story of unadorned masonry, merely pierced with a few plain small mullioned windows, above which is a strongly-marked sill, forming the base to a series of rich traceried windows, with buttresses and arches and statues between them; pinnacles and an open Gothic balustrade over. A perspective from Cowgate is added. If the author had only carried all round this strong distinction between the plain basement and the rich upper story, he would have made a still better piece of work of it. The reference library is a lofty room, with a late type of hammer-beam roof over it. It would make a fine apartment. There is an alternative Classic design, which also shows good qualities, but the plan is open to a good deal of objection.

"Harmonia."—Why Harmonia? There is nothing specially harmonious about it as far as we can see. It is a design in rather commonplace Classic style, with an orthodox basement and order, and balustrade with great big flower-pots on the top of it. The point of merit in it consists in the special expression which is given by the treatment of the greater part of the upper story as unbroken wall, where the bookcases of the reference library are ranged. The plan is in the main a simple and well arranged one, at least so far as the main rooms and the access to them are concerned, except the "Juvenile Room," which is very badly placed, cut off from everything else by a passage with glass partitions, most awkwardly carried across to give access to the staircase from Cowgate level. This is a feature enough to vitiate any plan. The interiors of reference library and staircase are creditable pen drawings, showing well-worn features of Classic detail with nothing special to recommend them.

"Duomo" is noticeable for having a circular treatment of the whole library block, with an external colonnade, from which rises the domed roof of the reference library, the lower portion of the building forming a circle of larger diameter around it. The entrance is at the north end, and is marked by a graceful kind of minaret spire over it, which is not spoiled by being duplicated at the other angle. The lending library is on the entrance level, and the public are let into the centre of it, with a circular counter all round them. This does well enough, but in the rooms intended for reading and reference there is this objection to the circular form, that on a comparatively small scale it is a very noisy room, every whisper of conversation being intensified in it. This has been found to be a practical objection in similar cases, though it is not, perhaps, perceptible in a room on such a scale as the British Museum Reading-room.

"Bibliography" shows a very rich and elegant front elevation; an arcaded ground-story of a kind of Renaissance-Romanesque type, with round arched windows with mullions in them, and carved ornament in the spandrels; there is a strongly-marked architrave and cornice over this, and then a loftier range of mullioned windows between piers, relieved by statuary, and a small attic with *voiles-de-bois* and garlands over; this part of the design is stopped by solid turrets of nearly unbroken masonry at the angles. The whole shows great taste and refinement; and on the Cowgate front we observe that the first-floor architrave and cornice is carried round, and all beneath it treated as plain basement work. The portico leads from George IV. Bridge into a vestibule running across the front, terminating in a stair at each end, that on the left going down to the news-room, that on the right up to the reference library. The access to the lending library is immediately from the corridor. The plan is a very good one, and the reference library an effective room, well lighted from a sloping roof with large skylights, carried by richly-decorated semicircular ribs. There is a frieze of figures beneath the cornice on either side of the *voiles-de-bois* windows. The skylight windows are rather too bare and

bald, with their large sashes and straight bars; they require to be broken up and given more variety and richness of surface to correspond with the character of the room below. This is certainly one of the best designs here, practical and effective at the same time. The lanterns finishing the angle-turrets or pavilions of the front are a little commonplace; we should imagine the author could improve on those.

"Eliä" is a poor and commonplace design, about which we only feel bound to express any opinion because a local paper has thought proper to single it out for special admiration, and to state that the drawings are superior in execution and finish to any others in the room: a statement which can only possibly be explained on the supposition that the author has very energetic friends on the local press.

"Usui Civium."—A design with a good deal of merit. The library block is kept at the back, covering the whole width of the ground at right angles to Cowgate, the advantage of which is that the north side of the large rooms gets nearly clear of adjacent buildings and can be well lighted on three sides. To utilise the front space, however, the author has to be content with lighting the magazine-room, ladies' room, and others, from small open courts, and the access to the lending library, through a small passage between two of these courts or areas, is cramped and unsatisfactory. Once in the lending library, the pencil sketch shows it as a very commodious and well-lighted room; the reference library may claim the same praise, and has the merit which we noticed in another design, of making the bookcase blocks part of the architectural design of the room, though with a less bold and effective treatment than in the other case. The external aspect is shown in a nicely-tinted sepia sketch, the bridge being broken away to show the whole of the Cowgate side of the building; it is a Classic building with nothing remarkable about it, rusticated ground-story, and an order of coupled pilasters above; but it is graceful and suitable to its purpose.

"Regium Donum."—The two exterior alternative perspectives, one with cupolas over the angle pavilions and the other without, are elegant Classic groups, the former especially, but the details in the larger drawings, views of interiors of the libraries, are wanting in refinement, and the drawings rather showy than satisfactory. The plan is good in general idea, but with bad points in detail; for instance, the angle of the lending library jutting out into the hall opposite the entrance, looks very clumsy on plan, and would appear almost as much so in execution. The separate stair to the ladies' reading-rooms is not of much value, because they have to traverse the whole width of the hall or upper landing of the main staircase to get any books after all. Altogether the main attraction of the design is in the two small exterior perspectives.

"Desideratum."—A very fine and numerous set of drawings. The external design is of a Classic type, freely and picturesquely treated; a strong rusticated ground-story with semicircular-headed window designs, but the tympana of the arches filled in with sculpture, with an architrave window-head under; the angle portions form slightly projecting pavilions, with cupolas over them, and angle rustications, with sculptures as acroteria (N.B., the cupolas are too small and light for the substructure, and look out of scale). The centre portion has as a central feature a segmental pediment and Corinthian columns, and a high pyramidal roof rises over this portion, the whole being rather French in appearance. The plan is simple and effective, a spacious entrance vestibule giving access to staircases in the pavilions at each end and to the lending library opposite the entrance, which is very well arranged, with a horseshoe counter and plenty of space before it for the public; the two staircases give access to the reference library above, which runs down the centre of the building from George IV. Bridge to the back, subsidiary rooms, as ladies' reading, &c., opening direct out of it from each side. The room is very boldly treated internally, the cornice line runs into a semicircle, and the ceiling into a semidome at each end—an arcade is carried all

round the room, some of the tympana pierced with windows, and others being filled up with ornament in relief; a great panelled ceiling rises above the cornice, part of which is pierced by skylights. With all this the room does not seem in the drawing to be quite adequately lighted, but it is a very fine design, and the plan is admirably practical, compact, and simple.

"Lux," which is the last in order, is a Gothic design of rather florid type, and somewhat thin and wiry in treatment, but not without a certain degree of effectiveness. The best point in it is the treatment of the Cowgate elevation, which is kept very plain and solid, with a series of long buttresses rising from the lower ground-level to the upper story in strongly-marked vertical lines.


The limit of cost was 30,000l., and some few of the competitors have probably exceeded this limit, but we have avoided any special comment on individual designs in this respect, as it would be hardly possible to form a decisive judgment on this point without more detailed and protracted consideration of each design than time would have allowed.

Considering that the competition was limited to Edinburgh architects, the result gives a favourable idea of the general average of architectural talent represented beneath the smoke-breaths of "Auld Reekie."

\*\*\* Since the above remarks were written it has been announced that the first premium has been awarded (on the recommendation, as we understand, of Mr. Waterhouse, the assessor) to the design marked "Bibliothèque," by Mr. G. Washington Browne; the second to "Triumphant Democracy," by Mr. Dunn, an assistant in the Burgh Engineer's Office; and the third to "Harmonia," by Mr. J. Lumsdaine, principal assistant to Mr. Morham, Superintendent of Public Works. That two out of the three premiums should have been taken by gentlemen engaged as assistants under others is an unusual incident in the history of competitions, and argues a great deal of energy as well as architectural ability on the part of the authors, who must, we presume, have been carrying on their usual official duties at the same time. We are sorry to see that the proposition has been advanced that these gentlemen are not entitled to the awards on the ground that they are not "architects carrying on business in Edinburgh." The real object of the limitation in the instructions was obviously to restrict the competition to Edinburgh men. If the Corporation disappoint two men of the reward of their labour on the mere technical verbal objection that they are not themselves "carrying on business," they will do a very shabby thing. It is still more to be regretted that the principal mover of the objection appears to be the Superintendent of Public Works, in whose office one of the competitors is engaged. As long as the subordinate did not neglect his official duties for his competition design, we should have hoped the only feeling of his principal would have been gratification that he had so clever a man in his employ. We know nothing of the two competitors concerned, — never heard their names before; but they have given undoubted practical evidence of ability, and the proposal to deprive them of their premiums on a technical ground is not at all creditable to those who have set it up.

Mr. Waterhouse's report, we see from the *Scotsman*, has been referred to a sub-committee, who are empowered to select a plan for the Building, in consultation with the Library Committee.

#### PRESERVATION OF STONE.\*

 IMONTS composition, brought out in 1870, partakes more of the nature of a cement (like many others of the preparations that are being discussed) than of a protective fluid or paint. The material is directed to be made up of one thousand pounds of potters' earth, formed into a paste, with twenty pounds of any common

\* Continued from p. 893, ante.

oil, and four pounds of fish oil. Then a separate paste is formed from arachis (ground nut), which is spread over the previous compost, followed by the addition of eight pounds of finely-powdered charcoal and twenty-four pounds of coarse hair, which are well stirred in. There are several other similar compounds mentioned in the specification, in all of which oil of some kind seems to constitute the water-repelling ingredient.

The following are the remaining oleaginous preparations that have been patented or recommended:—

Egleston's preparation (1885, patent 9,087); so-called "fat oil" (oxidised linseed oil) is employed in conjunction with paraffin, vaseline, and sulphur. The mixture is used warm, and applied with a brush. Hibble's protective was made up of ground lime, turpentine, linseed oil, silicate of lead, and ground sulphate of iron. Another patentee suggests sulphur and linseed oil. Hardwicke's mixture contained potash, alum, fish and linseed oils. A paint to be applied hot, and which is made up of ten parts of wax, thirty parts of oil, and one part of litharge is considered worthy of mention in Knight's American Mechanical Dictionary. Provisional protection only was granted for the use of a varnish made up of shellac dissolved in naphtha or other solvent, to be applied specially to the preservation of magnesian limestone. Another suggestion was to mix any convenient resinous varnish with various metallic oxides. R. Alexander, in 1867, patented the use of mixtures of varnishes containing lime; and another patentee a few years later, the use of a varnish composed of the poisonous juice of Euphorbia plants.

Bituminous and similar preparations have also been utilised, and those which have been made the subject of patents are as follows:—Bethell's patent, chiefly available for wood, though also recommended for porous stones and cements, such as Portland, freestone, chalk, some marbles, plaster of Paris, &c., consists in the injection, under pressure, of mineral or vegetable tars, bitumens, &c., mixed or not with any suitable solvent. In some cases sulphates of iron or copper can be employed.

J. Teychenné, feather merchant, patented in 1846 improvements in treating stone to render it hard and impermeable, which improvements consist essentially in the immersion of the stone in hot melted mixtures of tar, pitch, &c., with fine sand. If the stone is not desired of so dark a colour, resin, turpentine, &c., are substituted for the tar.

In 1872, a process for saturating bricks, stones, &c., with boiled coal tar, pitch, and similar materials, was patented by G. H. Smith, of New York, who also obtained another patent which relates to the treatment of porous plasters, stones, works of art, &c., and by this process it is claimed that articles formed of plaster of Paris are rendered harder and more durable, and susceptible of a fine polish. The articles are saturated by immersion or otherwise, with materials such as coal-tar, coal-oil, melted or dissolved pitch, bitumen, &c., and subsequently heated until all volatile matters are driven off, and cooled slowly.

The use of ozocerite and paraffin wax, melted or in solution with suitable solvents, has also been patented.

In G. O. Kramer's patent, a mixture of boiled tar and sawdust is employed.

The class of expedients so far discussed are only in the most favourable cases capable of certain limited applications, and in not a few instances it is difficult to see with what object some of the ingredients are employed, yet, ineffective as a large number of them are, their consideration is instructive as showing the direction in which a large number of patentees have been working. A larger, more important, and certainly more scientific section of devices are those which have for their object the formation of some insoluble mineral compound upon the surface, either by acting upon an ingredient of the stone itself or by the reaction upon each other of the constituents of the mixture applied. Of course in every case regard must be had to the nature of the stone,

and further, the protective coating to be of any real good, should be harder (or at least as hard) and very much more resistant to atmospheric influences than the untreated stone to which it may be applied.

The silicates of soda and potash, commonly termed soluble or water-glass, may be regarded as the sheet-anchor of most seekers after a good mineral protector for stone surfaces, as in upwards of twenty patents these silicates play a more or less important part.

To M. Kuhlmann is generally ascribed the credit of having been the first to use silicate of soda for the purpose of protecting stone. This application, although it gave a good start to the employment of soluble silicates, was not so great a success as had been sanguinely expected. The river front of the Houses of Parliament was coated with the substance, but so slow was the union of the silica with the calcareous matter of the stone to form the desired insoluble and resistant silicate of lime, that a few winter months proved its inutilty.

Various attempts were next made to protect the silicate covering until union with the lime could take place. Szerelmezy, about whose method there seems to have been much unnecessary mystery, worked in this direction, and professed to cover the silicate with an asphaltum varnish; but there is little doubt, from Frankland's investigations, that various other paint-like mixtures were employed. A distinct step in advance was taken by Mr. Frederick Ransome, of Ipswich, whose indefatigable labours as the inventor of artificial stones are well known. Mr. Ransome applied alternately to the stone solutions of silicate of soda and chloride of calcium; in this way decomposition is effected at the surface of the stone, a white enamel-like silicate of lime being formed together with soluble chloride of sodium. The formation of a soluble salt in the above reaction is, of course, a serious disadvantage, and Mr. Ransome made several efforts to avoid its presence or modify its effect. One patent, applied for by this gentleman in 1860, which received provisional protection only, had for its object the decomposition of solutions of rosin, shellac, or other gums soluble in alkaline or saline solutions with soluble silicate. Further, in 1868 another patent was obtained by Ransome in which the use of objectionable alkaline salt was entirely avoided, as, in the place of an alkaline silicate, a solution of silicic acid or so-called "soluble silica" was employed; solutions of lime or baryta in water, or saccharine solutions of the same substances, were first applied to the stone and followed by the silicic acid solution.

In another process more complicated reactions were aimed at by the employment in succession of solutions of phosphate of calcium or of some aluminium compound, lime, or baryta water and solution of silicic acid.

Erichsen, Barff & Sullivan, Bartlett Bros., and other patentees give a distinct preference to silicate of potash as compared with the soda compound. In Barff & Sullivan's process the stone is treated with a mixture of alumina, carbonate of zinc, and silicate of potash. In the process of Messrs. Bartlett Bros. & Co., carefully-adjusted strengths of silicate of potash and aluminate of potash were used. If the solutions are not too concentrated the mixture hardens only after some time, forming insoluble silicate of alumina, but if too strong the mixture solidifies immediately, and before it can be applied to the desired purpose. With respect to aluminate of potash, we are reminded by its mention of an instructive incident which illustrates the value (?) of the examination made by the Patent Office of new applications. A year or two ago a chemist made application for letters patent for an improved disinfecting powder. Unusual delay in the granting of provisional protection caused inquiry to be made, when the agent in charge of the matter was informed that the delay was due to doubts on the parts of the omniscient examiner as to the existence of such a class of compounds as aluminates. The absurdity of such ignorance is evident in the face of the fact that every standard treatise mentions such compounds, which are also well known to every one having

the least pretence to chemical knowledge. Would it not be better to do away with the absurd farce of a preliminary examination which seems only to serve the purpose of providing salaries for several more or less competent individuals, and which certainly does not in the smallest degree add to the legal value of the patent.

The late Professor Barff, whose name has already been referred to, and who will be best remembered in connexion with his ingenious invention for producing rustless iron, patented a mixture containing silicate of soda, powdered pumice, and white lead, which applied as a paint forms a hard impervious coating on stone. Another patent by the same gentleman involved the use of a mixture of silicate of potash and soda, alumina and oxide of zinc. A few years later Barff recommended for the purpose of preserving and indurating cement, stone, stucco, &c., a mixture of sulphate of barium and carbonate of lime, together with silicate of potash, the object of using the sulphate of barium being to prevent the too rapid combination of the silicic acid with the lime, and so to secure the more complete impregnation of the surface of the stone with the mixture.

Professor Church in 1862 advocated a process in which a solution of silicic acid was first applied to the stone, followed by one of hydrate of barium. In 1884 M. Dennstedt obtained letters patent for a mode of preserving plaster and stone, which seems to include Church's method, as in this it is proposed to brush the surface over with various acids in aqueous solution, such as carbonic acid, sulphuric acid, silicic acid, or chromic acid; the application of any one or other of these to be followed by a solution of hydrate of barium, or less preferably hydrate of strontium, whereby the insoluble corresponding salt is produced.

A. L. Fleury preferred to use the silicic acid solution alone, taking advantage of the fact that as the water evaporates the silica becomes insoluble, and incapable of re-entering directly into solution with the water again. In the case of many calcareous stones, some formation of silicate of lime also results.

J. C. Russell's method, which secured only provisional protection, consisted in the production of a kind of artificial stone, made up of limestone mixed with soluble silicate, and then immersed in water, either pure or acidulated with hydrochloric or carbonic acid, or mixed with magnesium compounds, such as the mother liquors from salt-pans. The cement thus formed is dried, broken up, calcined, pulverised, mixed with water, and used as a paint.

Several patentees have worked in the direction of producing on the surface of the stones or bricks glazes or enamels obtained by the fusion of mixtures of silicates. The chief patents having this object are those of Summerfield, obtained in 1854; of the Viscount de Romanet, in 1876; of A. Gonault, in 1879, which applies especially to the glazing of sandstones; of C. Moreing, in 1880, also chiefly applicable to sandstones which were to be soaked in an alkaline solution, such as caustic soda and potash, dried, and then baked almost to vitrification, so that union between the silica, alkali, and any calcareous or ferruginous matter in the stone may be more or less completely effected. In another process, the stones, after being fixed, were to be brushed over with any moderately fusible enamel mixture, which was then to be melted with a hot-air blast, blow-pipe, or other means.

Hydrofluo-silicic or fluo-silicic acid, which may be regarded as a mixture of hydrofluoric acid and silicic fluoride, is an active agent in several processes. Thus, in Coombe & Wright's process, patented in 1861, this acid was used for coating stones, bricks, &c., being, of course, most useful where the substances treated contained materials capable of forming insoluble compounds with the acid.

In another process the stone was first washed with a hot solution of barium hydrate, or of bicarbonate of magnesium, and then brushed over with fluo-silicic acid.

Coombe & Wright, in a second patent, mixed



the fluo-silicic acid with lime, chalk, and other suitable materials, and used the mixture as a preservative paint, and for making artificial stone. In Sullivan's method, soluble fluo-silicates were employed, such as those of zinc and magnesium, and subsequently decomposed by application of alkaline silicates or aluminates. Faure & Kessler's patent (1883) refers chiefly to the use of fluorides and fluo-silicates of various metals.

Bernays also recommended fluo-silicic acid, the surface to be subsequently washed with a solution of a potassium salt so as to produce the insoluble fluo-silicate. Rust & Mossop's plan was to coat the surface first with a solution of hydrate of barium, and then with fluo-silicic acid.

Crookes proposed the use of a mixture of fuller's earth and hydrofluoric acid, the acid uniting with the alumina to form the insoluble fluoride.

The remaining processes are of no very great importance, and may be briefly enumerated. Daine's method (1854, pat. 1,765) involves the employment of a solution of sulphate of zinc, "to fill the pores and neutralise the tendency to alkaline efflorescence," and then, with a brush or exhausted case, a solution of sulphur in linseed oil or other suitable solvent is applied.

A process for preserving and indurating marble and other stone, and rendering it less liable to chip in working, was patented by Page in 1855, and consisted, first, in brushing over the surface a mixture composed of water, lime, and pearlsh; then carefully heating until quite dry, and while still hot rubbing thoroughly over the surface white beeswax. Another patent relating particularly to the hardening of plaster, utilises solution of barium hydrate, in which the articles are to be soaked for a few days.

Paul's processes, patented in 1857, effect the preservation of the stone by the application thereto of solutions of soluble aluminates, zincates, or alkaline solutions of phosphates of aluminium or zinc, the solutions being mixed before using with finely powdered carbonate of magnesium, chalk, silica, or other suitable substances. One would-be-patentee put himself to the trouble of trying to secure the monopoly of the use of a wash made of lime and salt and water. Others identified themselves with the application of sulphates of iron or alumina, the object being doubtless, in the case of stones containing carbonate of lime, to produce the corresponding less soluble sulphate.

In Douglas & Watson's patent a suitable solution of resin is applied and then a solution of alum. Solutions of soap applied to stone which is then treated with alum solution result in the formation of an insoluble coating of stearate or oleate of alumina, which is sometimes found useful in rendering stones, cement, &c., impervious to water.

In 1873, the application of a hot solution of alum as a preservative of stone was patented, and this might conceivably be useful in the case of some calcareous stones.

"Spence's Metal" perhaps, can hardly be regarded as adapted to stone preserving purposes, yet in some situations, especially when not likely to be exposed to a high temperature, it may be found useful as a damp-proof material. The "metal" is produced by melting powdered sulphides, chiefly those of iron and copper, with sulphur.

The following is a brief description of Westmacott & Perceval's elaborate processes for the purposes of preserving, strengthening, &c., plaster casts and natural and artificial stones. In the case of plaster articles, these, when dry are immersed in a mixture of sulphate of barium, borax, and boiling water, or in the case of walls the mixture may be applied with a brush. The object is to harden the surface. A second operation follows called the "sealing process," and consists simply in the application of shellac or other varnish. A further operation is termed the "permeating process," and consists in immersion in a bath of melted paraffin wax. For surfaces other than plaster the first process is omitted.

In 1880 A. Magaud obtained a patent for

the application to stone of the sulphates of iron, copper, or zinc, together or separately.

McMurris & Chambers, in their patent process, treat the stone with a mixture of earthy or metallic sulphates, and subsequently with a solution of fatty acids, the object being to form an insoluble soap on the surface.

C. Laboré plunges the stone into a solution preferably of sulphate of zinc and alum. The process is only applicable to those stones containing lime compounds capable of being converted into sulphates.

Spiller's method was proposed for magnesium limestone only, and consisted in the treatment of the surface first with superphosphate of lime and then with ammonia solution, the idea being evidently to produce amongst other results an insoluble double phosphate of ammonium and magnesium which will be, so to speak, held on to the surface by the hydrate of lime formed at the same time.

In concluding this summary of the subject it may be well to point out that it is futile to expect that any one particular preparation will answer equally well for every kind of stone. Even to obtain a moderately satisfactory result,—and this is all that is at present obtainable,—the chemical nature of the stone to be treated must be carefully taken into account, or the result in some instances will be a positive deterioration of its quality, and in others a waste of labour and material.

NOTES.



WHEN the Irish Crimes Bill is out of the way,—which every one, whatever may be his politics, devoutly hopes will be shortly the case,—some of the numerous Bills which have been introduced into Parliament will be discussed. There is not one which in many respects is more important than that to make further provision for technical instruction, which has been introduced by Sir H. Roscoe, Sir Lyon Playfair, and others interested in the subject. We suppose that no one will deny the need for greater technical instruction, but we fear that this Bill is but a crude attempt at reform. The subjects which are included in the purview of the Bill are (a) the use of ordinary tools, (b) commercial arithmetic, (c) commercial geography, (d) bookkeeping, (e) French, German, and other languages, (f) freehand and machine drawing. The Bill gives authority to any School Board or other School Authority to provide and maintain "day technical and commercial schools and classes for the purpose of giving instruction in any of the subjects set out in the schedule," which we have already enumerated. The first criticism which occurs is that two things are here mixed up which should be kept entirely separate, namely, technical and commercial instruction. The use of ordinary tools, and hand and machine drawing, ought not to form part of the same curriculum as foreign languages. The latter form part of a higher primary instruction; the former should either be taught in technical schools, or, so far as the very elementary part is concerned, in connexion with the ordinary primary schools. But the policy of obtaining funds in the same manner as for ordinary instruction in primary schools is a subject which requires to be carefully worked out. There is difficulty enough already in obtaining money for primary schools; to obtain further sums for technical education will be very difficult. That a discussion of this Bill in the House of Commons will be useful cannot be doubted, but it is not the least likely to become law. The subject must be dealt with in a Government measure, and the scheme must be a comprehensive one for the introduction of technical schools throughout the country. The grouping of school districts for the purpose of the higher technical education seems almost absolutely necessary, but, be that as it may, we repeat that the subject is far too important to be left to the initiation of private members, and deserves the careful attention of the Government.

THE section of the proposed Panama Canal, referred to in a former number of the

Builder (p. 861, ante) shows a maximum depth of cutting of 360 ft. at La Culebra. This depth, moreover, is measured on the centre line of a cutting aligned on the side of a hill; and the depth from the top of the slope must be considerably more. The point in question is in the centre of a district of about 7½ miles in length, comprising the sections of *Obispo*, *Emperador*, *Culebra*, and *Paraiso*; the total estimated contents of which amounts to 93 million cubic yards. As the attack on this prodigious mass must furnish the limit to the time for completing the canal (supposing funds to be forthcoming), any engineer would have made it the first point on which to set to work. Accordingly it was announced that work was to be commenced at "the hard-rock mountains of Culebra" in December, 1881. Up to June, 1886, the aggregate of 12,350,000 cubic yards had been excavated in these four sections. It is to diminish this almost inconceivable cutting that it has been proposed to introduce locks. It should not be forgotten that the tidal range of the Pacific, which amounts at times to over 27 ft., renders a canal without locks, like that of Suez, physically impossible. A tidal lock at Panama has been an integral feature of the scheme, and 480,000*l.* was allowed for the cost in the first estimate. The gates of this lock cannot be less than 40 ft. in height. The extent to which it is possible to raise the summit level of the canal by means of locks, if the matter be regarded according to the ordinary rules of art, is limited, by the supply of water, to a rise of 135 ft. This would still leave 225 ft. of cutting at Culebra. It is obvious that as the construction of locks is now spoken of as a matter for consideration, no very material diminution of the block of 81 million cubic yards left in this district last June is likely to have been since effected. Lieut.-Col. Lloyd, in 1827, ran a series of levels across the Isthmus, with a view of determining the relative mean ocean levels on either side. His work, which is in the possession of the Royal Society, gives a difference of 352 ft., by which the Pacific was higher than the Atlantic. The engineers of the Panama Railway, however, regarded the mean levels as identical. It is possible that difference of opinions may exist on that point, but the question is immaterial when compared to the known fact of the higher tidal range at Panama; nor is it justifiable to speak of the canal, under any circumstances, as without locks, as all vessels passing through it must lock, either up or down, at Panama, for at least twenty hours out of the twenty-four. The tidal range at Colon is, according to Colonel Lloyd, 116 ft.

THE report of a sub-committee of the National Health Society on the proposed "Sanitary Registration of Buildings Bill," which has been forwarded to us, is a very plain-spoken document, in decided opposition to the Bill in question. The Society opposes it on the ground that it will result in the creation of a new and unnecessarily numerous class of so-called "experts"; that there is no adequate provision for securing the real *bona-fide* competency of such experts; and that it is proposed to license "Sanitary Associations incorporated by licence of the Board of Trade." On this subject the Committee remarks:—"The licence in sanitary practice which the Local Government Board is required under the Bill to give to such an Association would clothe it in its corporate capacity with power to give an unchallengeable certificate of sanitary perfection. Associations of this kind exist nominally for the mutual help and protection of their members; but they are necessarily largely dependent for their financial success upon the amount of business in the way of sanitary inspection which their professional advisers and associates can develop. Looking to the fact that the Bill is being promoted by an Association of this sort, it is not unfair to assume that a primary reason for its introduction is to be found in the desire to foster the work and encourage the operations of such bodies." This has been very much our opinion from the first. The Bill is, we believe, essentially an advertisement.

A QUESTION was asked in the House of Commons, on Monday, relating to the proposed introduction into the Railway and Canal Traffic Bill of a clause compelling the railway companies to carry town refuse at a cheap rate. In alluding to this matter on the 4th inst., we deprecated the proposal as unreasonable; and it appears from the statement made by Baron de Worms that the Government take the same view, and do not intend to import any provision of this nature into the measure. They have, as it is said, failed to make it acceptable to the agricultural interest, who confidently looked for benefit in the Bill. Sir Richard Paget, at the meeting of the Central Chamber of Agriculture last week, stated that he should oppose the Bill from beginning to end unless they could get amendments introduced to render it of more practical benefit to themselves. What they look upon as the primary object of the measure is frustrated by any justification of lower rates for imported than for home produce; and that this position does not of necessity involve the adoption of a principle of strictly equal mileage rates, was clearly shown by another speaker,—Mr. Bell, of Newcastle,—at the same meeting. He said that what the farmers asked for was that foreign goods should not be carried over a greater distance at a less rate than home goods of the same class were carried over a shorter or the same distance. This is a reasonable demand, and it is to be hoped that the House of Commons will agree to amend the measure accordingly.

THE reply given by Lord Henniker in the House of Lords on Friday last with regard to the destination of a statue of the late Lord Idlesleigh throws a curious light upon the manner in which our public buildings are decorated. Interrogated by Lord Mount-Temple as to whether it was proposed to place the statue in the Central Hall of the Houses of Parliament or upon one of the pedestals in St. Stephen's Hall, Lord Henniker replied that, as representing the Office of Works, he was unable to give an answer to the question, but that the whole matter was in the hands of the Lord Grand Chamberlain! Lord Mount-Temple submitted that the question of the position of a statue in a building was eminently one for the decision of an architect, and instanced the case of the statue of Earl Russell in the Central Hall as an example of the mistakes which are made when professional advice is not taken in the selection of a site. Lord Mount-Temple's remonstrance evoked no echo among their lordships, who are content to leave the adornment of the palace in which they meet in the same hands as those which regulate Court entertainments. It may be safely averred that in no other civilised country in the world would such a way of arranging such matters be tolerated.

THE judgment of Mr. Justice Smith in the case of Wright v. The Wallasey Local Board (Law Reports, 18, Queen's Bench Division, p. 783) is worth noting. By the statute 17 and 18 Vict., c. 128 *seq.*, "No ground not already used as, or appropriated for, a cemetery, shall be used for burials. . . . within the distance of 100 yards from any dwelling-house." It was contended by the plaintiff that the words "dwelling-house" must include the curtilage and not the house alone. But this view the Judge would not accept. As he truly remarked, why should a burial be permitted within 100 yards of a house without a pleasure-ground or yard, and yet not within, say, 200 yards if it has these appendages? Whether 100 yards is in itself a sufficient distance seems to be questionable, but the statute is clear, and is made certain by this decision. If those who are competent to form a judgment consider the distance too short it is the duty of the Legislature to increase it.

NO. XXIV., the last issue of the *Wandtafeln* of Dr. Launitz, is the most interesting of the series. It represents a restoration of the Acropolis, and gives a view not only of all the buildings still remaining, but also the hypo-

thetical site and appearance of many of the monuments mentioned by Pausanias, which have long ago perished. It is, indeed, as a help to the realisation of this class of monuments that Dr. Launitz's work has its chief value. We all know, either from memory or photographs, what the ruins of the Parthenon and the Erechtheum, the Temple of Nike, and the Propylæa, are like, and if we want to picture them as they stood, new-built in the time of Pericles, we probably prefer the image of our own fancy to that of Dr. Launitz, for somehow his restorations remind us rather of Munich than Athens. But which of us, in thinking of the Acropolis, peoples it with all the motley throng of shrines and statues and votive offerings which met the eyes of Pausanias? How many could recall off-hand, ever so roughly, where the horse of Strongylion stood or the triple Hekate EpiPyrgidia of Alcemenes? And yet if we want to realise ancient Athens these and a hundred other monuments must not be absent from the picture. These restorations are, in fact, of service, not as satisfying the artistic sense, which they rarely can, but as a stimulus to a flagging historical imagination. Dr. Launitz's "Acropolis" is accompanied by an explanatory text, much needed by those to whom the account of Pausanias is not familiar. A ground plan of the Acropolis is to follow, giving details of the building only seen here in somewhat confusing perspective.

IN attempting the restoration of the Acropolis, topographers have at least a sufficiency of fixed points to start from in restoring the Agora; in the plain below, it is far otherwise. The most recent,—and, as it seems to us, far the most satisfactory,—attempt is the sketch given by Kaupert in the *Philologische Wochenschrift* (No. 18, 1887). In the brief text which accompanies the sketch, Dr. Kaupert clearly states the conditions of the problem. In the main, this restoration coincides with that of Dr. Curtius. He believes the Agora to have been a quadrangular space broadening towards the south, and lying in the hollow between the Thesean hill and the hill on which the Athena Archegetis gate now stands, and to the south the slopes of the Areopagos and Acropolis. This quadrangular space was divided, he believes, half-way by the street of the Hermae, the line of which produced would reach the Athena Archegetis. He takes the Stoa of Attalus as the eastern boundary of the northern half, in the same direction bounding the southern half he believes the Stoa Poicile stood. Immediately opposite the Poicile,—i.e., bounding the southern Agora on the west,—he places the Stoa Basileios, the Stoa Eleutherios, and the Temple of Apollo Patroos; bounding the Agora on the south, the little complex of buildings, the Metroon, Bouleuticon, and Tholos. Where he differs from Curtius is this. Curtius neglects entirely the so-called Hall of the Giants. Kaupert takes its east end as the west boundary of the upper Agora. Whether this Hall is to be taken into account or not can only be decided by a thorough excavation of its very substantial remains. How long are we to wait for this?

THE Chapter Coffee-house, in Paternoster-row is about to succumb to the fate which overtook its neighbour and contemporary, Dolly's Chop-house, about five years ago. Concurrently with the migration of the booksellers into the Row soon after the beginning of last century,—in succession to the tire-women and milliners,—the Chapter seems to have replaced Child's, on the southern side of St. Paul's churchyard, as the resort for proctors and the clergy. Dons and other University men in town, and the booksellers, soon followed. Here assembled the Witenagemot of the Wet-Paper Club. But it is also in connexion with Chatterton, Goldsmith, Bonnell Thornton, and Churchill that the Chapter will be remembered. Chatterton speaks of it more than once in his letters to his people at Bristol:—"I am quite familiar at the Chapter-house, and know all the geniuses there: a character is now unnecessary; an author carries his character in his pen." Again he writes from the King's Bench, May 14th, 1770 (shortly before his

death), to say that a friend he meets there has undertaken to introduce him to the young Duke of Northumberland with a view that he should accompany his grace on the grand tour: "hut, alas!" he adds, "I spake no tongue but my own." The Chapter is cited in "The Connoisseur" of January 31, 1754, as the haunt of "those encouragers of literature, and not the worst judges of merit, the booksellers." Some reminiscences of its literary and political frequenters during the period 1797-1805 are given by Alexander Stephens. These comprised the two Parrys, of the Jacobin "Courier"; Patterson, Pitt's mathematical tutor; the Robinsons, and Chalmers, their foreman; Alderman Waitman; Dr. Buchan, author of "Domestic Medicine," who with Dr. Gower compounded the famous punch; Walker, the rhetorician; and John Johnson, who, at 72, St. Paul's-churchyard (since the draper's shop), published Cowper's first volume of poems, his "Table Talk," and "Task," together with Newton's Olney Hymns.

MR. JOHN NOBLE has undertaken to endow a free library in Lower Marsh (*près* New Cut), Lambeth, with a gift, in honour of Her Majesty's Jubilee, of 10,000l. We learn, too, that the same borough is offered another free library, to be known as the "Durning Library," at Kennington; together with a site, for the same object, in Norwood. The Earl of Cadogan promises to contribute books to the value of 300l. to the proposed Free Library for Chelsea. Moreover, as tenant for life, his lordship will grant a ninety-nine years lease at a nominal rent of a suitable site for the building. Lady Cadogan supplements this gift with 50l. worth of books; her husband also has offered to contribute 200l. towards the restoration of the organ in St. Luke's Church.

SIGNOR GIACOMO BONI writes to the *Riforma* complaining that the canal front of a fourteenth-century palace at the ferry of St. Maria di Zobenigo, at Venice, has been recently newly plastered, and coloured the colour of rotten strawberries, with panels in imitation of relief, and white and dark lines, such as are usually seen under shop-windows. The Ca' Foscari, on the Grand Canal, erected towards the end of the sixteenth-century, and attributed to Maestro Bartolomeo Bon, the architect of the Porta della Carta, has been painted a uniform and dark red colour. The new colour, according to Signor Boni, does not harmonise with the plaster until the oil has become decomposed, and then instead of improving the colour deteriorates. Signor Boni advocates the use of plaster made with lime and ground brick, quite red and smooth, but not shining, which acquires very beautiful brown tints with age, and quotes Goethe's lines:—

"Was glänzt ist für den Augenblick geboren  
Das Aechte bleibt der Nachwelt unverloren."  
In conclusion, Signor Boni says:—"I hope that not only a material difficulty, but rather a persuasion that such things should not be done, will dissuade people from gilding afresh our ancient buildings. I hope that the new red plastering will be real plastering of red brick, not the colour of rotten strawberries or faded poppies; and, above all, if our fourteenth-century houses have a guardian genius, as the Cippolino quarries in the island of Eubœa had their marble Apollo, I hope that he will stay the hands of those who attempt to whitewash the mouldings and foliage of the arches and capitals."

THE vicar of Herne, Kent, has reprinted in a pamphlet form from the *City Press* of April 20th an account of Herne Church, with illustrations, for the purpose of raising funds for the restoration of the north aisle and the repair of the tower, the other portions of the church having been already restored. The cost of a new roof to the north aisle and the repair of the tower is estimated at 800l., of which sum 250l. has been collected. The plea upon which the vicar appeals to the citizens of London is that the church is the last resting-place of a former Lord Mayor of London, Sir

Matthew Philip, who died in 1470, and who, with his third wife Beatrice, is buried in the chapel of St. John the Baptist, commonly called the Milles Chapel, part of the north aisle of the church. The north aisle has a low-pitched lean-to roof, which is much dilapidated, and it is proposed to remove this roof and replace it by a span roof of an elaborate Gothic design. There appears no necessity for this alteration in the character of the roof; the aisles of churches in the Decorated and Perpendicular periods were commonly covered with lean-to roofs, and to substitute a roof of an entirely different design from the original roof seems an unnecessary and indefensible proceeding.

THE High Canons Estate, at Shenley, Hertfordshire, a beautiful property of about 810 acres, in Dacorum Hundred, has just been placed in the market. The out-farms and other holdings yield an income of nearly 1,800*l.* a year. The large sheets of water in the park were constructed during the proprietorship of Mr. T. Fitzherbert. In Shenley churchyard were buried the Rev. Philip Falle, the historian of Guernsey and Jersey; and Nicholas Hawksmoor, the architect of, *inter alia*, St. Anne's, Limehouse, burnt on Good Friday, 1850; Christ Church, Spitalfields; St. George's, Bloomsbury; St. Mary Woolnoth, Lombard-street; St. George's-in-the-East, Wapping; and the new inner quadrangle of All Souls, Oxford. He died on March 25, 1736.

THE Twyford Estate, of 916 acres freehold, traversed by the Itchen river, and lying two miles out of Winchester, between the high roads to Southampton and Portsmouth, was to have been sold at auction on Tuesday last. St. Mary's Church, Twyford, has been rebuilt, in the Transition style, by Mr. A. Waterhouse, R.A. At Twyford House Franklin is said to have written the story of his life: he was then a guest of Dr. Shipley, bishop of St. Asaph. In the Catholic school at Seagers House was educated Alexander Pope.

A CORRESPONDENT writes.—“One of the most extraordinary resolutions ever arrived at by a public body was perhaps that recently passed by the Ventnor Local Board. With a view to reducing the expenditure of the town, notwithstanding the strongest opposition on the part of the chairman and leading members, the Board resolved, by a majority of one, to give the whole of the officials three months' notice to terminate their engagements, discharge the gardeners at the Park, and invite tenders for keeping the grounds by contract, reduce the wages of the workmen and other employees by sums varying from 1*s.* to 4*s.* per week, suspend the flushing of the sewers, and directed that all letters intended for circulation within the district should be delivered by hand instead of through the Post-office! The Board afterwards offered the offices to the clerk at 20*l.* less per annum, the Surveyor at 50*l.* less, the Sanitary Inspector at 14*l.* less, and the rate collector at 12*l.* A discussion subsequently arising in which doubts were expressed as to the Board being able to make any alteration in the salary of the Inspector without the consent of the Local Government Board, who refund a moiety of the amount paid, it was resolved to allow him to continue on the full amount for the present time. On the decision of the Board becoming known, a petition was immediately prepared and presented at the following meeting by the Ventnor Medical Association, and signed by all the medical men of the district, asking the Board to reconsider their decision with regard to the surveyor (Mr. R. S. Scott), whose removal, after nearly eight years' service, would, in their opinion, be prejudicial to the interests of the town, but without effect, and Mr. Scott having accepted an appointment elsewhere, has already left the town, which will probably be without a surveyor for some time to come.” Our correspondent is responsible for the statement as to facts, but if they are correctly given, we may remind the Ventnor Local Board of one consideration which seems to have escaped them, viz., that Ventnor largely subsists on

the visitors who come there for health or pleasure. If they render the town less desirable as a resort to either of those two classes they may find they are quarrelling with their own bread and butter more effectually than they at all expected.

A VERY large work by Mr. Geo. Tinworth, a subject of life-size figures in terra-cotta, extending 23 ft. in length, has been on private view at Messrs. Doulton's this week. It is called a “panel,” but the word conveys a wrong impression: it is properly not a panel in relief, but a series of detached figures arranged in an extended composition, only one or two being attached to the background, the rest standing out on a tiled floor several feet in width from the background, conveying the general idea of a section showing the upper end of a room, with figures congregated on the floor. This is quite a different art from relief sculpture, and is to our mind a very doubtful experiment. It produces a realistic effect, in one sense, which seems to take it out of the category of ideal sculpture; when we see this tiled floor and the figures standing out on it, we almost expect to see them coloured and dressed like real life also. A bas-relief, or even an alto-relief, is a far more intellectual form of sculpture than this modelling of a company of figures standing about; and the objection to it is more felt on a life-size scale than on a small scale. Apart from this, the group, which represents Christ before Herod, shows all the same qualities of vivid and spirited realisation of the story which we have been accustomed to in Mr. Tinworth's smaller scale illustrations of Scriptural incidents. Herod and Christ are seated side by side, and the key to the expression and action of the principal figures is to be found in the words “Herod questioned with him in many words, but he answered him nothing” (Luke xxiii. 9). Carrying out this idea further, a figure, a kind of “remembrancer,” is introduced behind the king, with a scroll, supposed to be prompting or reminding Herod of various points on which to question his prisoner. The face of Christ seems to us expressive of dogged resolution and contempt, rather than the orthodox Christian meekness; but perhaps Mr. Tinworth, who has often shown his indifference to conventional readings, has and intends to express that idea. The remark that Herod “hoped to have seen some miracle done by him” has been expanded, in very dramatic spirit, into an excuse for inserting groups on either side of such persons and their friends and attendants. One of the best figures in the composition is that of the woman on the left who leans against the wall looking down sadly on the invalid on a couch at her feet; and on the right the group of the paralytic man on the floor and the others bending forward from behind him is very effective, and is the only really composed portion of the work, in a sculptural sense. Vivid dramatic conception of the scene, and realistic expression in the separate characters, are Mr. Tinworth's strong faculties; and these are among the most important elements in great sculpture; but they are not everything, and we do not call this sculpture in the highest artistic sense: it is something very clever and interesting, but it is not sculpture.

THE *Figaro-Salon*, which is being brought out in numbers by MM. Boussod, Valadon, & Co., and by M. Baschet, contains a large number of very beautiful illustrations of the leading works in the *Salon* of this year. The third number, which has just reached us, contains a beautiful reproduction of Heilbut's “*Jour d'Été*” among other things. The previous number contained illustrations of two pictures which have attracted much attention, the hospital scene by M. Gervex, and the painting of a rural wedding breakfast, “*Noce d'Ouvrier*,” by M. Fourie.

AMONG the suggestions which have appeared in the *Times*' correspondence, since the Opéra Comique disaster, for rendering theatres safer, an important letter from Mr. John Percy suggested the employment of

thin mild steel or iron (properly braced) for scenery, wire gauze for the drop curtain, iron framing, with perhaps a papier-mâché finishing surface, for the stage itself; Mr. Percy aiming at making theatres “unburnable.” His suggestions are well worth consideration, but we doubt whether anything would be considered a satisfactory substitute for the time-honoured “boards” on the stage itself. A suggestion of “B. M.” that there should be many wall-openings, filled in with thin stuff that can be broken through in case of fire, is ingenious; but he forgets that, for the safety of the property in the building, such a method could not be applied for final exit through the outer walls of the building, and therefore would only let people out of the auditorium to intensify the final crush at the real outer exits.

ARCHITECTURE AT THE ROYAL ACADEMY.—VIII.

1736, “Duko-street Mansions, Grosvenor-square,” Mr. J. T. Wimperis. A well-executed pen-drawing, showing a large block of “houses in flats,” sufficiently broke up by projecting bays to have a generally picturesque effect, but not presenting anything remarkable. The plan may be very well arranged, but there is nothing to show this. The treatment of the end of the block, with two large octagonal turrets standing out from the line of wall at the angles, and balcony railing carried across flush with their outer faces, is effective.

1739, 1747, “Statues for decoration of pediment, St. Vincent-street Buildings, Glasgow,” Mr. A. W. Bowcher. Pencil sketches of a series of small cupid-like figures with musical instruments, designed with a good deal of spirit, and which have this special merit, that, while they are sufficiently conventional and symmetrical for decorative effect, they show an attempt to do something special and original, instead of putting up mere lame repetitions of classical types of architectural sculpture.

“Chaines Church, Worcester: Enlarged and Restored,” Mr. Astou Webb. Two very well-executed pen drawings, exterior and interior, showing a small and unpromising Little Gothic church, with a low square tower. A small plan is commendably added, showing what is old and what are the additions, the latter consisting of a new north aisle and vestry in keeping with the rest of the building.

1742, “Drawing-room and Library: Steamship *Ormuz*,” and 1744, “Dining Saloon,” in the same vessel, Mr. J. J. Stevenson. These represent the internal woodwork fittings designed by Mr. Stevenson for this vessel. Reproductions of the drawings, which are by Mr. H. W. Brewer, were published in the *Builder* of June 4. The fact that an eminent architect has been commissioned to make designs for the entire fittings of the ship is one of the instances of the importance now attached to the decorative fitting up of passenger steamers; and no doubt Mr. Stevenson would ensure the good execution of the work, and the employment of the best profiles for the mouldings, &c., and the tasteful execution of the furniture. It does not appear, however, that anything special beyond these desiderata has been attained. The filling in of the windows in the drawing-room is pretty; but the general details show nothing beyond commonplace devices of panelling and pilasters. One would have thought that so special and unusual a commission might have suggested some attempt at novelty and originality of treatment.

1743, “Enlargement of Kew Church: Interior looking East,” Mr. Henry Stock. This is the interior view of what is shown externally in No. 1720; the drawing appears to be a well-executed water-colour; but is hung too high to be well seen; and here, as in the other view, we are left in the dark as to how much is original and how much is addition.

1745, “Competition Design for Proposed Church of St. Paul's, Kensington,” Mr. Edwin Dalry. A very well-executed water colour of a brick church, with red-tiled roof and tracery decorated windows, apparently the tracery in stone; the clerestory is diversified by a flat stone string at the level of springing of the window-heads, with cross-stripping in the brick-work above. There is nothing out of the way in the design, but it is well carried out as far as it goes, except that the two west end

buttresses disappear very awkwardly within the roof of the return buildings, which are carried across the lower portion of the west end.

1746, "The Tower of St. Ouen, Rouen," Mr. Arnold B. Mitchell. A monochrome drawing, a kind of geometrically symmetrical perspective, executed in the telling but rather mannered black and white method illustrated in No. 1687, to which we have already referred.

1745, "St. Alban's Shrine, St. Alban's Abbey, Herts," Mr. R. W. Paul. A very good example of free pencil sketching.

1750, "Cathedral of Tours," Mr. Aston Webb. Another free pencil sketch, but slighter; the western towers of the cathedral, with their peculiarly effective contrast of rich upper stories and lofty, plain, rock-like substructure, are seen from under a partly-broken arch which flies across the foreground. Nothing could be better chosen for a picturesque architectural sketch, but we are rather inclined to suggest that sketches for exhibition should be a little more finished than this.

1752, "Part of a Series of Windows in the Rajah's new Palace at Kolapur. 1. Sivajee's surrender to Jey Sing. 2. Sivajee and Sumbajee, his son, escaping from Delhi in baskets. 3. The goddess Bhowanee, in the temple of Purwuntum, interposes to save Sivajee from sacrificing himself"; Messrs. Ward & Hughes. These would be of interest as designs by English artists for glass in an Indian palace, but, being on a small scale, and bung at the top, it would be impossible to see them without a lorgnette. They seem to be groned in a spirited manner; we can discern no special indication of stained-glass treatment. They fill three window-heads of trefoil shape, with the upper foil terminating in ogee form.

1753, "Church of St. Luke: Decoration of Interior," Mr. W. Stirling. What Church of St. Luke? We always think these vaguely-named churches and houses with no locality given are imaginary, and existing as what the author would like to carry out. The drawing, a large coloured elevation, shows a bay of a church of rather nondescript style, a kind of round-arched Gothic. Flowers are freely painted on the stone ground of the walls, decorative flowers with symmetrical arrangement, but with a certain amount of variety in detail; above the arch is a painting with gold ground of the Adoration of the Magi; over each pier is a panel painting of a Saint; St. George and St. Agnes are the two represented; we presume these are intended for mosaic. Above is a stained-glass window with subjects from the Temptation and the Expulsion. The gold backgrounds make a glare in the drawing which would not be the case to the same extent in execution, and so far the drawing is unfavourable to the effect of the design; it is, however, even apart from this, rather too patchy and scrappy in effect, and wants concentration and the contrast of a little blank surface; but there is no doubt a great deal of originality in the design, and it is very well put upon paper.

1754, "Testcombe, Fullerton, Hants," Mr. W. D. Caroe. An elevation of a much-diversified, many-gabled, red-brick house, coloured so as to convey something of a pictorial effect, the ground-line given in section: not a bad way of illustrating an architectural design. The design is a mixture of red brick and wall tiling and half-timber gables, picturesque in appearance, and the drawing very well coloured; but as there is no plan, one can form no clue to the meaning of the various projections and gables; it is a picturesque conglomeration, that is all we can tell.

1756, "St. Clement's, Oxford: Parish Buildings," Mr. H. Wilkinson Moore. This is a very pleasant, characteristic bit of building; a small plan is added, showing the arrangement of the buildings, which consist of a long block containing the "parish hall," the end of which faces the street, and an adjoining block containing coffee-room, reading-room, &c. These are treated separately in the design, the small accessory rooms being treated as a domestic building, a street house of humbler order, in fact, and the end of the hall is shown with three large pointed windows high up, giving a "public-room" character; this upper range, we find from the plan, lights the schoolroom; the parish room, on the ground-floor, is lighted by square-headed mullioned windows, with long corbels between them, assisting to carry the upper wall, which is oversailing to some extent. Without any pretensions, the

building is a very good example of quietly picturesque effect arising naturally out of the disposition of the plan.

1757, "Design for Stained-glass Window," Mr. T. W. Bladen. A two-light window with a figure in each light, one playing a band-organ (not a barrel organ, *bien entendu*, but one of the small organs called in Mediæval parlance a *portatif*, as capable of being carried in the hand), the other singing; cherubic heads fill up the upper part of each light, and below the figures are scrolls containing lines from Milton's glorious little poem "At a Solemn Musick." The idea is good and the figures are graceful and expressive, but the colouring as shown in the drawing is rather dull and heavy in effect.

1758, "West Croydon Congregational Church: One of the Three West Windows," Mr. E. Frampton. This is a lofty and narrow two-light window, the effect of which is shown in a well-executed and effective coloured sketch, rather than drawing. Mr. Frampton, unlike the author of the last-named window, is obviously not afraid of his colours, and instead of trying to tone them down into respectable dullness, he puts them in brilliant masses, but well balanced and contrasted, and with very transparent effect in the drawing. The upper portion, which is one subject (though divided by the mullion), represents the Adoration of the Magi; the upper part shows the starry sky, forming a dark blue hack-ground relieved by powderings of stars; above this is some rich Gothic tabernacle work. Two smaller subjects are given below, one in each light. The treatment of the subject is suitable to glass; the figures are expressive and well designed; altogether this is one of the best bits of stained-glass drawing in the room.

#### THE CONGRESS OF FRENCH ARCHITECTS.

A BRIGHT sun and exceptionally fine weather, succeeding to the storm of the previous week, favoured the success of the fifteenth Congress of French Architects, which commenced its sittings on Monday, June 6th, at the Ecole des Beaux Arts under the presidency of M. Bailly.

As usual, the first day was devoted to preliminary proceedings, and the consideration of certain questions which periodically recur, and have a special professional interest, and which were again relegated to various committees for consideration. The subject of public competitions, so ably treated two years ago by M. Paul Wallon, assumes more and more importance from its close connexion with the subject of the "Caisse de Défense Mutuelle," the establishment of which was first set on foot in 1884, and which equally figures in the orders of the day of the present Congress.

Perhaps, by the side of other questions, such as those relating to professional charges, amnition, roads, artistic copyright, &c., one would have wished this year to see the question of theatre construction prominently brought forward. It is one full of practical importance and affecting many different interests. The Société Centrale could hardly overlook a subject which so much concerns the public safety, and some sound practical advice from the leading professional body might have influenced the measures to be taken by the Administration for the prevention of calamities such as that which has recently taken place.

M. Loviot, this year, undertook the review of the *Salon* architectural exhibits; but as the *Builder* has already spoken at length of these, we will merely here pay a tribute to the ability of the paper read, without going further into the subject. M. Loviot, who is the son-in-law of the lamented Duc, is a young architect of great promise, who has already obtained the Cross of the Legion of Honour for his restoration of the coloured decoration of the Parthenon.

The order of the day included a notice of the life and words of M. Ruprich-Robert, but M. Just Lisch not having had time to prepare his paper, was obliged to postpone his notice of the deceased architect to another meeting. We may mention here that M. Lisch succeeds Ruprich-Robert as director of excavations at the Arènes de Lutèce.

At the close of the meeting a subject was brought forward which considerably interested the architects who hold official relations with the State and the municipality. On several occasions Parliament has had to decide in

regard to votes of money occasioned by the cost of work exceeding the approved estimates. In order to obviate this for the future, the Minister of Public Instruction and Fine Arts has instructed the Prefects and other Government officials that they are not to accept from architects any plans which have not been completely and accurately made out in regard to detail and to the method of construction employed (including furniture in cases where that forms a part of the work), and in regard to the cost of the work. Besides this, the architects' proposals must in future include a final clause by which they bind themselves, on their *personal responsibility*, to confine the work, except on a special official order, within the cost first specified and sanctioned.

This is the general tenor of the Ministerial circular which came before the Congress for consideration. It is evident that on principle the Minister is perfectly right to wish to suppress an abuse, but it appears that this code is somewhat Draconic. When an architect undertakes work for the State there is an actual signed contract between him and the Minister. But such a contract should have a character of reciprocity, and if the architect is to be made responsible for excess of cost over the estimate he ought also to be the sharer in any overplus arising from a reduction of the estimated expense in carrying out the work. Upon this delicate point the Minister of Instruction is silent.

On Tuesday, June 7, the members of the Congress repaired to the Military Hospital of Val de Grâce, the last remnant of the celebrated Abbey founded in 1621 by Anne of Austria. The church, which is one of the finest monuments of Paris, was commenced in 1645 from the designs of François Mansard and Lemercier. Long interrupted by the troubles of the Fronde, it was completed in 1665 by Lemet, assisted by Gabriel Ledru and Duval. The Abbey, suppressed at the Revolution, has become a hospital of 900 beds. The rooms are large and airy, and the buildings surrounded by fine gardens. Some of the ancient apartments of Anne of Austria have been restored to the condition and appearance they presented in her time. A large court, separated from the Rue St. Jacques by a grille, and in which there is an absurd statue of the surgeon Larrey, which does little honour to David d'Angers, precedes the principal façade of the church, the decorative treatment of which recalls that of the Italian churches of the end of the sixteenth century. It is a fine example of the Jesuit style, which has inspired so many religious buildings in France, especially St. Gervais, the Sorbonne, Notre Dame des Victoires, &c. The style is one which does not shine either in simplicity of lines or in correctness, but it is not deficient in richness and dignity; and the dome, flanked by four campaniles, which is seen from far on the horizon of Paris, between the Pantheon and the Invalides, is remarkable for its graceful design and outline. The timber construction in it, which was in a very dilapidated state, has been reconstructed in iron. Internally the church, which the unsparing revolutionary band has despoiled of its rich decoration, looks to-day bare enough. It was transformed into a magazine at the Revolution, and was only in 1826 reopened for worship. The cupola is supported by four large arches and four pendentives. François Mignard decorated it with more than 200 figures, the largest of which are considerably above life-size. This gigantic composition is a kind of glorification of Catholicism. There should be noted also the paintings of Philippe de Champaigne and the splendid bas-reliefs with which Michael Anguier, the sculptor of the Porte Saint-Denis, has decorated the pendentives and the chapel arches. Under the dome is a high altar, the baldachino of which, supported by six great twisted columns, adorned with gilt garlands and palms, recalls that of St. Peter at Rome. The group in marble at the altar, executed by Lequieu & Desprey, is a repetition of the original group by Anguier, destroyed in 1793.

Last year M. Gosset, of Rheims, read a very able paper before the Congress on the ancient Christian basilicas, in which he traced the development of the dome, interrupted in the east by the fall of the Byzantine empire, and taken up again in the west on what he considered false principles, which destroyed the unity of the composition, and introduced common and conventional architectural forms in

place of religious symbolic ornament and mosaic pictorial decoration. Continuing the same class of subject, M. Gosset has this year presented an interesting study of the churches and mosques of Constantinople, fully illustrated, and which was listened to with great interest.

On the same day the Congress repaired to the atelier of M. Calland, the able decorator, whose works were exhibited some time since at the Union Centrale des Arts Décoratifs. The atelier is quite a museum, where the members saw, among other things, some important work executed for America, the fine cartoons for tapestries (intended for Gobelins), and the designs of work for the new Hôtel de Ville (in which M. Galland has his allotted place. These latter are carried out in accordance with the intentions of Ballu, the late architect; M. Galland, in the spirit of a true decorative artist, placing his idea in subordination to that of the architect. With many French painters the theory and practice of decorating is, unfortunately, very different from this.

On Wednesday, June 8th, the Congress met at the Luxembourg. As our readers are aware, the modern museum of painting and sculpture has been recently turned into the ancient crangerie, and the Palace of Marie de Medicis is now entirely occupied by the Senate. It may be worth while, in speaking of the visit of the Congress to this well-known palace to remind the reader of its dates and architectural origin. It was commenced in 1615 by Jacques Desbrosses, nearly finished in 1620, enlarged by Chalgrin in 1804; then, from 1831 to 1844, considerably enlarged again by De Gisors, father-in-law of the present architect, M. de Gondoin, and grandfather of M. Scellier de Gisors, himself an architect of eminence, and who was kind enough to conduct the party over the building.

It was De Gisors who built the chapel called "du Sénat," situated in the left wing, and decorated with some fairly good paintings by E. Gigoux, Vanhelet, and Abel de Pujol. Near this is the "Chambre du Trésor," erroneously called "Chambre de Marie de Medicis," the decoration of which is as old as the foundation of the palace. The ceiling, attributed to Van Hoec, represents the apotheosis of Marie de Medicis; the walls, arcades, and columns are decorated with medallions, figures, and arabesques on a gold ground, painted by Jean d'Udine and Van Thulden. Here were formerly preserved the most valuable archives of the Chambre des Pairs. We next visited the first floor, consecrated to the Senate. The first room visited was a committee-room formerly reserved for the sovereign, when about to attend the sittings of the Senate. The decoration is heavy and in bad taste, like most of the work of the reign of Louis Philippe, which has been termed the mahogany epoch, and which exaggerates still further the vulgarity of the style of the Empire. In 1879 the Salle du Sénat was altered with the object of increasing the number of seats. The side bays were built up and turned into triunes, and the room is lighted now from the cupola, which was formerly a surface covered with allegorical paintings. The decoration is rich and massive in character. In the midst of a hemicycle adorned with statues of eminent law-givers rises the President's throne, surcharged with decorative work in brass. This is the room devoted to the Council of Five Hundred. The architectural motifs, the occasional groups of sculptured cherubs, the medallions with cameo heads, &c., form a rather curious decorative medley; unity and harmony of effect being decidedly wanting. Behind this room is the library, the cupola of which is painted by Eugène Delacroix, with great power and effect. The "Salle du Trône" is very rich in effect, though a little overdone with ornament; the ceilings are the work of Brune, Balze, and Lehmann. Here the Peers formerly used to sit; to-day it is divided by partitions into committee-rooms. Various other rooms attracted more or less attention. In one are paintings by Cabanel and Flandrin, in another a fine ceiling by Jadin. Lastly, the grand staircase constructed by Chalgrin brought us back to the original starting-point of our inspection, which the exigencies of Parliamentary procedure had unavoidably abbreviated.

At 3 p.m. the Congress met again in the Hemicycle of the Ecole des Beaux Arts, under the presidency of M. Marteau of Lille, to hear a description by M. Maspéro of the most recent of the excavations carried on at Luxor under

his direction. M. Maspéro, who has been devoted from an early age to the special studies with which his name is connected, is still a young man, though with a very mature reputation. Since 1874 he has been Professor of Egyptian archaeology at the College of France, and his literary work is, of course, universally known. No one could be better qualified to expound the celebrated ruin of which his son-in-law, M. Gayet, has exhibited an interesting restoration in the architectural room of the Salon.

Taking the temple from its foundation,—that is, from the date of Amenophis III. and Rhameses II.,—M. Maspéro traced the successive enlargements, which made it, like other great Egyptian temples, almost a town in itself, and the centre of an agricultural industry. Then, towards the third or fourth century of the Christian era, the temple, which had already undergone the mutilation of the Ethiopians, was transformed into a church: a convent was formed within its precincts, and Christian emblems were engrafted among the hieroglyphics. Lastly, the Mohammedans came in their turn, suppressing the church and the convent, and constructing a mosque in the "dromos" in front of the temple. An Arah village grew up on the mounds of sand which engulfed the remains of the pylons and colonnades of the ancient structure. When the excavations were commenced, the *enceinte* of the temple enclosed a population of 3,000 inhabitants distributed among about eighty houses. The eminent Egyptologist described with picturesque realism all the vicissitudes of the excavations, and the difficulties presented both by the nature of the ground and the opposition of the inhabitants. Even now the expropriated house-owners, though they have received large indemnities, persist in endeavouring to regain a footing there. However, in two years, the French expedition has accomplished a great deal of work. Unfortunately, the mosque is still standing, and the population make a set opposition to its demolition. However, adds M. Maspéro, though we are at present prevented from pulling it down ourselves, the condition and nature of the ground are such that it will very likely demolish itself before long, without any further trouble to the excavators.

At the end of this lecture, which was much applauded, the Congress hoped to have heard M. Lavastre, the decorator of the opera house, who had promised M. Sédille to treat the question of theatre decoration. But, with a delicacy of feeling perhaps a little exaggerated, M. Lavastre had thought that it was more fitting, so soon after the dreadful catastrophe at the Opéra Comique, to adjourn the subject to some future date, and M. Saladin rose instead to give some account of the archaeological mission in Tunisia, which the Government had entrusted to his direction. This young architect,—whose excellent water-colour drawings in the architectural division of the Salon we have already mentioned,—conducted his audience through the curiosities of a region still little explored, the ruins in which form a useful complement to the study of the monuments existing in France. Bon-Chateau, ancient Utica, Dougga (where was a temple consecrated to Jupiter, Juno, and Minerva), Shebita (where some splendid mosaics have been discovered), Monastir, Soussa,—all bear witness that architectural evolution here followed the same lines as in France, and was under much the same developing influence.

Thursday, the 9th, was the day reserved for excursions beyond the city, and as this year one of the most picturesque routes of the environs of Paris had been selected, more than 150 members accompanied the excursion. Chevrenx, Dampierre, and les Vaux de Cernay included a fine collection of historical monuments of great interest. The Chateau de Dampierre is the princely residence of the Duc de Laines, whose funeral chapel, decorated by the sculptor Bonassieux, is attached to the modest church of the village. The chateau was built in the sixteenth century by the Cardinal de Lorraine, and rebuilt in great part in the eighteenth century from the designs of Hardouin Mansard, by the Duc de Chevrenx. The architect Duban restored it in 1840. The principal façade, of brick with stone dressings, rises from the *cour d'honneur* closed by a very fine iron grille. On the front of the main block, which is flanked by two turreted pavilions, is a central feature with a double order of

superposed columns, and a gable over. In the grand vestibule on the ground-floor is the "Penelope" statue by Carveier, which the artist exhibited in the Salon of 1849, when he was still a *pensionnaire* at the Villa Medici. On the first story, reached by a staircase with a wrought-iron balustrade, is to be seen in the bed-chamber of Louis XIII. a silver statue of that king executed by Rude. In one of the salons may be seen also a curious "Minerva" statue, in ivory, gold, and silver. The gardens, by Le Nôtre, are large and fine, the stables curious, the library an admirable apartment.

The Vaux de Cernay are better known to the public, and the Baronne Nathaniel de Rothschild readily gave permission to visit the ancient abbey founded in 1120 by Simon de Montfort, and which still comprises the remains of the church as well as of a long building which served as the monks' parlour. To say the truth the restoration of these buildings has not been happy, nor do we care to see modern habitations installed amid the *debris* of the Middle Ages. Thus, in a room full of decorations and furniture brought from pretty nearly everywhere, one comes on capitals and a vault of the thirteenth century, which look very much out of place in the midst of all the *bric-à-brac*. There is certain character of grandeur about the place, however.

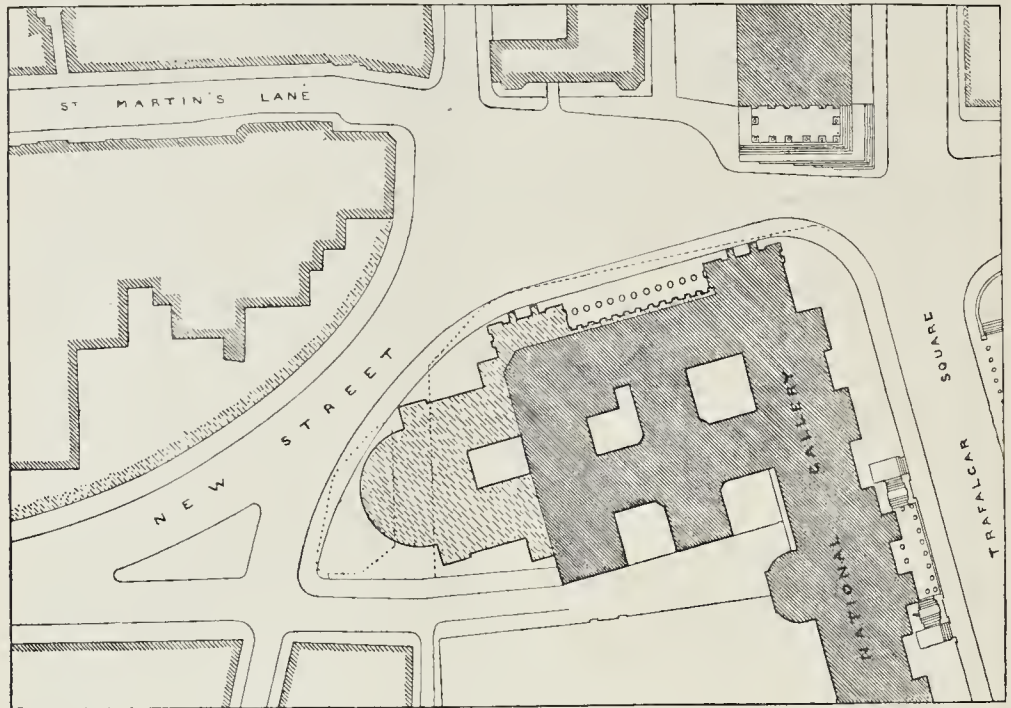
Generally, the last day of the Congress is devoted, in the morning, to the "Caisse de Défense Mutuelle," and after midday to the distribution of honours; but as the Académie des Beaux Arts holds its weekly meeting on the Saturday, there was this year an interruption in the order of proceedings of the last two days, in order to permit members of the Institute to be present at the presentation of medals. In consequence, the morning of Friday had been reserved for the Caisse de Défense, but the meeting did not give rise to anything specially worth record. The distribution of "récompenses" in the afternoon drew a very large attendance. M. Spuller, Minister of Public Instruction, who was to have presided, had to delegate his duties to M. Kaempfen, the Director of Fine Arts, who opened the sitting at three o'clock. He was supported by M. Bailly, President of the Société Centrale, M.M. Hermant, Questel, Lenoir, Gbarles Garnier, Paul Sédille, De Joly, Echernier (Lyons), Martean (Lille), Hénard, Paul Wallon, Galland the painter, Vicomte Delaborde, &c. After some words of welcome from M. Bailly, M. Kaempfen, in a short extempore speech, retraced the work of the Congress and rendered homage to the two eminent deceased architects, Le Soufflot and Ruprich-Rohert, and uttered a warm eulogy on the indefatigable energy of M. Bailly, "le cher et vénéré maître, toujours jeune de corps, d'esprit, et de cœur."

On M. Questel it devolved, in his capacity of "Censeur" to the Société Centrale, to speak of the life and works of M. Soufflot, his professor in the same post, who was a pupil and collaborateur of Duban. We have already spoken\* of the work of Soufflot, and of his success in the practice of domestic architecture, and the great influence which he exercised upon it.

Then M. Paul Sédille, in the name of the "Jury des Récompenses," proclaimed the names of the laureates of the Société Centrale. The Silver Medal, instituted by M. Soufflot for good work in domestic architecture, which, said M. Sédille, is the prose of the art, as monumental architecture is its poetry, has been awarded to M. Louis Charles Boileau, who directed the works of the Magasins du Bon Marché. This is not the sole title of M. Boileau to artistic honours, as he took the first premium in the competition for the monument to Gambetta,—for the architectural portion of it, that is to say,—the sculpture being the work of M. Aulé.

The second silver medal was decreed to M. Garros, of Bordeaux, pupil of Constant Dufrenoy, for his numerous private houses, all remarkable for the study and invention displayed in them. In addition to this, M. Garros has acquired such a reputation in the South of France, and is regarded with so much confidence, that he is never asked to make an estimate, his clients contenting themselves with indicating a sum which is not to be exceeded, and which never is. Another pupil of Constant Dufrenoy received the medal for archaeology, M. Chipiez, who is well known by

\* "Letter from Paris," Feb. 5, p. 211, ante.



Suggestion by the Institute of Architects for adding to the National Gallery and laying out the New Street behind it.

his publications on art and antiquity made in conjunction with M. Perrot. The silver medal for jurisprudence was given to M. Alfred Normand, author of some esteemed works on architectural jurisprudence. We may remark the fact also that M. Normand was the designer of the curious Pompeian house which was built for Prince Napoleon in 1860 in the Avenue Montaigne.

The silver medal offered to the École de France at Athens has been awarded, on the representation of the Académie des Descriptions et Belles Lettres, to M. Gustave Fongères, member of the École, for his important work in the excavations at Delos.

After these various awards, which the Société gives every year by way of indicating that the architect must be at once archaeologist, juriconsult, and artist, MM. Eustache and Bernard, both pupils of M. Ginain, obtained the silver medals given by the École des Beaux Arts. M. Raphael, pupil of M. Paulin, has obtained the silver medal given by M. Van der Boyen to the private schools of architecture; M. Judas, pupil of M. Ruprich-Robert, received that of the Rolland foundation in favour of the École des Arts Décoratifs; and, lastly, the silver medal founded by M. Sédille for artistic industries has been awarded, with general approval, to M. Froment Meurice, the able silversmith, who continues so admirably the artistic traditions of his father.

There is always a great interest manifested in the awards to the apprentices and to the building artisans, the "personnel du bâtiment." This year again we have seen, not without emotion, old, grey-haired labouring men coming up, at the call of M. Wallon, to receive in a trembling hand the medal awarded as a recognition of many long years of loyal service. The list of these old servitors is a long one. They have been faithful and zealous coadjutors with the architect; and one of them, already an aged man, was accompanied by his father, a venerable octogenarian, whose button-hole was adorned with a red ribbon, attesting that in that family honours were hereditary. As usual, also, M. Wallon found ready and eloquent words in which to welcome the modest heroes of labour, and to satirise the so-called humanitarian theories which, in reality, repre-

sent the negation of talent, the encouragement of ignorance, and the decline of art.

Saturday, the 11th, the last day of the Congress, was set apart for a visit to the works of the Great Exhibition. So much information as to the progress of the works has been given in these columns from month to month, as to render it unnecessary now to enter into details. The visitors were received by M. Alphand, who, after having exhibited the plans and indicated the position of the principal buildings, conducted the party over the various workshops. MM. Bonvard, Formigé, Eiffel, and Dutert successively did the honours of the particular works they are directing; the first, for the Palais des Expositions diverses, the second for the Palais des Beaux Arts, M. Eiffel for the enormous substructures of his metallic tower, and M. Dutert for the Palais des Machines, the works of which, however, are not sufficiently advanced to be of much interest to visitors at present.

In the afternoon M. Charles Lucas, who, along with MM. Merindol, Daumet, and Rolland, represented the Société Centrale des Architectes at the Congress of Sociétés Savantes held last month at the Sorbonne, presented, as in former years, an account of the proceedings at that meeting.

Among the subjects treated at this Congress may be mentioned especially a short paper by M. Daumet on the necessity of introducing some ideas upon art into the course of primary and secondary education in France, and a dissertation by M. Lucas on the origin of the plans of the round and polygonal churches still existing in France.

After a very well filled week, the members of the Congress, as usual, dined together at the Hôtel Continental, thus closing the Congress of this year.

**The Simplon Tunnel**—The Swiss Cantons of Vaud, Valais, and Freiburg, have signified their intention of contributing respectively 100,000L., 40,000L., and 80,000L., to the Simplon tunnel. Geneva and Neuchatel refuse to contribute, but it is considered that the prospects of this scheme being realised are more encouraging than was recently the case.

**PLAN FOR LAYING OUT THE STREETS AROUND THE NATIONAL GALLERY.**

The accompanying plan represents the suggestion of the Royal Institute of British Architects for laying out the new street behind the National Gallery, and making additions to the gallery. Something good might be made of the new colonnade on the east and the proposed large apse on the north side of the gallery, but it is a pity the Institute did not suggest such a remodelling of the east side of the gallery as would have enlarged the narrow neck of street between it and St. Martin's Church.

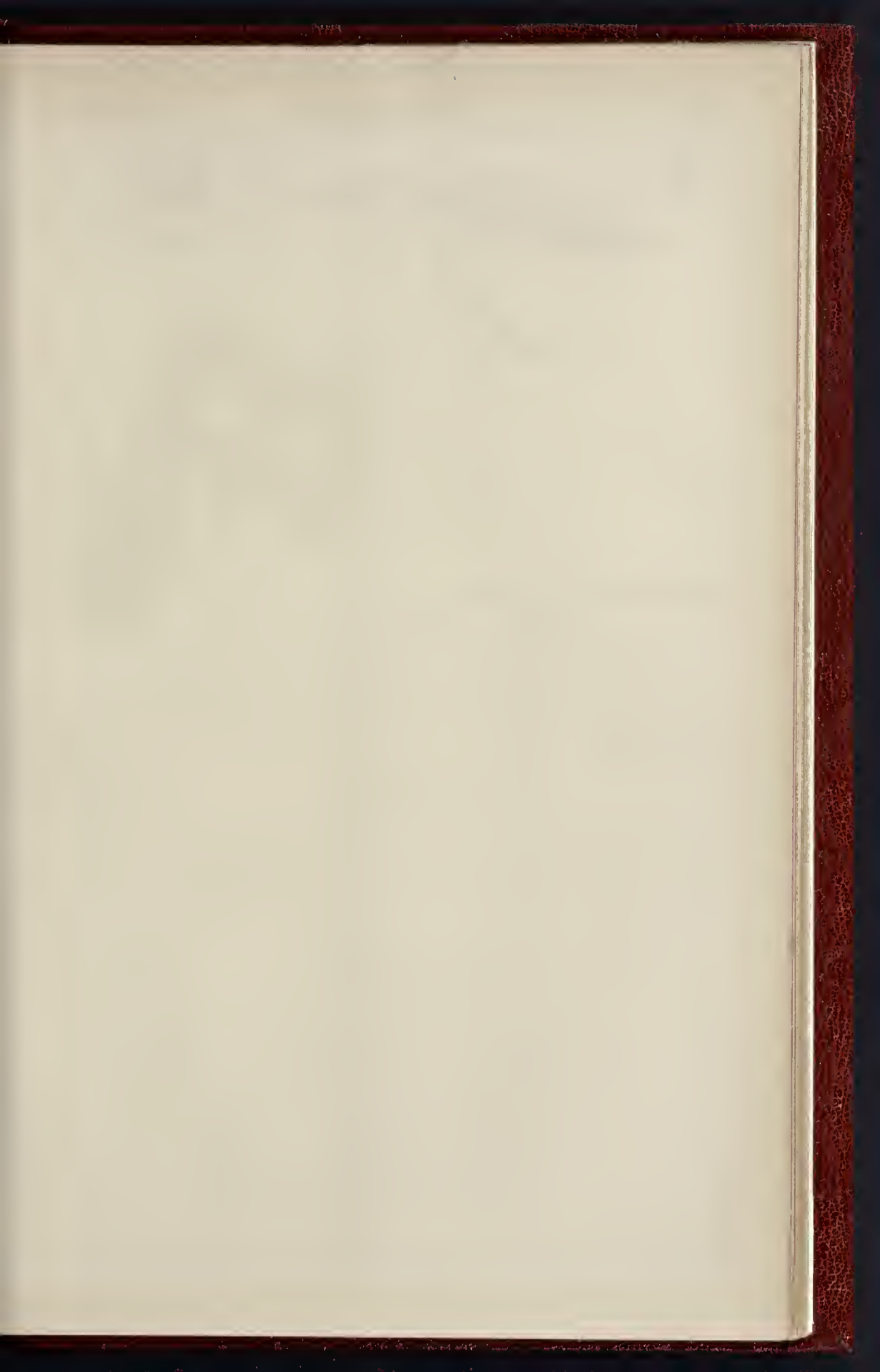
**Architectural Association Visit to Cambridge.**

The following is the programme of the Association's visit to Cambridge this Saturday, June 18th, under the guidance of W. M. Fawcett, F.S.A.:—

|                                              |            |
|----------------------------------------------|------------|
| Leave Liverpool-street.....                  | 8-45 a.m.  |
| Arrive at Cambridge.....                     | 10-3       |
| Christ's College.....                        | 10-30      |
| Round Church.....                            | 11-0       |
| St. John's College.....                      | 11-30      |
| Trinity College.....                         | 12-30 p.m. |
| Causes.....                                  | 1-30       |
| Senate House, &c.....                        | 2-0        |
| King's College.....                          | 2-15       |
| (Luncheon in Hall.)                          |            |
| Clare.....                                   | 3-45       |
| Queen's.....                                 | 4-15       |
| St. Katherine's.....                         | 5          |
| Corpus and St. Bene's.....                   | 5-20       |
| Church.....                                  | 5-20       |
| Pembroke.....                                | 6          |
| Peterhouse and Little St. Mary's Church..... | 6-30       |
| Tea.....                                     | 7          |
| Depart for London.....                       | 7-51       |
| Arrive in London.....                        | 9-10       |

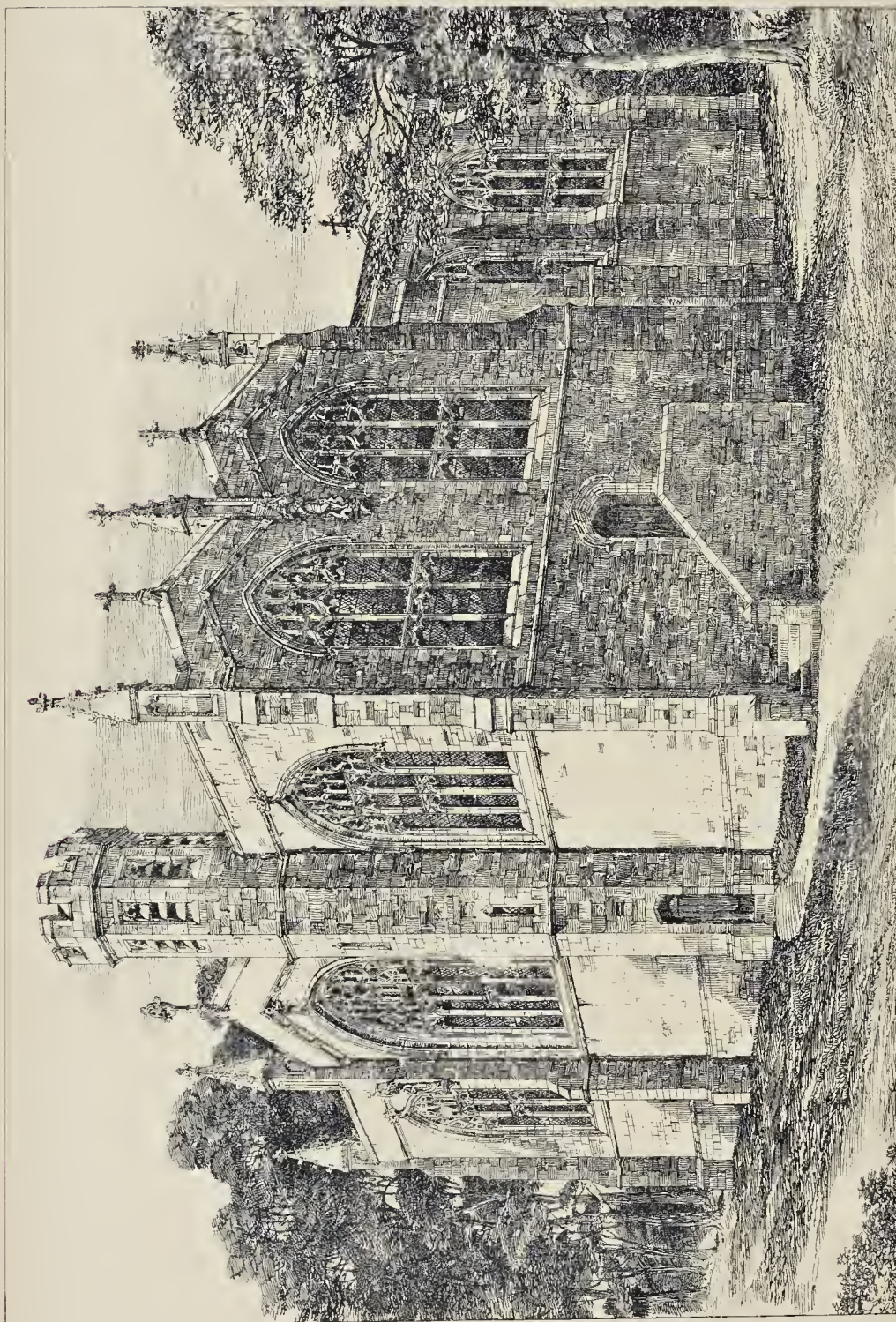
Those members who have not sent in their names to Mr. Leverton must be at the station by 8-30.

**Purity of Sand.**—Herr Lieven has called attention in *Dingler's Journal* to the fact that the presence of turf or humus in sand used for the preparation of cement mortar completely prevents hardening. A mortar thus prepared has no resistance, remains quite soft, has a saponaceous touch, and displays brown exudations, resembling a kind of jelly. He calls attention to the absolute necessity of seeing that sand is free not only from clay, but also from organic substances.



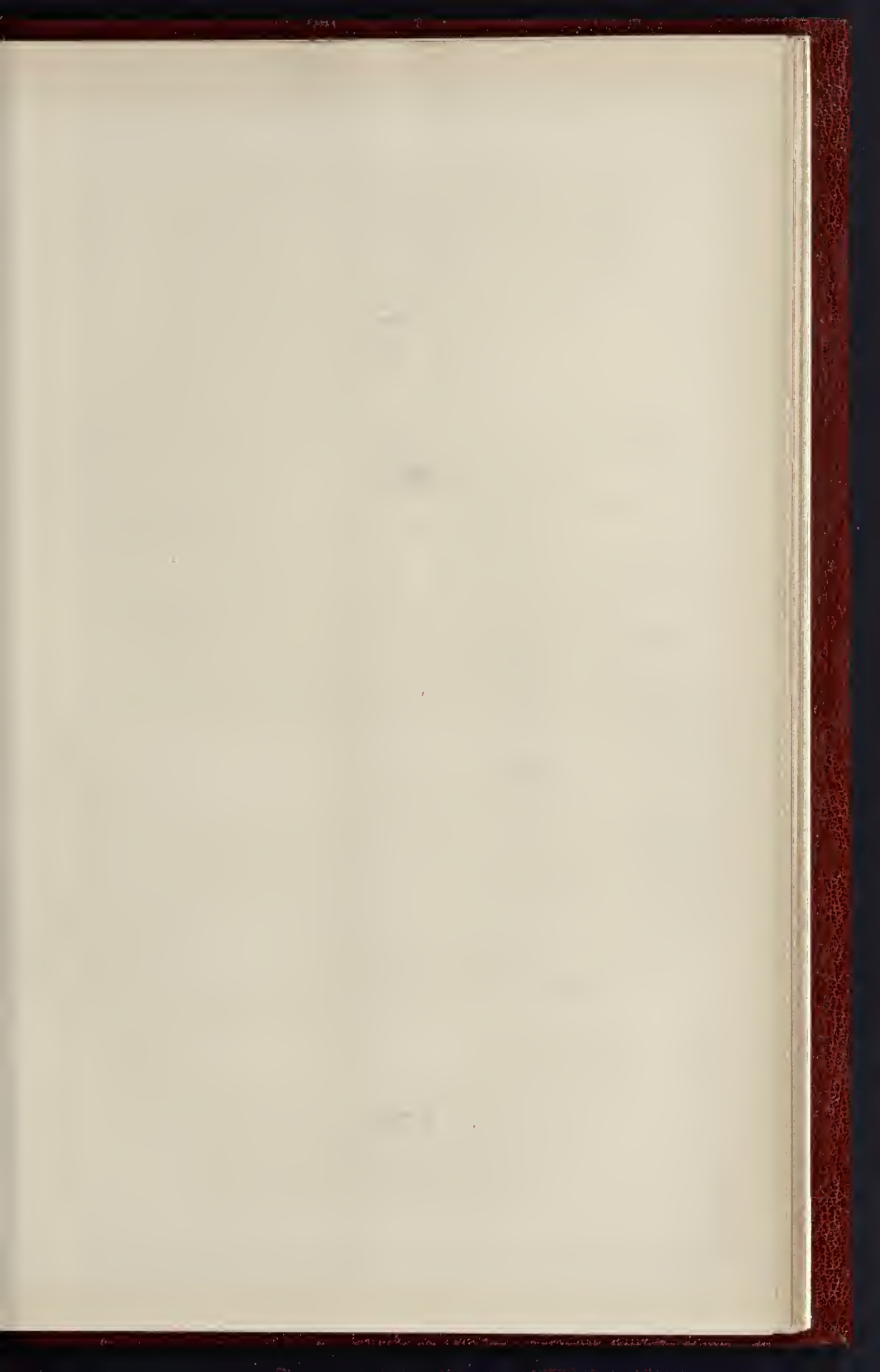
THE BUILDER, JUNE 18, 1887.

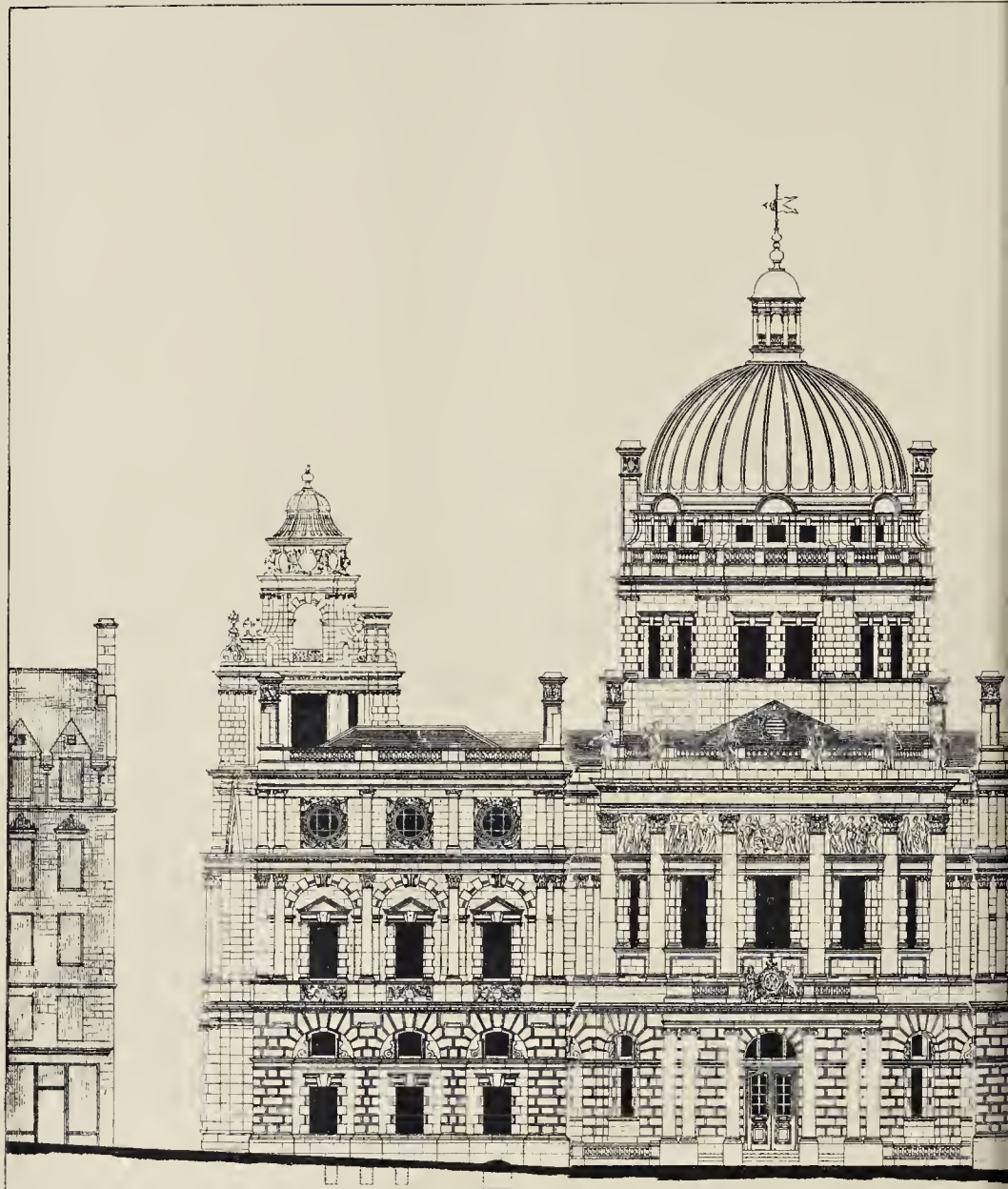
THE BUILDER, JUNE 18, 1887.



CHURCH OF ST VINCENT DE PAUL, MILL HILL.—Mr. FRANCIS W. TASKER, A.R.I.B.A., ARCHITECT







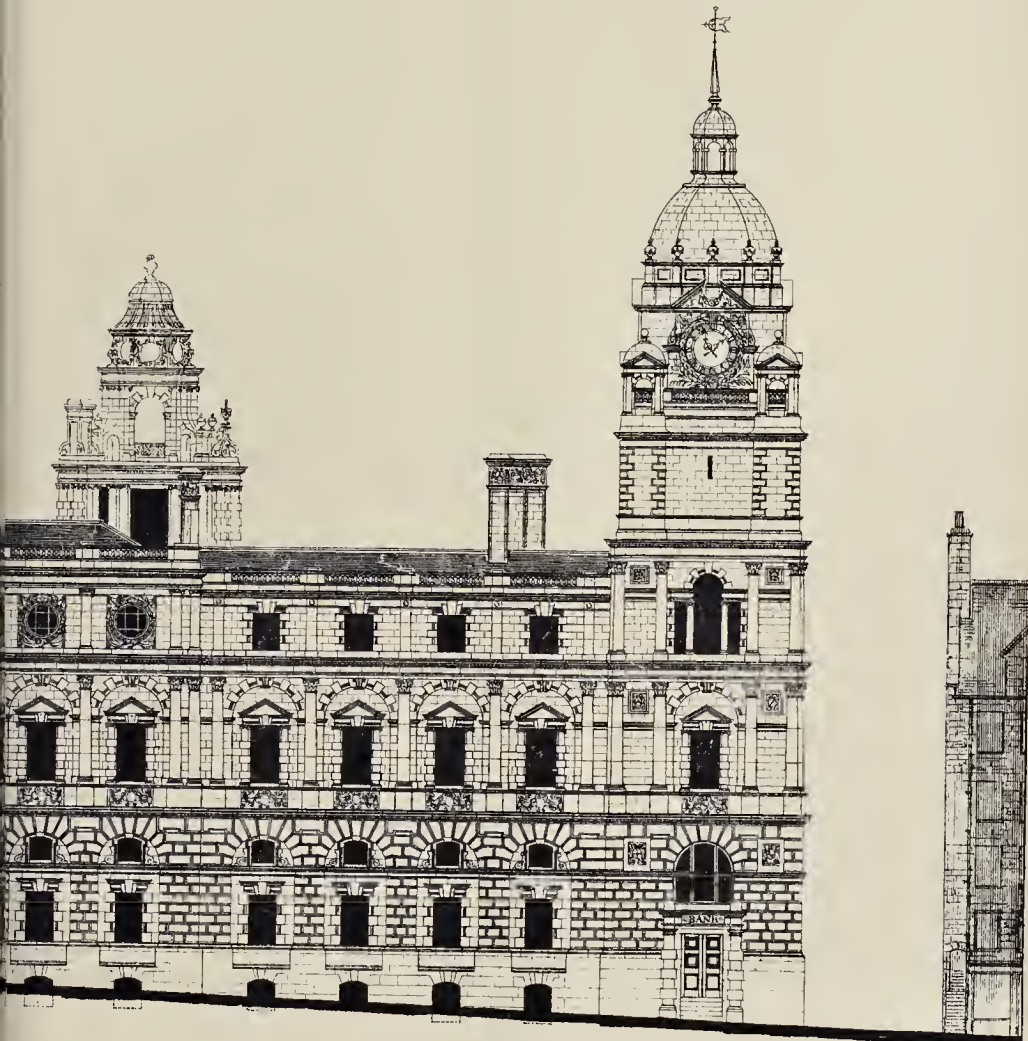
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EDINBURGH MUNICIPAL BUILDINGS; DE



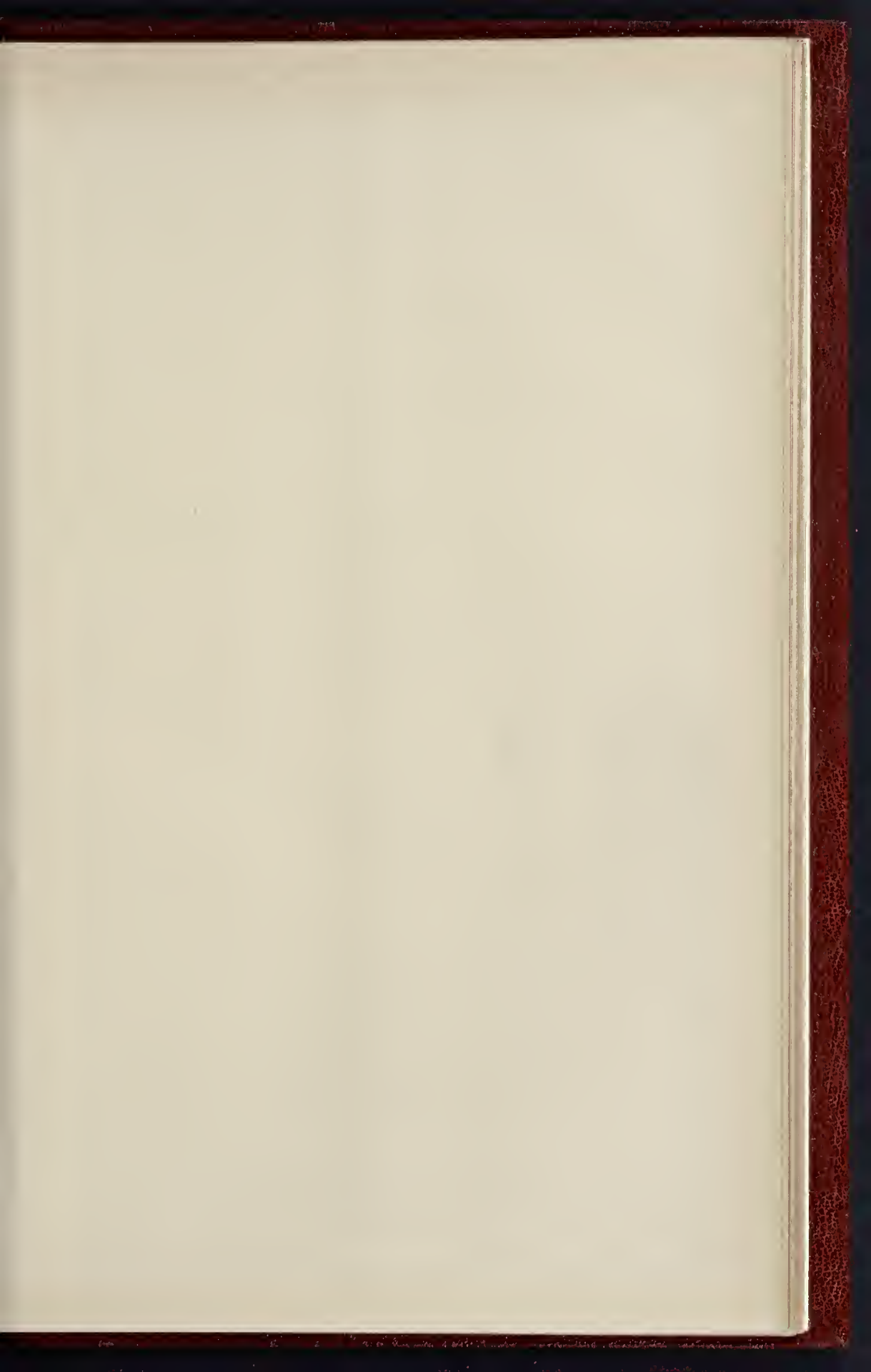
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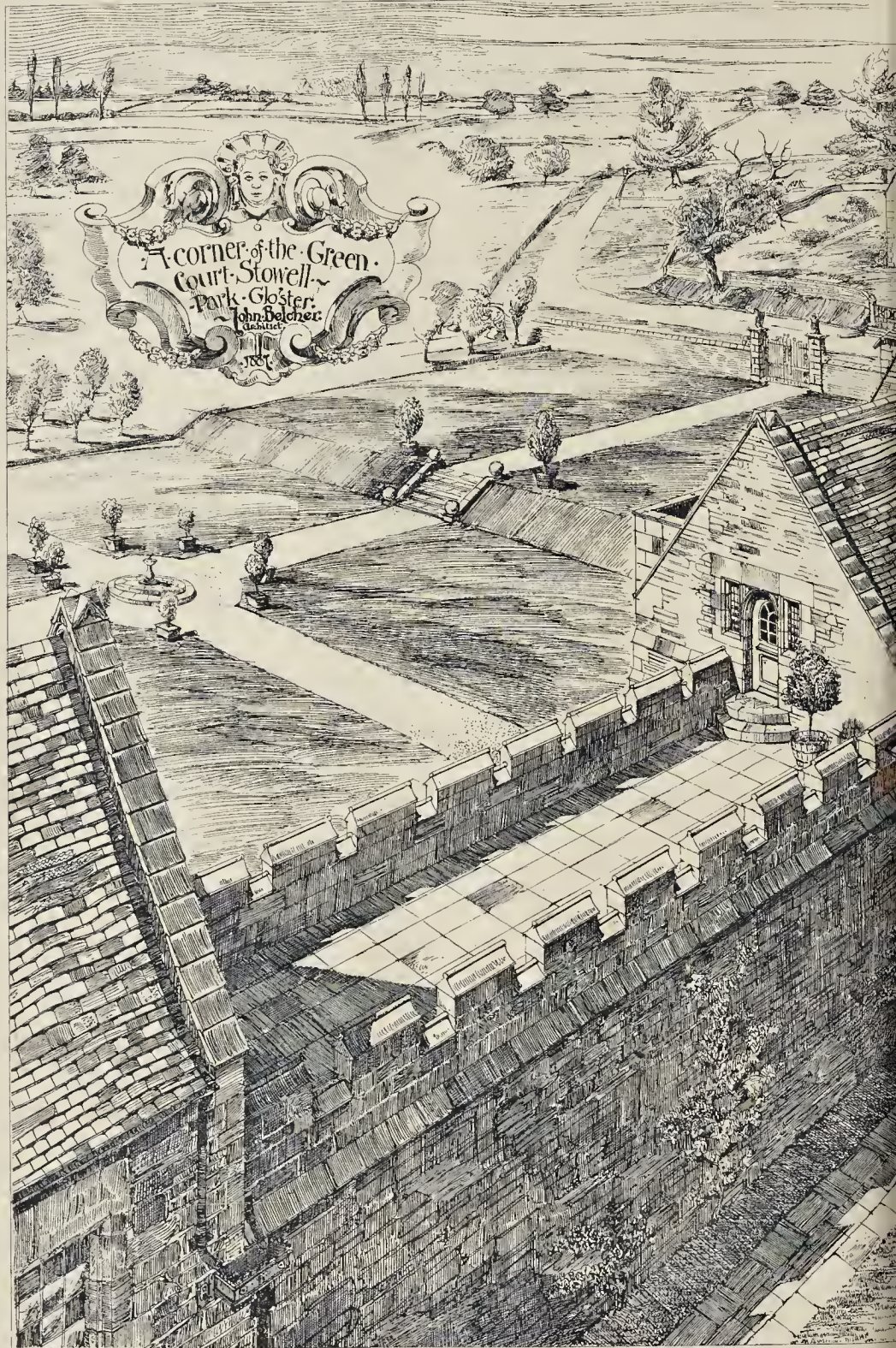
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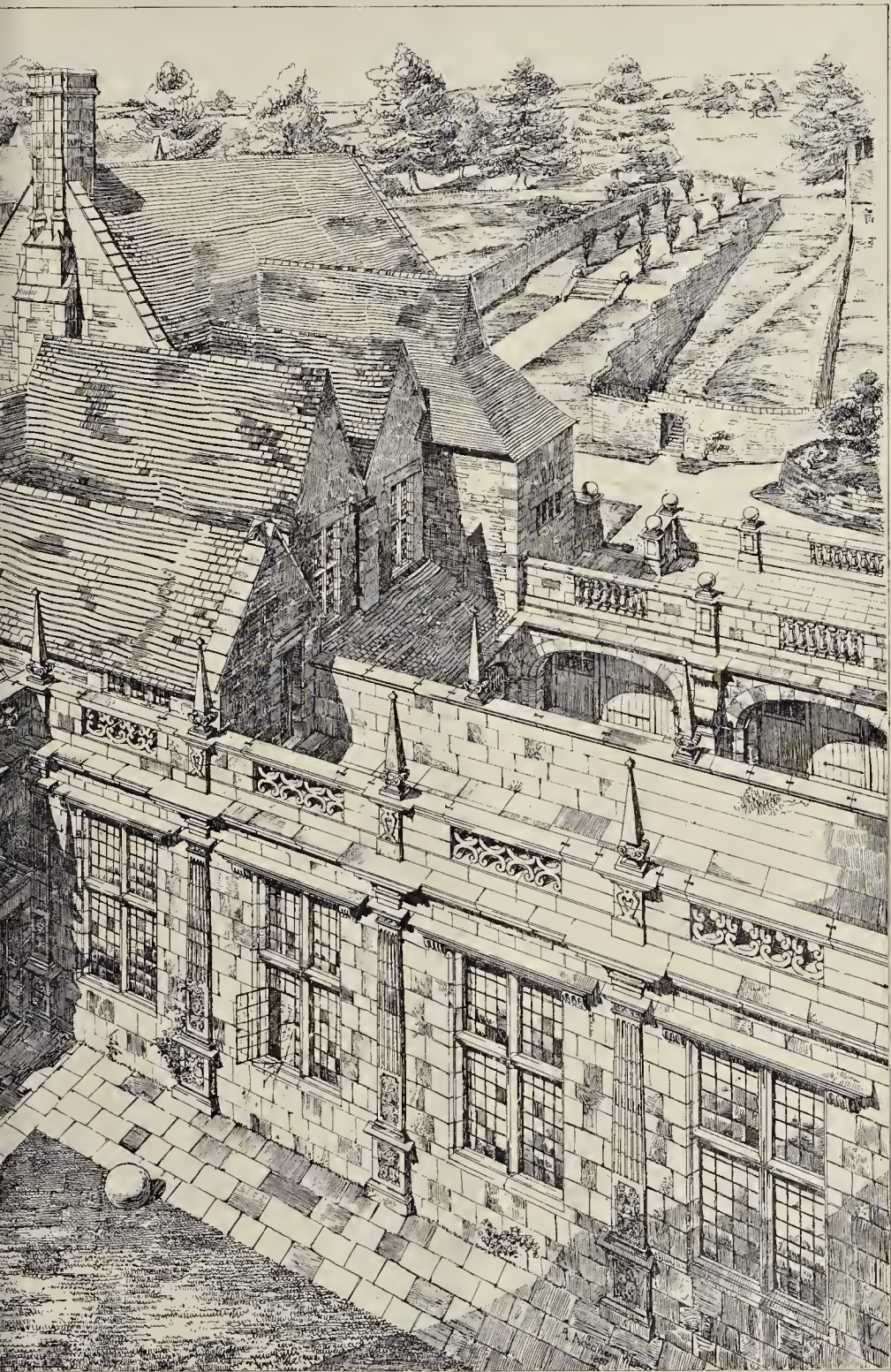
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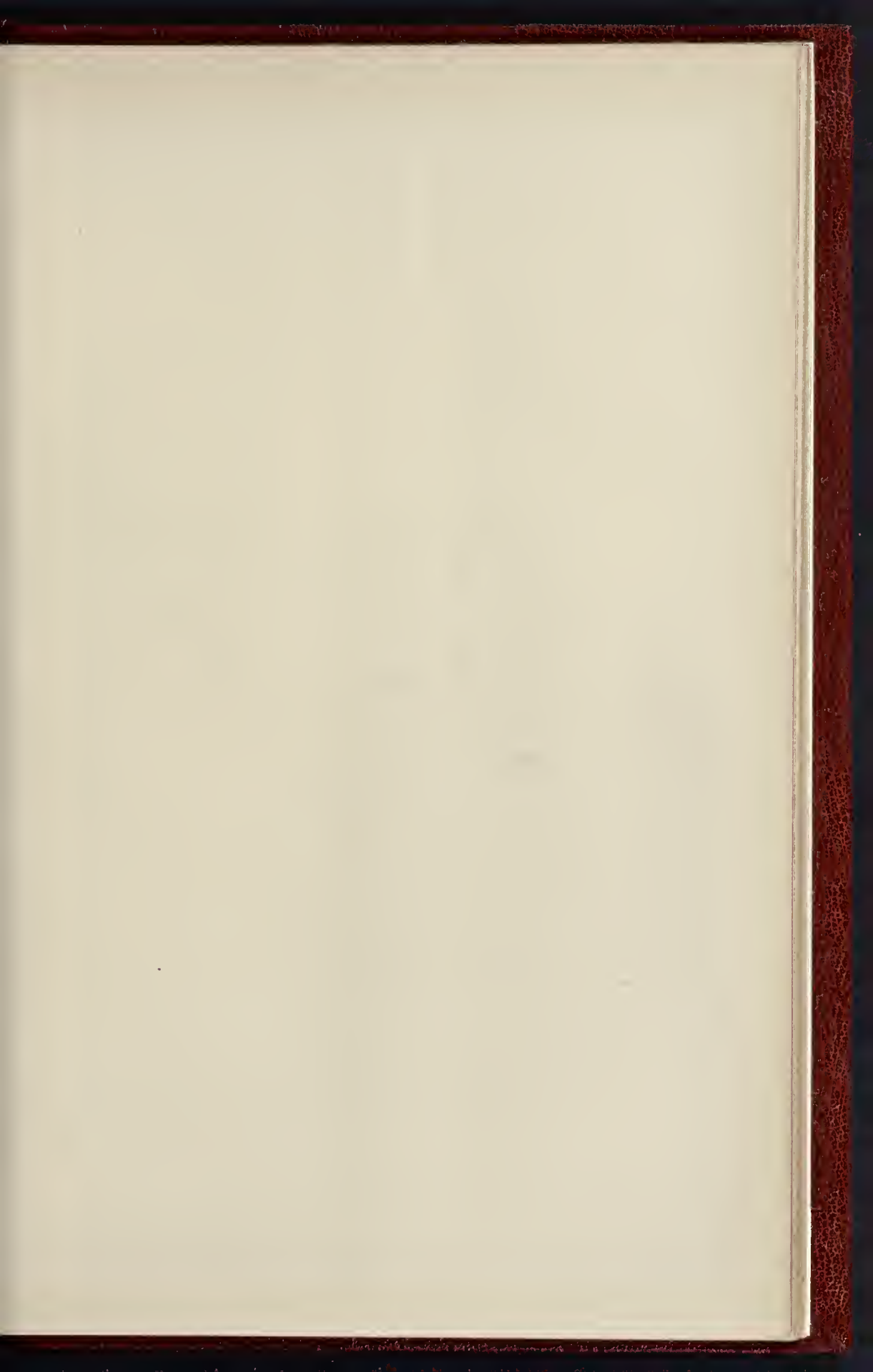


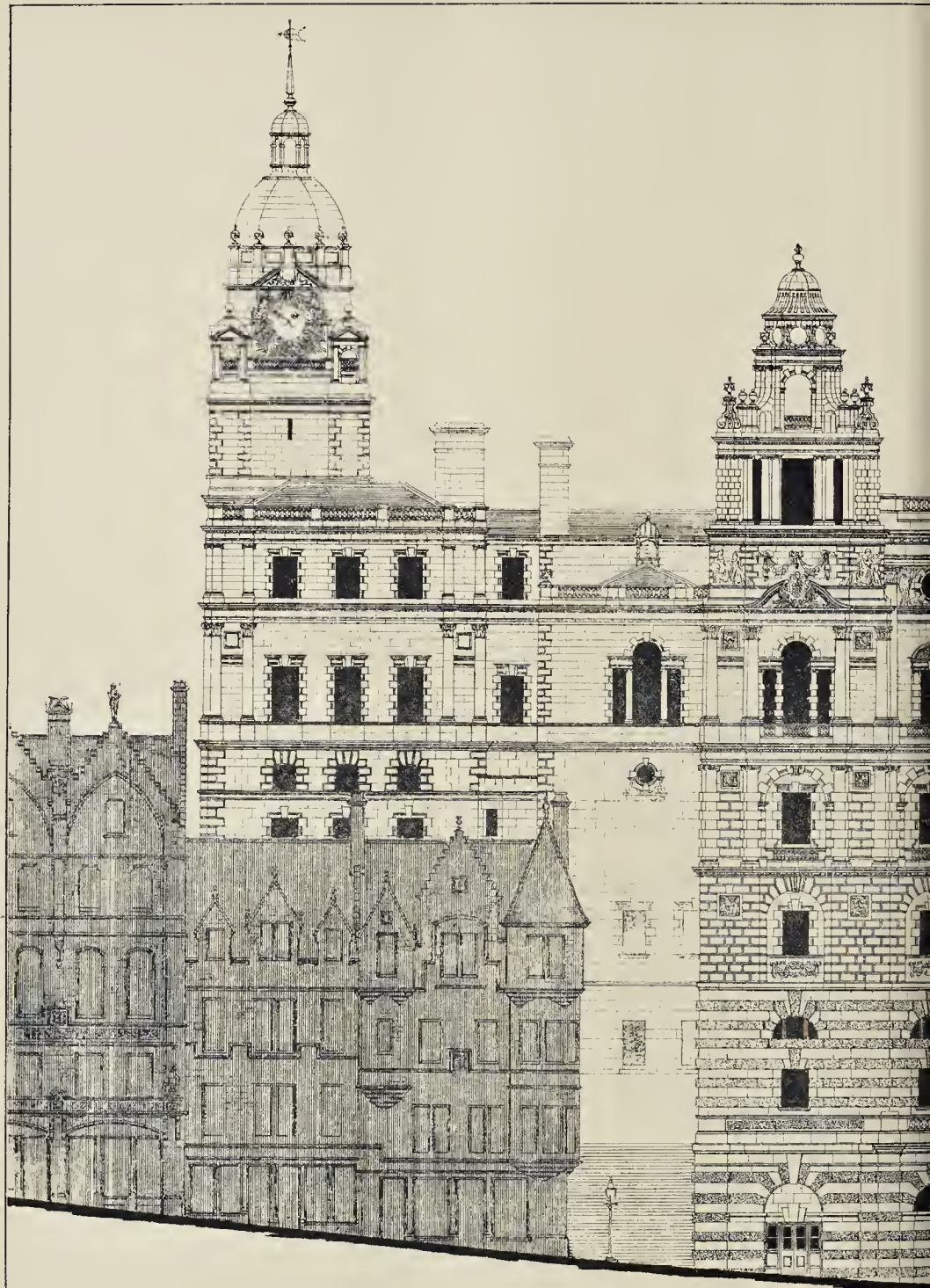
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THE UNIVERSITY OF CHICAGO







NORTH OR COCKBURN STREET ELEVATION.

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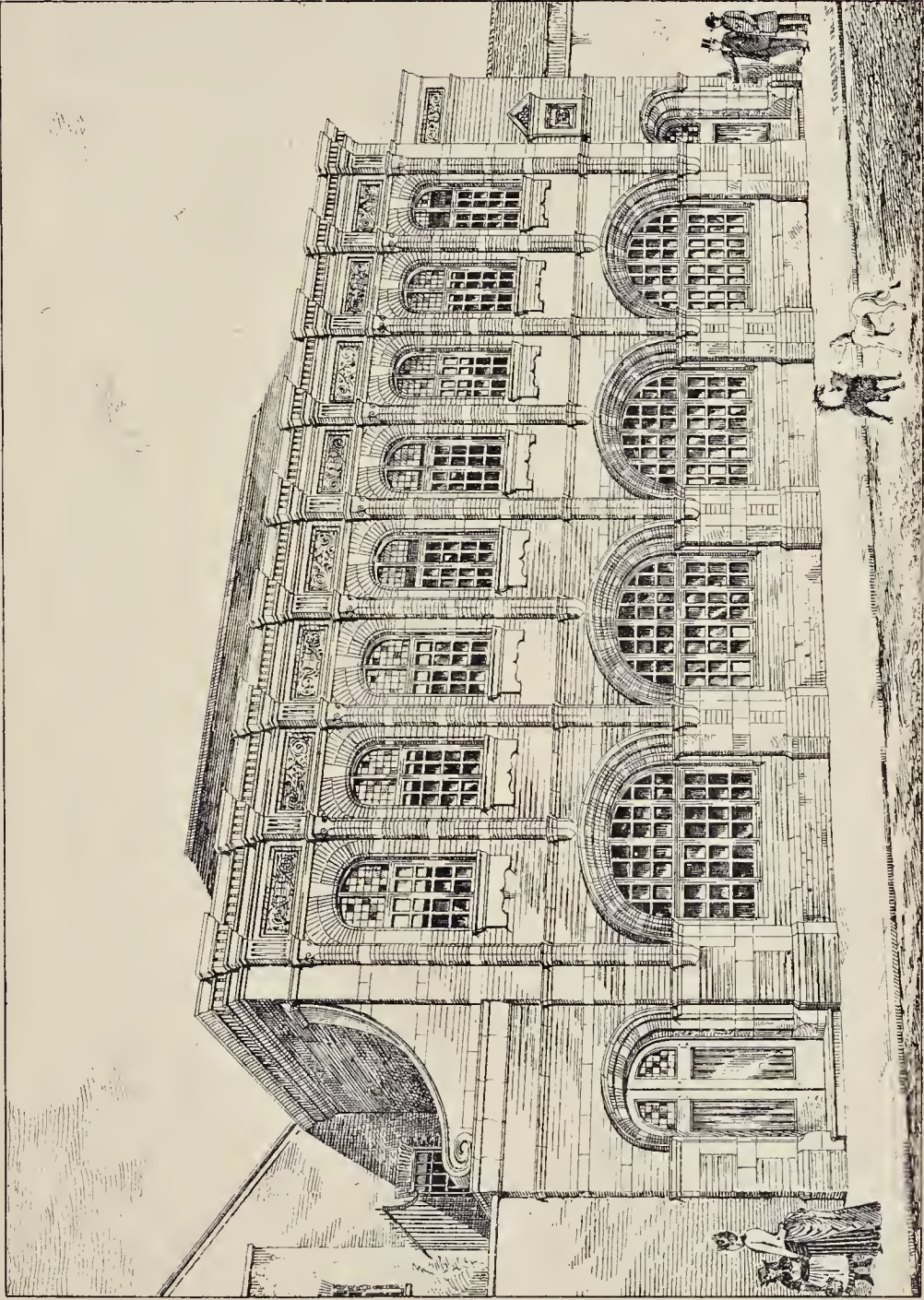
EDINBURGH MUNICIPAL BUILDINGS; DES



"FORTUNA."—By MR. J. M. BRYDON, F.R.I.B.A.

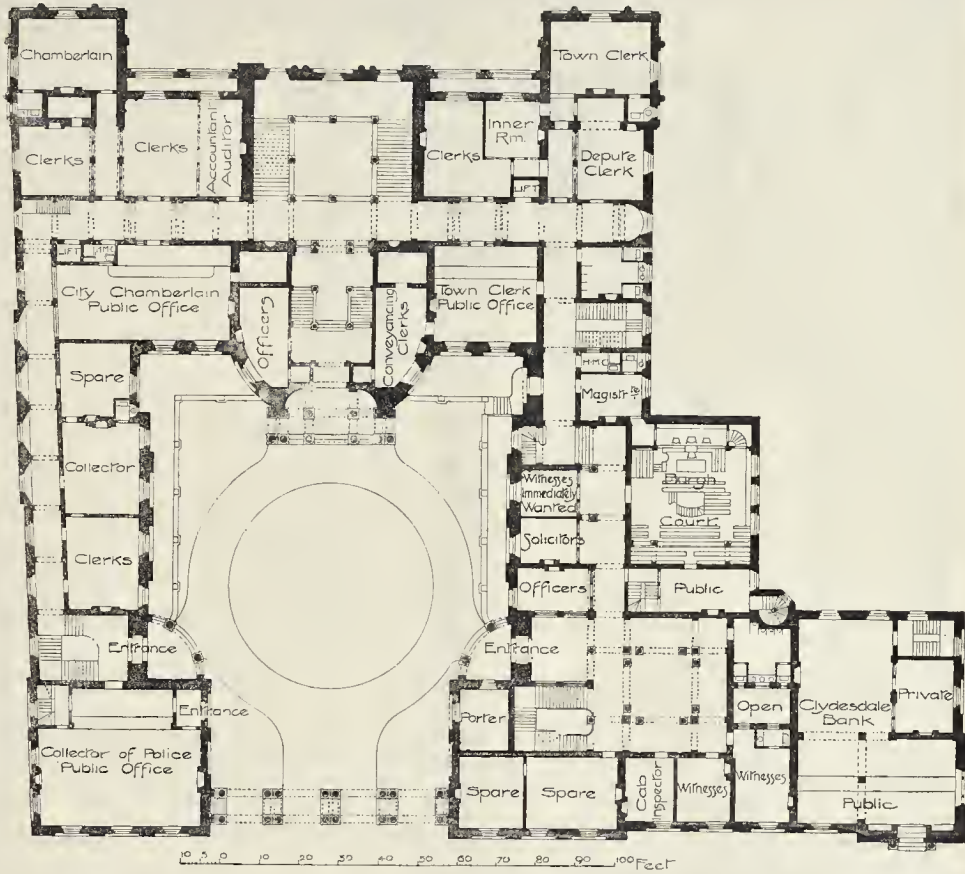
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BRYNASTON WORKING MEN'S CLUB, BROADLEY STREET, MARYLEBONE, W.—MR. G. HERRARD, ARCHITECT.

1915  
Chicago  
Chicago



Edinburgh Municipal Buildings: Design by Mr. J. M. Brydon, F.R.I.B.A.—Ground-Floor Plan. (For First-Floor Plan, see next page.)

**Illustrations.**

**CLOISTER BUILDINGS, STOWELL PARK.**

THE buildings illustrated are a small portion of the works now in course of erection, and consist of a vaulted cloister which will connect the old mansion with the banqueting-hall. At the end of the cloister is a staircase leading to the gallery that opens into the hall on the upper level. The view also shows the passage under the terrace communicating with the offices and kitchen, a serving-stair giving access to the transept of the hall.

**EDINBURGH MUNICIPAL BUILDINGS COMPETITION.**

We give this week illustrations of the Classic design submitted in this important competition by Mr. Brydon, under motto "Fortuna"; including the north and south elevations and two of the plans. The lofty elevation from Cockburn-street has been very boldly treated with massive rustication, and the plan has a great deal to recommend it. Whether the manner of providing light for the rooms below the ground-floor on the inner court, by areas, and keeping the main area of the court up to the High-street level, is one to be recommended may, however, be a question.

**ST. VINCENT DE PAUL, MILL HILL, HENDON.**

This chapel is in course of erection for the Sisters of Charity of St. Vincent de Paul, who have recently purchased a property at Mil

Hill, upon which is a fine old house dating from the time of Charles II., and which is now the "Mother House" for the sisters of this religious community in England.

The materials used in the church are Kentish rag stone, with Stoke-ground stone dressings for the external work, and Bath stone for the inside. Teak will be used for the floors. Mr. C. Wall, of Chelsea, is the builder; Mr. Francis W. Tasker being the architect.

**BRYANSTON CLUB.**

We give this week a perspective view of the Bryanston Working Men's Club, now in course of erection. The elevation to Broadley-street is in red brick with Bath stone dressings, the other elevations to Lisson-grove and St. John's-place are in stock brick and red brick dressings.

The hall on the ground-floor will hold between 250 and 300 people, and can, when occasion requires, be divided into two rooms by lowering a revolving shutter in the centre of the hall. The floor over the lecture-hall is entirely occupied by a billiard-room, and the remainder of the site and the upper floors are given up to the usual requirements of a club, with the exception of the plot facing St. John's-place, and here some flats are being erected. The total cost of the club, including the flats, is about 5,000*l.*, and the contract is in the hands of Messrs. A. & E. Braid, the architect being Mr. George Hubbard.

**Buildings for Applied Science Teaching.** Messrs. Whittaker & Co. will publish early next week Mr. E. C. Robins's book on "The Design and Construction of Applied Science and Art Buildings, and their Suitable Fittings and Sanitation."

**THE ARCHITECTURE OF DALMATIA.**  
ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE concluding meeting of the present session took place on Monday last, Mr. Alfred Waterhouse, R.A. (Vice-President), in the chair.

Mr. William H. White (Secretary) announced the receipt of a large number of books and "Transactions" of other societies, the titles of which would be published in the Proceedings; also the receipt of two guineas each from Mr. F. E. Jones and Mr. W. S. Weatherley, Fellows, for the Library Fund. A further donation, through Mr. Aitchison, was announced from Signor Boni, of Venice, of his pamphlet on "Santa Maria dei Miracoli," and sixty photographs of the church.

Notes of thanks were passed to the several donors, a special vote being accorded to Signor Boni, on the motion of Mr. Octavius Hansard.

Mr. J. Macvicar Anderson (Hon. Secretary) read a letter from Lady Jones, thanking the Institute for its vote of condolence with her on the occasion of the death of her husband, the late Sir Horace Jones.

The following gentlemen were balloted for and declared to be duly elected, viz., as a *Fellow*: Mr. William C. Evans, of Westminster; as *Associates*: Messrs. Herbert Winkler Mills, Hampstead; Charles Gourlay, Glasgow; Joseph Laveuder, Wolverhampton; and Thomas Locke Worthington, Hampstead.

The Secretary intimated that the name of Mr. Benjamin Ingelow had been recommended to be added to the Literature Standing Committee.

The Chairman, in introducing the lecturer for the evening, spoke of him as not only being a most distinguished architect, to whom Oxford owed many of its recent beauties, but also an explorer of a region which seemed hitherto to



Edinburgh Municipal Buildings: Design by Mr. J. M. Brydon, F.R.I.E.A.—First-Floor Plan.

have been much neglected both by the architect and archaeologist.

Mr. T. G. Jackson, M.A., F.S.A., then read a paper on "The Art of Dalmatia," of which the following is an abstract:—

Dalmatia consists of a narrow strip of rock and moorland lying between the mountains and the sea on the eastern side of the Adriatic. Its geographical position has always given it considerable maritime importance; while the interior, which is comparatively poor and unproductive, remained in a condition of neglect and semi-barbarism, the cities of the sea coast prospered commercially, and attained a high degree of civilisation. The architecture of Dalmatia is therefore entirely urban, and though under the Roman Empire there were a few flourishing cities in the interior with buildings of some pretensions to magnificence, during the Middle Ages it was only in the maritime cities that the arts and letters continued to be cultivated.

The series of Dalmatian examples may be said to begin with Diocletian's palace at Spalato, which dates from the end of the third century. The importance of this building in the history of architecture can scarcely be over estimated. It stands at the meeting-point of the styles of ancient and modern Europe, and marks the period when the strict rules of Classic architecture began to be relaxed, and the various members of the order were for the first time treated with something of the freedom of Mediaeval architecture. The proportions of the various members of the entablature were altered without scruple; some parts hitherto considered essential were left out altogether; fresh ornaments, like the zigzag of the coming Romanesque style, first appeared; entablatures were made to spring into arches; and, finally, by the omission of frieze and cornice, the architrave was left alone to spring from column to

column without any intervening entablature, thus marking the final emancipation of the arch from the traditional forms of trabeated architecture.

To balance these signs of architectural life and progress, for thus they must be considered by all who look at the matter historically, we find in Diocletian's work some signs of the coming barbarism of the succeeding centuries. The ornament is coarsely executed, the mouldings are inartistically profiled, and in more than one instance materials of older buildings are used up second-hand in the manner which became so general a few centuries later.

In plan the palace was like the Roman camp, square or nearly so, and divided by two cross streets into quarters, except that on the south side the street did not run through, being intercepted by the Imperial apartments. Though the greater part of its area is thickly covered by houses with narrow alleys meandering among them, the outer circuit of the walls, the two temples, the peristyle court in the middle of the palace, and two of the three principal gates remain to this day; and there is no place in the world which presents a better picture of the magnificence with which the masters of the Roman world housed themselves.

The principal temple, now the Duomo of Spalato, which has by some been supposed to be the mausoleum of Diocletian, though all tradition makes it originally a temple of Jupiter, is octagonal without and round within, and is covered by a dome of brick, above which is a pyramidal roof. The cella is surrounded externally by a Corinthian peristyle, and internally by two orders of eight columns which carry projections of the entablature. Between these columns are four square recesses alternating with four semicircular niches.

The other temple, generally said to have been dedicated originally to Æsculapins, has by some

modern writers been in its turn supposed to have been the mausoleum of Diocletian. It consists of a small rectangular cell, with a portico of four columns, and is covered with a wagon ceiling, which forms also the roof, the rounded surface being exposed externally, though, strange to say, it finished at each end with the ordinary triangular pediment of a Classic temple.

These two buildings, from first to last, exercised a remarkable, though very natural, influence on the imagination of Dalmatian architects, which may often be traced in the plan and design of the buildings raised in the country during the Middle Ages.

Of Dalmatian architecture, during the following five centuries, no building has survived the disasters of the barbarian conquest, and to complete the sequence of examples we must look to the neighbouring coast-cities of Istria and Friuli, where at Parenzo and Grado may still be seen Byzantine basilicas resembling and rivaling the co-eval churches of Ravenna.

The only building in Dalmatia belonging to this period of which we have any traces is the half-excavated basilica of Salona, which suffices to show that the Byzantine style established itself as firmly in Dalmatia as in other countries which owed allegiance to the Emperor of New Rome.

In the seventh century Dalmatia was overrun by hordes of Goths, Avars, and Slavs, and one by one the ancient Roman cities were taken, sacked, and destroyed. But the Roman population was not crushed out of existence. When the shock was over the fugitive citizens came back from their island hiding-places and either rebuilt their old cities or founded new ones. Zara rose from her ashes, the fugitives from Epidaurus settled on a rock near their old home and founded the city of Ragusa, and the Salonitans, leaving their ancient city in ruins,



as it has ever since remained, crept back to the mainland and housed themselves within the deserted villa of Diocletian, which they converted into the modern Spalato.

Henceforth Dalmatia had a double population and a double history. In the rural districts were the Slavs, Croats in the northern part, and Serbs in the southern, who, with their countrymen over the old Dalmatian border, gradually were consolidated into the kingdoms of Croatia and Servia. In the maritime cities and on the principal islands of the Quarnero were the Latins or Romans, or, as they came to be called distinctively, Dalmatians, speaking their old Latin language, governing themselves by the old Roman law, electing their own magistrates and bishops, and preserving the traditions of the old Roman municipalities. The city, at first tributary to the Slavs, gradually became wealthy and powerful, and progressed in the arts of peace, while their Slavonic neighbours were left behind in semi-barbarism. To the present day the old distinction of Latin and Slav survives, and is the key to the proper intelligence of Dalmatian politics.

Dalmatian architecture during the ninth, tenth, and eleventh centuries was based on Byzantine models, but the buildings that have come down to us from that period are so humble and rude that it is impossible to fix the date of each example with precision. The most remarkable among them is the grand circular church of St. Donato at Zara, of which we know with tolerable certainty that it was built about 800. Bishop Orsini, its builder, had travelled widely for that time, and had visited both Constantinople and the Court of Charlemagne. The result of his travels may be traced in the resemblance which in a rude way his church at Zara bears to that of St. Vitale at Ravenna, and to the Cathedral of Aix-la-Chapelle. One of the most singular facts about the church of St. Donato is connected with its foundations, which consist of splendid architectural fragments of ancient Roman buildings laid confusedly on the pavement of an ancient Roman forum.

The connexion of Dalmatia with the Eastern Empire was broken by the Hungarian conquest of 1105. From that date the possession of the province was contested by Hungary and Venice, and the architecture was thenceforward based on the schools of Italy and Germany. The traces of Northern feeling which can be detected in many of the Dalmatian buildings, must be explained by the influence of Hungarian rule, which no doubt introduced architects from Austria and other countries of Central and Western Europe into the dependent provinces.

The art of Dalmatia, then, passed at this time from Byzantine to Romanesque, and the earliest examples of the new style are to be found in the Benedictine nunnery of St. Maria at Zara, and in the island city of Arhe. In point of design and execution they will compare favourably with the coeval work of any other European school.

Perhaps the most remarkable feature of the history of architecture in Dalmatia is the long duration of the Romanesque style in that country. In France and England, round-arched gave way to pointed architecture at the end of the twelfth century; in Germany, Romanesque began to give place to Gothic about the middle of the thirteenth, and Italian Gothic reached its full development about the same time; but in Dalmatia architects went on working contentedly in Romanesque well into the fourteenth century, as if they had never heard of any other style, and examples of it are wanting even as late as the fifteenth.

The finest church in the thirteenth century in Dalmatia is the Duomo of Trau, which, though dating for the most part from 1200-1250, is thoroughly Romanesque in style. It is also remarkable for its close resemblance in many points to contemporary architecture in Hungary, thus affording another instance of the influence of the trans-Alpine styles to which I have above referred. The west doorway of this church is the crowning glory of Dalmatian architecture, and the wooden doors, choir-stalls, and marble pulpit of the cathedral at Spalato, which belong to the same period, are not less beautiful in their design than they are perfect in execution.

The greatest work of Dalmatian architecture in the fourteenth century is the campanile of the Duomo of Spalato, which was built in instalments between the years 1300-1416, but is from first to last in the Romanesque style, and

has borrowed not a little of its details from the late Roman work of Diocletian's building by which it is surrounded.

At the beginning of the fifteenth century Dalmatia passed finally under Venetian rule, and the political change was marked by a corresponding transition in the architecture, though Romanesque had thus actually prolonged its existence till it met the new round-arched style of the Renaissance. The Gothic style which succeeded, and which the Venetians brought with them, never rooted itself firmly in Dalmatia except in domestic work. The only great Gothic church is the duomo of Sebenico, and of that only the lower part is in that style, the rest being finished by a Renaissance architect. But the most beautiful Gothic work in Dalmatia is to be found in the palace of the rotors of the republic of Ragusa, which was begun in 1435. The sculpture of this building is scarcely to be surpassed within the range of Gothic art.

But the reign of the Gothic style in Dalmatia was short. The Dalmatians, it would seem, had a natural liking for a round-arched style, in which we may, perhaps, trace the influence exercised on them from first to last by Diocletian's buildings at Spalato. Consequently, they welcomed with almost precocious ardour the return of the round arch when the Renaissance brought it about, and if they were behind the rest of the world in adopting Gothic, they were among the earliest to adopt the Renaissance. In 1441 the latter part of the Cathedral of Sebenico was begun by Giorgio Orsini in an eclectic style, which became less Gothic and more Classic as the work advanced. The most remarkable part of this building is the stone covering,—ceiling and roof in one,—a stupendous effort of daring construction, which makes this church one of the most remarkable in Europe.

But though the Dalmatians adopted the Renaissance style so readily, they used it throughout with a freedom that had more of the spirit of the older Gothic art than that of slavish obedience to formula which the severer masters of the Classic Renaissance exacted.

The Dalmatian Renaissance work is eclectic from first to last, and Gothic and Classic details are found strangely mixed together, though they are happily combined with a true artistic instinct, so as to produce a consistent and harmonious whole. The Renaissance art in Dalmatia continued, as it had begun, free from the shackles of a rigid formalism. It never developed, as it did in Italy, into pure Palladianism. Of the cold, severe architecture of that school there is hardly an example to be found throughout the province; something of the wild freedom and playfulness of Gothic clung to it from first to last, till in the latter part of the seventeenth century it suddenly sank into the slough of the Barocco, in which all its life and beauty was at once smothered, and architecture as a fine art ceased to exist.

Mr. William Emerson, in opening the discussion, expressed the pleasure Mr. Jackson's paper had given him. It was well in these days of going to-and-fro in the earth occasionally to bring forward specimens of the architecture of other countries, tending, as it did, to enlarge the mind, for English architects, as a rule, ran too much in a groove. Many swore simply by fourteenth-century architecture, and others by Classic, but it seemed to him that the particular style,—the transition between Classic and Gothic,—was the starting-point of what was to be the future architecture of this country. He moved a vote of thanks to Mr. Jackson.

Prof. Baldwin Brown (Edinburgh) seconded the vote of thanks, and said that the paper they had just heard was an exceedingly valuable one in the study of architecture, and for the way in which it showed the relation between the different styles that had succeeded each other since the period of the Roman Empire. It was interesting to see how very close was the contact in Dalmatia between the early round-arched architecture of the Romans and the later arched architecture of the Renaissance; how little influence the Gothic had towards the south, and how closely in many features the Renaissance was to the earlier architecture. Mr. Jackson, in his description of Diocletian's palace, had brought before them the fact that the Classical architecture of the Romans embodied more variety of plan than they had often been given credit for.

In the case of the tower, which was sometimes thought to be of Teutonic origin, the old Roman work showed a feeling in that direction, and more especially in the Roman buildings in the South of France. The early Basilica built over the cemetery, to which Mr. Jackson had referred, was extremely interesting. It looked as if the small buildings above the ground, built on the plan, were memorial chapels over the tombs of Christian saints. Possibly, also, the apsidal end in the main building was a memorial chapel built over the tomb of some saint and martyr at a later period. They were told that the old basilicas grew out of the memorial chapels, and it was curious to find what might have been the original wall cutting off the memorial chapel remaining when the nave aisles were added.

Mr. Arthur J. Evans (Keeper of the Ashmolean Museum, Oxford) said he could bear testimony to the extremely exhaustive character of the paper. In the course of his remarks Mr. Jackson had alluded to the way in which Dalmatian history had influenced the architecture of that country. It was a remarkable fact that Dalmatia was the one Roman province divided between the Eastern and Western Empires. In the palace of Diocletian was to be seen, on the one hand, the form of the Roman "Chester." In the massive architecture could be seen the influence of the West and the genius of Rome, while many details, there could be little doubt, had been borrowed from some other favoured cities of the same empire in Asia, such as Palmyra, the masons' marks being of the same character. The whole country between the Alps and the Euxine had been deluged again and again by barbaric invasions, but Dalmatia remained a flourishing province, and became one of the great strongholds of Roman civilisation. It was thus capable, not only of sheltering civilisation within its limits, but also of influencing the border countries.

In Dalmatia some of the latest of the Roman Emperors took refuge, and in the palace of Diocletian the last Western Emperor reigned after he had ceased to reign in Italy. The rocks of Dalmatia were so favourable to the practice of architecture that the country produced a race of masons who had much to do with the buildings of the opposite coast of the Adriatic, and remarkable traces were to be found of the employment of Dalmatian architects and masons in Italy. At a later date Dalmatia shared the fate of other provinces, and was subjected to the variety of influences to which Mr. Jackson had called attention,—Croatian, Carolingian, and Byzantine. Later still there were influences besides the Hungarian. In following the eastern coast of Italy, from Ancona southwards, striking parallels were to be found between the architectural details of the buildings on the opposite coasts, and in looking at the admirable drawings on the screens one was struck with a feeling of melancholy by the fact that the civilisation which was spreading over the mainland behind Dalmatia had been cut short in its development. The architecture was in its origin the work of the surviving Roman provincials, but in the Middle Ages it became to a great extent the work of the Slavonic inhabitants of Dalmatia who had received Roman culture. All that, however, was cut short, and many of the monuments, such as the Church of Ragusa, were destroyed by the great earthquake. They might congratulate Mr. Jackson on having apparently reached the termination of his great work on Dalmatian architecture, and as in the seventeenth century an Englishman was one of the first who had brought a knowledge of Dalmatian art to the West, as in the eighteenth century another Englishman executed his great work on the palace of Diocletian at Spalato, so now the most important work in Dalmatian architecture had been undertaken by an Englishman.

Mr. J. P. Seldon tendered his extreme thanks to Mr. Jackson for his most admirable paper, which had opened up new ground. He only hoped that the excellent drawings he saw around the room would be left for a few days, so that the members might examine them at their leisure. The development of Roman architecture was most interesting and instructive, and particularly as showing that when the Dalmatians found a good style, they knew how to keep it. At the same time he hoped it would be looked at in an archaeological light, and that it would not be studied with the view suggested by Mr. Emerson, as that would be deplorable. If they were

in search of a new style, as many now appeared to be, they should not go to a country which had passed through such a history as Dalmatia had, and be content with its work.

Mr. H. H. Statham said he thought the members owed a great deal to Mr. Jackson for having been a pioneer in an almost unknown district, or one, at least, which very few had an opportunity of visiting. There was one point which had struck him. In the drawing of the interior of the Duomo at Curzola he noticed the same phenomenon which was to be observed in the Yorkshire abbeys, of the pointed arch being used in the arcading of the nave and the round arch in the triforium. Was that to be accounted for in the same way as in England, viz., the employment of the pointed arch for constructional reasons, and the retention of the round arch because of its supposed better appearance? The only regret he had in listening to the paper was that it should have been written by one who was not a member of their body, a drawback, let them hope, which would soon be remedied. (Hear, hear.)

Mr. George Aitchison, A.R.A., wished to ask Mr. Jackson a few questions. He was interested in the drawings of the Temple of Jupiter belonging to the palace of Diocletian. The plaster which had only been partially stripped off the dome in Adam's time, seemed now to permit an inspection of the construction of the dome. He did not know whether Mr. Jackson had the opportunity of seeing how the dome was finished at its centre. In one of the churches at Ragusa, so charmingly vaulted with circular ribs and slabs of stone, he did not know whether Mr. Jackson had had an opportunity of knowing if the long flat stones were jointed, or whether they were entirely in the vaults. In the Temple of Diana at Nîmes, the church was vaulted in a similar manner, but the stones seemed to be rebated out like the Gothic ribs. One of Mr. Jackson's remarks was extremely true, viz., that in large and important towns, where the architects were mostly confined to the examples of that town, they were almost certain to be reproduced, and to give a strong mark to the architecture of the place.

Mr. F. Percival said they had been told that the Campanile at Spalato was covered with scaffolding. When he (the speaker) was there, it was one mass of scaffolding inside, and he would be glad to know if the main features of the building had not been in any way injured.

Mr. Ralph Nevill remarked that it was rather the fashion to ascribe every peculiar development to Teutonic influence, but in the case of Dalmatia that influence seemed to have been slight. If Mr. Emerson thought of introducing a new style of Dalmatian art it was to be hoped he would give it an English feeling, just as the Renaissance architects did when they introduced the art from abroad.

Mr. Emerson.—I did not suggest copying this exactly.

The vote of thanks was then put and carried by acclamation.

Mr. Jackson, in replying, said the drawings could remain for inspection for a few days. Professor Baldwin Brown had suggested that the apse and curious wall of the basilica at Salona might be part of an older church. The impression he had derived was that that was not the case, but that the oldest parts of the groups of buildings were some of the outside chapels. The few architectural features of the apse pointed to its belonging to a later rather than to an earlier period. Mr. Statham had referred to the mixture of pointed and round arches. In one building the nave arches were pointed, cut square through the wall without any moulding, and with a slight moulding outside. That was in a church which showed the Northern influence, because it had a triforium and distinct clear-story, the triforium arches being round. In that they saw an instance of the eclecticism which ran through the Dalmatian styles. Mr. Aitchison had raised a point about the dome. The interior of the church being entirely filled with scaffolding, he and a professor of Spalato had examined the dome, and had come to the conclusion that there was no evidence of the "eye." As to the jointing of the slabs, the construction of them was more like carpentry than anything else. Every bay and pillar had a strong marble rib spanning the church, and those being rebated received slabs of marble reaching the whole length of the nave in one piece. The restoration of the dome at

Spalato was a sad story. A great deal of the work was much decayed and broken, such as the capitals, carving, corners, and entablatures generally. All the capitals of the lower tower had been restored, but the greater part of the entablature of the lower tower, and nearly all the entablature and the eight capitals of the upper order, had been renewed. There was no doubt that a great deal more had been done than was necessary. The meeting might be congratulated on the presence of Mr. Arthur Evans, than whom no one was entitled to be listened to with more respect when dealing with Dalmatia. The point touched upon by Mr. Evans, as to the work of Slavonic artists was a very interesting one. The names of several Dalmatian architects had been preserved, and those of the architects who constructed the doors at Spalato and Ione were undoubtedly Slavonic. Those Slavonic artists were men who had been brought within range of the culture of the Latin cities, and their work had no distinctive character, but was like the work of the Latins themselves. That showed that the Serbs only required peace and tranquillity to develop the arts. With regard to the use that might be made of the study of Dalmatian art, there was nothing to be directly copied, nor did he think that was the proper way to use any style of art. But he did think that a great deal was to be learned from Dalmatian architecture in another way. In it could be seen, from first to last, the correspondence between the art and history of the country; indeed, he did not know another country in which that could be more distinctly traced. Then, again, they might notice the curiously eclectic way in which the Dalmatians had worked from the beginning, and how new forms and departures were constantly breaking in upon the purity of the existing style. Such innovations the purists of the time might call barbarisms, but, looking back on the works of those periods, people could now-a-days see how far they were from being barbaric. They were, in fact, the germs of new life, and ought to give hope in regard to the work of the present day. A great deal of work was being done now which would shock the purists, but when people looked back upon these things they would be able to trace all its singularities, as they were termed, as germs of the future life to which he hoped their art in time would attain.

#### THE SOCIETY OF ENGINEERS:

VISIT TO MESSRS. AVELING & PORTER'S WORKS,  
ROCHESTER.

On Wednesday last a party of the Members and Associates of this Society, together with a number of friends, accepted the invitation of Messrs. Aveling & Porter, of Rochester, to visit their well-known steam road-roller and traction engine works at Rochester. The party included Professor Henry Robinson (President), Mr. A. T. Walmisley (vice-President), Professor Henry Adams, Mr. Perry F. Nursey, Mr. C. Gaudon, Mr. J. Bernays, and Mr. Jabez Church (past-President), Mr. W. H. Lindsay, Mr. J. S. Tamberlin, Mr. R. L. Andrews, Mr. Philip Cbeek, Mr. R. Masefield, Mr. E. J. Heskeht-Smith, Mr. Wilfrid Airy, M.A., Mr. G. Corderoy, Mr. Parker, and Herr Gustav Kemmann, Royal Prussian State Engineer. Proceeding by the 11-42 train from Charing-cross, in a saloon carriage, the visitors reached Strood Station shortly before half-past one, and immediately proceeded to Boley Hill House, the residence of Mr. Thomas Aveling, picturesquely situated overlooking the Castle keep and pleasure-grounds. These admirably-kept and pleasant gardens are a great boon to Rochester and to the many visitors to the time-worn but grand old Norman keep, and it must be a satisfaction to Mr. Thomas Aveling, the present head of the firm of Aveling & Porter, to know that his late father, Mr. Thomas Aveling, when mayor of the borough a few years ago, was able to gratify a long-cherished wish by setting on foot a movement which speedily resulted in securing the castle keep and grounds for the use of the town. The old keep, shattered as it has been by military attacks upon it, and still more seriously as it has suffered from being long used as a convenient quarry for building stone (the steps and newels of the staircases, for instance, having been totally carried away by former generations in this way), is now carefully

guarded from injury; it is being preserved, in fact, without any attempt at "restoration," which would, of course, be entirely misplaced. With due care it is likely long to stand "four-square to all the winds that blow." Mr. Thomas Aveling and Mr. Stephen Aveling very kindly entertained the visitors to luncheon in a very pleasant apartment,—part ball-room, part meeting-room, and part play-room,—a temporary erection, in fact, half partaking of the nature of a tent, and capable of use for a variety of purposes, being cool, comfortable, and airy in the hottest weather. When not otherwise occupied, such an apartment as this, readily removable, forms an admirable music-room and play-room for children, and Mr. Thomas Aveling has, by the construction of this apartment, given a hint to occupiers of country houses which might often be found worth acting upon. Before leaving the luncheon-table, the President of the Society, Prof. Henry Robinson, expressed the indebtedness of the members and visitors to Messrs. Aveling for their entertainment.

Under the conduct of Messrs. Thomas and Stephen Aveling, the party then proceeded to inspect the extensive and very interesting workshops of the world-renowned firm of Aveling & Porter. We say "world-renowned" advisedly, for in these days of depression of trade, largely caused by foreign competition, and when lugubrious forecasts sometimes tend to make us apprehensive for the future of British industries, it is refreshing and reassuring to learn that in this one industry of the manufacture of traction engines and road-rolling engines, the productions of Messrs. Aveling & Porter hold the field everywhere. Even in the United States, where their engines are handicapped by the cost of freight (about £100 per engine) and by a protective import duty of 45 per cent., they command the market by sheer force of excellence of workmanship. That this should be the fact is no marvel to those who had the opportunity of inspecting Messrs. Aveling & Porter's busy hive of industry on Wednesday last. About 400 men are employed, and there are some hundreds of machine-tools of the most ingenious and powerful kind at work, many of them actuated by hydraulic power, on Tredwell's system. These machine-tools, which are all the latest and best of their kind, perform varied operations, such as shearing, riveting, &c., and one very ingenious machine seen at work by the visitors was a hydraulic machine for bending, while hot, the massive steel crank-shafts of the engines. Steel is also used for the frames and boilers, and the best Low Moor iron for the fire-boxes. To use a building phrase, special care is taken to "set-out" the work connected with each engine, so that when the parts are put together there shall be no rivet-holes or bolt-holes which do not precisely coincide, and therefore no inequalities of strain. In like manner means are taken to prevent unevenness of bearing, thus reducing irregularities of wear to a minimum. By prolonging the side-plates of the ireroh upwards, brackets for carrying the working parts of the engine are formed without the necessity of bolting them to the boiler, thereby relieving the boiler of external strains and, of course, conducing to the longevity of the whole machine. In the foundry the visitors were in time to witness the casting of one or two of the heavy wheels or rollers for road-rolling engines. These wheels, it may be interesting to note, are, in order to ensure good work, cast with a margin of 2 in. or 3 in. of metal on each side of the ultimate edge of the periphery, these margins being afterwards taken off by a very simple but large machine of the lathe type. The casting to be operated upon being fixed on a gigantic chuck or holder, and caused to revolve slowly, fixed cutters are brought to bear, one inside the periphery and one outside it, the superfluous and always more or less doubtful metal from the edge of the casting being thus readily though somewhat slowly removed. It was incidentally stated that the capacity of the works is equal to the turning out of one road-rolling or traction engine per day,—everything being made at Messrs. Aveling & Porter's works except the steam ganges. There are, we were informed, about 3,000 traction engines and road-rolling engines by this firm in use, and of this number about seventy are road-rolling engines used in London. It is stated that whereas a well-known firm of building contractors estimate the cost of con-

veyance of heavy materials on common roads by horse traction at 10d. per ton per mile, the cost of the haulage of such materials by traction engines is only from 2½d. to 5d. per ton per mile. Before they left the works, the visitors witnessed trials of several traction engines recently completed. One of them was a large traction engine which is about to be sent to Bordeaux to be used in pulling a deep-running plough, going from 21 in. to 24 in. deep in the soil, through some vineyards of that part of France, in which deep ploughing is a necessity. Another type of engine tested was a traction-engine with double-tired spring wheels of large diameter, this type of engine being that most favoured by the dockyard and military authorities.

After thanking Messrs. Aveling for their kindness in showing them over the works, the visitors proceeded to the top of the keep of Rochester Castle, under the guidance of Mr. Stephen Aveling, and some of them afterwards proceeded to the Cathedral. Thus the afternoon was devoted half to engineering and half to archaeology. After dining together at the Bull Hotel, Rochester, Prof. Henry Robinson in the chair, the party returned to Town by the 8-20 p.m. train from Strood Station, after spending a very pleasant and instructive afternoon.

SOCIETY FOR THE PROTECTION OF ANCIENT BUILDINGS.

In the tenth annual report of this Society, presented at the annual meeting, held last week in Staple Inn Hall, as mentioned in our last, it is stated that though, during the past year it has not had the fortune to gain any impressive triumphs in helping to preserve buildings of the first rank, the Society has yet met with much success, while its failures are a proof of how urgently its efforts are still needed. The report proceeds: "If the cases in which we are able to report definite results are not so many or so important as could be wished, it should be borne in mind that the Committee work earnestly nearly every week in the year for the cause of the Society, and that much of the good result of this labour cannot find its way into print. It is no light thing to aim at changing the sentiment of the educated part of the nation, even within the narrow limits in which we are attempting to do so. That we have to a great measure succeeded, the altered tone of some of our critics and the press generally gives us ground for believing, and we are not infrequently pleased at hearing echoes of our own arguments and our own sentiment. Our work cannot, however, be effectively continued without the hearty support of our members. The balance-sheet at the end of this report will show the pressing need there is of our funds being increased; and this increase ought to be made by the subscriptions of new members. . . . The chief work before the Society has always been to bring architects and the clergy to understand our point of view and to act accordingly. We wish them to have a full appreciation of good buildings, both old and new. In writing to the Committee, a correspondent says, towards the end of his letter,—'There is little chance for the building arts in England while architects and their organs take their present line. All they care for is their own selfish ends. They cut their own throats, for while they are so mean and sordid they cannot produce beautiful things, and it is no wonder that the public treat architecture with scorn. Men who can't treat old work with reverence, and are blind to its beauty, can't do good new work.' There is much truth underlying this statement. Architects, as a body,—and among them we must include the architect and surveyor,—are most strongly opposed to the Society. They consider that it should be discredited, and suppressed, if possible, as it is 'had for trade.' No doubt they have benefited to some extent by the 'restoration' movement, but in the long run it will be most distasteful to their disadvantage. They have had the impossible task before them of converting a good old church into a good modern one. They have made them modern certainly, but not good. The result has been that they have brought discredit upon themselves, and made a large number of people permanently disgusted with architecture. . . . Some idea may be formed of the need of this Society when it is stated that in the year 1885 the sum of 1,733,900*l.*, or nearly a million and

three-quarters sterling, were voluntarily subscribed for church building, restoration, endowments, purchase of parsonages, and burial-grounds, irrespective of grants from the Ecclesiastical Commissioners, and other sources. Between the years 1876 and 1885, no less than 2,577 churches were restored, being an average of 250 a year, and 819 churches were rebuilt. The supervision exercised by the bishops of dioceses and the Ecclesiastical Commissioners with regard to the expenditure of this large sum of money is of the slightest and most perfunctory character."

LIFTS.

STR.—With your permission we should like to say a few words in reply to Mr. Gibson's letter appearing in your issue of the 11th inst. [p. 835].

Referring first to your footnote, we had not the least intention to mislead your readers, and we think you would yourself admit that there is a broad line of distinction between one case where a specific danger is entirely absent, and another where such a danger is present, but accompanied by a more or less efficient safeguarding device, which is an additional complication.

Turning to Mr. Gibson's remarks, we would first express our gratification that that gentleman finds himself in accord with us on the vexed question of pressures. With reference to the "second danger" pointed out by Mr. Slater, Mr. Gibson writes a general denial of its existence, and appeals to those who understand the subject. Will he be a little more explicit? In all the best English lifts, the charge of pressure water, after lifting the cage, is trapped in a closed chamber from which there is no escape, except through a passage completely move till the starting valve. In case of overloading, the effect is to open it. No compressing action on the entrapped water; but no movement can occur till something positively breaks. It is our constant practice to test our lifts by suspending in the cage double the maximum weight the lift will raise, and then lower the same slowly by the ordinary valve. The maximum weight should not be confounded with the contract weight. For instance, a 10 cwt. lift will probably raise a maximum load of 12 cwt.; and our test would be 24 cwt. In actual work, this would surely be overloading.

Now, we have given careful attention to all the published descriptions of the Otis lift, and have examined several machines after completion, with this particular note in existence, and are thereupon prompted to ask Mr. Gibson the following questions:—

1. Is there in the Otis lift any positive entrapment of the charge of driving water as above described?
2. Is there not a free escape for such water back to the source of supply, restrained only by the pressure in that source?
3. In case of sufficient overloading of the cage, would not the driving water be forced back, and the cage descend?
4. Could the governor prevent all motion of the cage, or would it only act after a speed was attained greater than its normal working speed?
5. Has the attendant any power to stop the cage, should it commence to descend under the circumstances pointed out? If so, how?
6. Is there any provision against the cage being brought up with a shock at the foot of the well, under the assumed conditions?
7. Is not the speed permitted by the governor equal to 150 ft. per minute?
8. Is there any appliance in the Otis lift, other than the governor, which will prevent motion downwards when overloaded? If so, what is it, and where can it be seen at work?

We should not have presumed to so catechise Mr. Gibson, only that he has so often invited investigation and inquiry, and we feel sure he would not wish to confine such inquiry to those who have everything to learn in connexion with the subject.

ARCHIBALD SMITH & STEVENS.

June 14th, 1887.

MAIDSTONE BOROUGH ASYLUM COMPETITION.

STR.—I send you a circular received from the Clerk to the Magistrates of Maidstone, and think your readers will agree with me that it shows scant courtesy to competitors, who must have spent each about two months' hard work in preparing the unusually elaborate drawings required for this asylum,—as I did.

I shall be much obliged if some of your readers can inform me what the "terms of such resolution" were, viz., whether a design was selected at all, or whether they are all made fools of.

A COMPETITOR.

\* \* We quite share the feelings of our correspondent. The circular referred to merely announces to the competitors that their plans will be returned to them by rail, "in pursuance of the terms of a resolution" (not given), and without a word of information as to what has been done. Competitors

are entitled, in common courtesy and common fairness, to know what has been the result of their labours.

"CRESTS."

STR.—In the article upon "Crests" in your paper of June 11th [p. 865], the device of an eagle preying upon a cradled infant is described as being that of the ancient house of Stanley. It had, however, the crest of the Lathams of Latham, co. Lancaster, assuming, of course, that a particular crest can be legitimately appropriated by any one family. This device was adopted by the Stanleys upon the marriage of the great Sir John Stanley, K.G., foffeee of the Isle of Man (he died 1414), with Isabel, daughter and heir to Sir Thomas Lathom, of Latham, Kt., of Latham and Knowsley, co. Lancaster. The Stanleys (Stoneley) descended from Adam de Aldithley, of Normandy, temp. the Conqueror, and the Lathams (Fitzhenry), took surnames from their places of residence. An ancient visitation of Lancashire, deposited in Herald's College, sets forth that a child which had been found in an eagle's eyrie, upon the Latham property, was adopted by the family. The tale may account for the crest, or vice versa.

W. E. M.

June 11, 1887.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

6,212, Compressed Blocks for Building. E. Edwards.

This patent relates to the apparatus for pressing the blocks, which are composed of slag, gravel, cement, lime, &c. It is claimed that the improved construction ensures a rapid and accurate delivery of the blocks as they pass from the rollers and the press.

7,498, Bricks. E. C. and E. Korry.

According to this invention, dovetail grooves are formed on the faces and ends of the bricks, with the object of giving a better hold for the plaster; or if the inner sides of the bricks are turned to each other in the inside of wall and grouted with cement, the bricks cannot be drawn out, and stronger and better work is claimed.

8,067, Bricks. P. J. Milligan.

The improvement which is the subject of this patent consists in the method of stacking the bricks while being haked or fired. They are so stacked as to form a natural kiln, and adjoining them is a tall chimney-shaft, which draws off the products of combustion. Fuel chambers, and all the other arrangements used in brick-burning, are also provided for, but the bricks are laid in an improved manner, differing entirely from the ordinary way.

8,339, Facing Bricks and the Manner of Setting the Same. R. Steinar.

The object of this invention is to enable the facing of the wall to be built with only one kind or form of facing brick, by which great saving of time and material is obtained. The bricks are formed hood shaped, with two shanks, being in thickness exactly half of the thickness of the back bricks (less half of the thickness of the layer of mortar). The shanks are placed at right-angles to each other, one shank serving as a facing for the wall, and the other as a means for fastening and building the facing bricks into the wall.

13,621, Metallic Lattice-work for Ventilators, &c. E. Hancock.

According to this invention, tin is first cut into strips, some of them wider than the others. The wide ones are then folded on both sides; then those that are not folded or doubled are placed the opposite way, one over and one under, those folded thus forming a woven fabric, or what, perhaps, may be better described as a basket-work pattern.

16,697, Feed Mechanism for Logs in Vertical Saw Frames. W. Buchanan.

By this invention an extra bar or rod is fitted to the feed regulator and to the feed wheel of the saw-frame. By this means, instead of the deals being fed by jerky motion on to the saw, the automatic feed is nearly continuous, and a much smoother and easier feed is obtained.

8,725, Manufacture of Pigments. J. M. Bennett.

The object of the invention is to obviate the grinding or crushing in pan mills the barytes or zinc oxides which are used for paints. A disintegrator is used instead, preferably enclosed, to prevent the escape of noxious dust and to permit currents of dried or heated air to be passed over the material under treatment.

NEW APPLICATIONS FOR PATENTS.

June 3.—8,024, J. Stevenson, Process for the Preservation of Woods.—8,031, R. Gould, Composition for Distemping.

June 4.—8,055, W. Thompson, Roofing.—8,084, F. Lees, Screws.—8,088, A. Zettler, Electric Alarm Devices.

June 6.—8,140, W. Bohm, Manufacture of Stair Treads, Flooring, &c.

PASTORELLI'S LEVEL

FIGURE 1

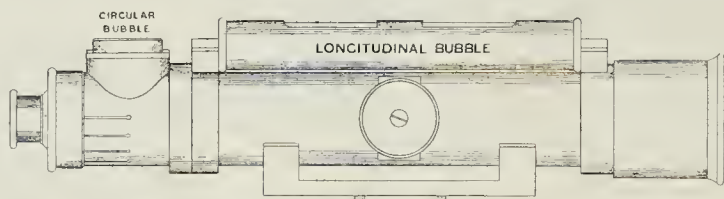
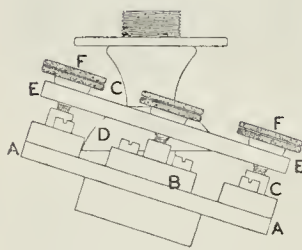
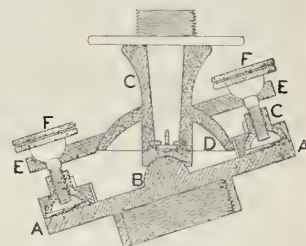


FIGURE 2



A—LOWER PARALLEL PLATE SCREWED ON STAFF HEAD. THE STAFF HEAD IS THE ADOPTION OF A PLAN BY THE LATE MR. FROUDE.  
 B—BALL-JOINT IN CENTRE OF PLATE A, WHICH ALLOWS THE INSTRUMENT TO MOVE NEARLY 20° OF INCLINATION, SO THAT THE TRIPOD MAY BE SET UPON THE GROUND ALMOST IRRESPECTIVE OF THE POSITION OF THE LEVEL.  
 C—VERTICAL AXIS WITH SOCKET END RESTING ON BALL B, AND CARRYING INVERTED CUP AND INSTRUMENT.  
 D—INVERTED CUP ATTACHED TO VERTICAL AXIS C, FOR RETAINING THE INSTRUMENT IN POSITION.

FIGURE 3



E—UPPER PARALLEL PLATE, CARRYING ADJUSTING SCREWS, THE HEADS OF WHICH WORK IN SOCKETS BORNED IN PLATE.  
 F, F—THE ADJUSTING SCREWS FOR CLAMPING CUP D AND FINALLY ADJUSTING THE LEVEL.  
 C—MOVABLE NUTS WITH BALL AND SOCKET ENDS. NOTE: THE CUP D IS CONCENTRIC WITH THE BALL JOINT B, AND THIS END THE BALL AND SOCKETS OF THE NUTS C ARE IN THE SAME GEOMETRICAL PLANE.

June 7.—8,170, J. Hughes and J. Holdsworth, Substitute for Stone or Marble.  
 June 8.—8,211, T. Wrigley, Preventing the Bursting of Water-pipes.—8,219, R. Garner, Self-flushing Water-closet.—8,221, J. Hamilton, Band Saw Machines.—8,252, W. Lee, Circular Saws.—8,256, W. Cliff and B. Peto, Brick or Building Block.—8,269, H. Price, Water Meters.  
 June 9.—8,316, C. Laspe, Fire Bricks.—8,318, A. Scrutton, Material or Compound for Paving.

PROVISIONAL SPECIFICATIONS ACCEPTED.

5,694, F. Griffith, Alarm Fastenings for Doors, &c.—6,410, G. Redfern, Lime Kilns.—6,435, J. Woodfield, Door and Window Fastenings.—6,695, J. Fairbairn, Window-sash Fasteners.—7,236, J. Warwick, Construction of Water-pipes exposed to the action of frost.—5,576, A. Barton and C. Arnold, Window or Sash Fasteners.—6,804, J. Johnson, Sawing or Cutting Stone.—7,036, F. Trier, Stone-working Machines.—7,178, J. Corbett and R. Hardy, Manufacture of Cement.—7,377, F. Crane, Varnishes.—7,400, G. Page, jun., Chandeliers and Gas Pendants.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

7,568, J. Hookham, Locks and Latches.—10,219, P. Smyth, Fittings for the Ventilation of and Access to Drains, Sewers, &c.—14,385, T. Rees, Metal Tiles.—16,694, J. Seymour, Window Fastenings.—6,253, A. Murray, Manufacture of Bricks, Mouldings, Ridges, &c.—6,496, C. Chambers, jun., Brickmaking Machines.—10,150, J. De Baere, Preventing Down-draught in Chimneys.—5,752, S. Taylor, Saws.—6,672, A. Boutt, Window-sash Balances.—6,806, A. and W. McCreary, Monuments.

**Sandwich (Kent).**—The last portion of the restoration of St. Bartholomew's Church is now being carried out. The nave was restored about six years ago. The north wall of the north chapel has been entirely taken down and rebuilt, and a new oak roof is being put on, while oak benches are to be placed in the nave. The ancient screen is to be restored and placed beneath the chancel arch, and a new screen to the north arch of the chancel. All the other chancel fittings are of English oak. Mr. John Oldrid Scott is the architect, and Mr. Wise, of Deal, is the contractor.

The Student's Column.

FIELD WORK AND INSTRUMENTS.—XXV.  
 Levelling Instruments.

XI.—PASTORELLI'S LEVEL.

Pastorelli's instrument, the horizontal bar to which the telescope is attached is either made shorter than in other patterns, or is dispensed with altogether. In the latter case, the telescope is soldered to a saddle-piece, the base of which is made parallel to the axis of the telescope, and the saddle-piece is also rigidly fitted to the gun-metal stem or pivot, which connects it with the joint at the parallel plates. In the former case, as shown in fig. 1, the telescope can be detached at the screw connexion indicated in figs. 2 and 3. By a comparison of the elevation shown in fig. 2 and of the section shown in fig. 3 with the general elevation given in fig. 1, it will be seen that the vertical axis of the instrument, marked C, terminates in a socket which rests upon a gun-metal ball formed over the centre of the lower parallel plate. This is marked B in the illustration, and the construction permits the instrument to traverse vertically about 20 degrees of inclination from the perpendicular. The underneath of the vertical axis is formed in an inverted cup shape, the curve radiating from the centre of the ball-joint. The lower parallel plate, marked A, is screwed on to a special form of tripod head, originally suggested by the late Mr. W. Froude. The three pairs of cheeks, to which the legs are here attached, are set wider apart than in the ordinary systems, and arrangements are provided for tightening the trunnions in their connexion at the cheeks, by bisecting the cylindrical bearings in which the leg-joints work, and fastening them together by means of the capstan-headed screws indicated in fig. 1. This improvement conduces to increased steadiness and freedom from vibration as wear goes on, so far as the tripod head is concerned. The wooden legs are each circular in section, and when closed up for conveying from one station to another are very uncomfortable to carry.

The level is retained in position by the upper

parallel plate marked E, which encircles the inverted cup marked D, and is clamped by the milled-headed adjustment screws marked F. The cup-piece, D, is concentric with the ball-joint, B. The parallel plate adjustment screws each have spherical projections formed under their heads, which projections work in corresponding sockets formed in the top side of the upper parallel plate. These screws work in movable hemispherical nuts marked G, which themselves are held in seats, as shown attached to the lower parallel plate. By tightening or slackening these screws, the upper parallel plate is made to clamp or to release the inverted cup attached to the vertical axis of the instrument. By loosening any two adjacent screws, F, F, the telescope can be tilted over by hand in the required direction, until the longitudinal bubble is approximately in the centre of its run, final adjustment being effected, after tightening the adjacent screws previously slackened, by turning the opposite parallel plate screws in the usual way. The tripod may be set upon the ground almost irrespective of level, and the telescope thus accurately set level without straining the parallel plates. Unlike the above arrangements, the ordinary parallel plates are very limited in their action, compelling the tripod-head to be placed within a small deviation from a horizontal plane, whereas the combination of the movable ball-joint with the parallel plate clamp, enables this form of tripod to prove of great value for work over very uneven country. It will be observed, however, that in this instrument the telescope stands higher than in ordinary instruments, and that, consequently, the vertical axis is longer. Before carrying the instrument from one station to another, care must be taken to tighten the plate-screws sufficiently to prevent the telescope from falling over in its vertical axis bearing. It will be further noticed that around the telescope are soldered two cylindrical gun-metal collars, very accurately turned and fitted to a perfect circumference. The longitudinal bubble, being fastened to these collars, can be fitted and framed parallel to the mechanical and optical axis of the telescope, with which the line of collimation should be

coincident. The centres of the movable nuts of the plate-screws are placed by the makers in the same geometrical plane as the centre of the half-joint at the foot of the vertical axis, thus insuring the most perfect action in the motion of the upper parallel plate.

RECENT SALES OF PROPERTY.

Table listing recent property sales with columns for location, agent, and price. Includes entries like 'Kensington Town-161, Prince of Wales-road, 63 years, ground-rent 7s. 6d., £430' and 'Clare Market-62 and 63, Stanhope street, freehold, 1,800'.

Table listing property sales with columns for location, agent, and price. Includes entries like '117, 118, and 119, Letchmere-grove, 87 years, ground-rent 12s., £220' and 'Malden Hill-22, Maids Hill West, 29 years, ground-rent 10s., 450'.

MEETINGS.

Table listing meetings with columns for date, organization, and location. Includes 'SATURDAY, JUNE 18. Architectural Association.-Visit to Cambridge.' and 'THURSDAY, JUNE 23. Society for the Encouragement of the Fine Arts.-A Morning Meeting.'

Miscellaneous.

Articles including 'Sale of a Building Estate at Cromer.-On Monday last a large sale of building land, in numerous plots, took place at Cromer.' and 'Abusing a Sanitary Inspector.-In a case which was heard last week by the magistrates sitting at Coventry, where the defendant, a pig-keeper, was convicted and fined for using obscene language to the Sanitary Inspector there,--insulting him whilst engaged in the performance of his duties under the Public Health Act, 1875.--Mr. T. Browett, the Town Clerk, who appeared for the complainant, remarked that the people who kept pigs, many of them honestly believed that their pig-styes, however filthy, were not a nuisance, and they resented, and occasionally they resented violently, any interference with pig-keeping.'

Registration and Technical Education of Plumbers in Scotland.

A meeting of masters and journeymen plumbers, architects, and builders, for the purpose of forming a local branch in connexion with the system of registration and technical education of plumbers established by the Company of Plumbers, London, and the City and Guilds Institute, was held on the 8th inst., in the Town-hall, Dundee. There was a large attendance, those present representing Forfarshire, Perthshire, and Fifeshire. Provost Ballingall presided. Mr. W. R. E. Coles, London, made a statement explanatory of the objects and working of the system of registration and technical education of plumbers. Dr. Anderson, medical officer for Dundee, afterwards adverted to the heavy mortality from typhoid fever and diphtheria in Dundee, resulting through escaped plumber work in many new houses erected after the passing of the Improvement Act. He stated the voluntary registration was good so far as it went, but argued that registration should be compulsory. Mr. Stewart Robertson moved that the meeting approve of the system of registration and technical training of plumbers, and in view of the important position which the plumbers' craft occupies in relation to the public health, agree to the formation of a local branch, upon condition that the executive and examiners be practically acquainted with the Scotch method of plumbing and its technicalities. Mr. Frew, Perth, seconded, and the motion was cordially adopted. Professor Ewing, of University College, Dundee, who also expressed approval of the proposal that the registration of plumbers should be compulsory, said that in a day or two ground would be broken in Dundee for the erection of a new technical school, and said that would be a consideration for the committee whether they should not institute classes, applicable to plumbers and plumbing-work. A committee, with Provost Ballingall as president, was then formed.

Abusing a Sanitary Inspector.-In a case which was heard last week by the magistrates sitting at Coventry, where the defendant, a pig-keeper, was convicted and fined for using obscene language to the Sanitary Inspector there,--insulting him whilst engaged in the performance of his duties under the Public Health Act, 1875.--Mr. T. Browett, the Town Clerk, who appeared for the complainant, remarked that the people who kept pigs, many of them honestly believed that their pig-styes, however filthy, were not a nuisance, and they resented, and occasionally they resented violently, any interference with pig-keeping. It was known to the Sanitary Committee, and he thought, to almost all intelligent people, that that was a dangerous delusion. Fevers constantly infested the city,--they were never without fevers,--and they were almost constantly traced to polluted air or polluted water. That people were struck down by these invisible foes was as plain as if they were struck down by a weapon, and yet the pig-dealers could not be brought to believe in this truth. The duties of an Inspector of Nuisances, therefore, were necessary, and his services of great importance to the public. They were also at times extremely nauseous and repulsive, and ought not to be made intolerable to the Inspector by conduct such as that of the defendant towards the complainant.

Improvements in Enamelled Bricks.-According to the Bulletin de la Ceramique, M. Laloy has patented a process for making enamelled bricks, remarkable for its simplicity. Furnace baking being relatively expensive, he bakes in moulds in the open air, as is usual in Flanders for ordinary bricks. He mixes with the clay a certain proportion of dust from coke, coal, or any other combustible substance, which is diffused throughout the mass by the kneading machine. The moulded and dried products receive the enamel colours according to the usual methods, and are laid in a pile according as the fire rises. The baking is said to be complete, and the vitrification of the coating perfectly homogeneous.

The Cement Trade in Germany.-The German cement industry (notably that of Silosia), has benefited by the re-opening of the Roumanian market, through the treaty of commerce between the two nations. The Schlesische Zeitung remarks that the English article which, on account of low sea freight, has been in a favoured position for some years, has now energetic opposition from the German product.

**Church Restoration in London.**—The Church of the Holy Trinity, Little Queen-street, Holborn, which was built about fifty years ago, has been recently re-opened, after some additions and improvements effected from the designs and superintendence of Mr. C. Forster Hayward, F.S.A., Museum-street, Bloomsbury. These include the unusual but most successful change in position of the altar from east to west, a matter which was most carefully considered, and not carried out till the sanction of all the authorities was obtained, and a faculty duly issued after inquiry, but a change of arrangement which might well be followed by many other churches where the frontage is towards the east with entrance lobbies right and left of the Communion-table, as was the case in this Little Queen-street church. The western gallery and useless enclosure beneath, and a strip of each gallery, north and south, being removed, a wide space was obtained for a raised chancel enclosure, with pierced stone parapets; the organ, formerly in this western gallery, being placed on the north, and vestry screens on the south side, the old pulpit and desks being cut down in height and refixed. The new chancel stalls in oak were carved by Robinson. The tiles for the sacarium were supplied by Messrs. Carter & Co., and those elsewhere by Messrs. Simpson (for Maw & Co.). The stained glass (the gift of Mr. Bateman) for the new window over the altar is by Messrs. Moore & Co.—On the 25th of May was laid the foundation-stone of St. James's Church, in a fast-growing suburb which is locally designated West Hampstead. Mr. A. W. Blomfield is the architect, and the contractor is Mr. J. Woodward, of Pinbury. The design is in the Early English style; the materials are red brick with Portland and Bath stone dressings; the capacity, 1,000 worshippers. A grant of 1,000l. has been made from out of the Bishop of London's Fund, and Mr. James La Fontaine subscribes 2,000l. towards the whole cost, which is estimated at 8,300l. These subscriptions bring the present contributions up to a total of nearly 6,000l.—Designs for the decoration and restoration of the chancel of St. Philip's Church, Camberwell, have been prepared by Mr. H. P. Burke Downing, architect, and the work is being carried out under his supervision as the Jubilee memorial of the parish. The decorations in all will be executed by Mr. R. Davison, of Marytebone-road.

**Leeds and Yorkshire Architectural Society.**—A general meeting of the members of the Associates' Sketching and Art Club was held on Monday evening, the 13th inst., at the Society's Rooms, Croft's-chambers, Infirmary-street. After the usual business, there was an interesting discussion on the sketches produced during the past month, amongst the most creditable of which are Mr. F. W. Bedford's "Interior, Gainsborough Manor House," Mr. J. W. Twist's "Old Font and Cover, Selby Abbey Church"; Mr. A. E. Dixon's "Lumb Hall, near Drighlington"; and Mr. W. Carley Hall's "Chapter House, Kirkstall Abbey." The drawings will remain on view to the public until Friday, the 17th inst.

**Architecture at University College, London.**—The prizes annually offered by Professor Roger Smith for the best set of sketches illustrative of the subjects of the lectures on architecture during the session have just been awarded. In the art class the first prize falls to Mr. John Borrowman, jun., the second to Mr. Harold Lander, and the third to Mr. Herbert Winny. In the science class the first prize is gained by Mr. Ernest A. Rüntz, and the second by Mr. R. S. Maynard. By the courtesy of the Directors of the Crystal Palace, the students of these classes, to the number of nearly thirty, paid a visit, on Friday, the 10th inst., to the Fine Art Courts at the Palace; some of the most remarkable of their contents were pointed out by the Professor.

**Gillingham.**—A large population having sprung up within the last few years at Gillingham, on account of its proximity to the Chatham Dockyards, it is found necessary to provide increased church accommodation. A strong committee has therefore been formed to build a new church to be called St. Barnabas, and Messrs. J. E. K. & J. P. Cnts. have been instructed to prepare plans. The church is to seat 600, and to cost about 8,000l. Gillingham is the head quarters of that curious sect the Jezzeelites, who are building a large temple there.

**British Archaeological Association.**—The closing meeting of the session was held on the 1st of June, Mr. Thos. Morgan, F.S.A., in the chair. It was announced that the Association had been invited to hold the Congress for 1888 at Glasgow, and that the invitation had been provisionally accepted. The Rev. Prebendary Scarth exhibited a board of bronze implements recently found at Penseymoor, near Neath. The articles were much worn, and appeared to be the stock-in-trade of a founder. Mr. Loftus Brock, F.S.A., exhibited a perfect example of rare Sieberg were obtained from Germany of similar pattern to what is sometimes found in excavations in London. Drawings were sent by Mr. J. T. Irvine of a small cup of green glass not unlike Roman work, but more probably of Early Saxon date. It was recently found in a coffin with an interment at Peterborough Cathedral. Mr. Walter Myers, F.S.A., described some curious bronze huckles of Etruscan date and other personal ornaments found near Ancona. A paper was then read by Mr. J. Romilly Allan, F.S.A. (Scot.), on the "Antiquity of Fonts." The existence of church fonts of earlier date than the Norman Conquest was proved by reference to many existing examples, some bearing inscriptions, as at Potterue, Wilts, or covered with interlaced ornament as at Penmon, Deorhurst, and other places. At Bingley, Yorkshire, is a curious font with a Runic inscription, and at Little Billing, Northants, and at Patrishow inscriptions in Saxon uncial characters occur. The second paper was on the "Excavations of the Site of Poughley Priory, Berks," by Mr. H. J. Reid, F.S.A., which have recently been carried out by the lecturer. The ground plan of the church has been recovered in part. It is not truly Orientated, but three interments found in the chancel are so placed. Two thigh-bones were found arranged in the form of a St. Andrew's cross over one of the interments.

PRICES CURRENT OF MATERIALS.

| TIMBER.                                                  | £. s. d. | £. s. d. |
|----------------------------------------------------------|----------|----------|
| Oreenheart, E.O. ....ton                                 | 5 10 0   | 7 10 0   |
| Teak, E.I. ....foot load                                 | 8 0 0    | 12 0 0   |
| Sequoia, U.S. ....foot cube                              | 0 2 3    | 0 3 0    |
| Ash, Canada ....load                                     | 2 0 0    | 3 10 0   |
| Birch " " " " " "                                        | 3 10 0   | 4 10 0   |
| Elm " " " " " "                                          | 1 10 0   | 4 0 0    |
| Fir, Dantsic, &c. ....                                   | 2 10 0   | 4 10 0   |
| Oak " " " " " "                                          | 3 0 0    | 6 0 0    |
| Canada " " " " " "                                       | 2 10 0   | 3 10 0   |
| " yellow " " " " " "                                     | 2 0 0    | 4 10 0   |
| Lash, Dantsic ....fathom                                 | 3 0 0    | 5 10 0   |
| St. Petersburg " " " " " "                               | 4 0 0    | 5 10 0   |
| Wainscot, Riga " " " " " "                               | 0 0 0    | 0 0 0    |
| " Odessa, crown " " " " " "                              | 2 15 0   | 3 0 0    |
| Deal, Finland, 2nd and 3rd, std. 100                     | 7 0 0    | 8 0 0    |
| " " 4th and 3rd " " " " " "                              | 5 10 0   | 6 10 0   |
| Biga " " " " " "                                         | 5 10 0   | 7 0 0    |
| St. Petersburg, 1st yellow " " " " " "                   | 8 0 0    | 13 0 0   |
| " " 2nd " " " " " "                                      | 7 0 0    | 8 0 0    |
| " " white " " " " " "                                    | 6 10 0   | 8 10 0   |
| Swedish " " " " " "                                      | 0 0 0    | 0 0 0    |
| White Sea " " " " " "                                    | 7 0 0    | 16 0 0   |
| Canada, Pine, 1st " " " " " "                            | 10 0 0   | 15 0 0   |
| " " 2nd " " " " " "                                      | 6 0 0    | 9 0 0    |
| " " 3rd, &c. " " " " " "                                 | 8 0 0    | 9 0 0    |
| " " Spruce, 1st " " " " " "                              | 7 0 0    | 7 0 0    |
| " " 3rd and 2nd " " " " " "                              | 5 0 0    | 6 10 0   |
| Deal, New Brunswick, &c. ....                            | 4 0 0    | 10 10 0  |
| Flooring Boards, sq., 1 in., prepared, First " " " " " " | 0 8 0    | 0 11 0   |
| Second " " " " " "                                       | 0 6 0    | 0 7 6    |
| Other qualities " " " " " "                              | 0 5 0    | 0 6 0    |
| Cedar, Cuba " " " " " "                                  | 0 0 31   | 0 0 34   |
| Honduras, &c. " " " " " "                                | 0 0 2    | 0 0 7    |
| Tobacco " " " " " "                                      | 0 0 4    | 0 0 7    |
| Mahogany, Cuba " " " " " "                               | 0 0 4    | 0 0 7    |
| St. Domingo, cargo average " " " " " "                   | 0 0 4    | 0 0 6    |
| Mahogany, Mexican, cargo av. ....                        | 0 0 34   | 0 0 4    |
| Tobacco " " " " " "                                      | 0 0 4    | 0 0 54   |
| Honduras " " " " " "                                     | 0 0 31   | 0 0 54   |
| Maple, Bird's-eye " " " " " "                            | 0 0 6    | 0 0 8    |
| Rose, Rio " " " " " "                                    | 8 0 0    | 11 0 0   |
| Balsa " " " " " "                                        | 16 0 0   | 24 0 0   |
| Box, Turkey " " " " " "                                  | 5 0 0    | 12 0 0   |
| Satin, St. Domingo " " " " " "                           | 0 0 5    | 0 0 9    |
| Porto Rico " " " " " "                                   | 0 0 6    | 0 10 0   |
| Walnut, Italian " " " " " "                              | 0 0 34   | 0 0 54   |

| METALS.                            | £. s. d. | £. s. d. |
|------------------------------------|----------|----------|
| Iron—Bar, Welsh, in London.....ton | 4 7 6    | 4 15 0   |
| " " " " " " " " " " " "            | 4 2 6    | 4 7 6    |
| " " Staffordshire, London.....     | 5 10 0   | 6 0 0    |
| Sheets, single, in London.....     | 6 15 0   | 8 10 0   |
| Hoops " " " " " " " " " "          | 8 0 0    | 7 0 0    |
| Nail-roads " " " " " " " " " "     | 5 15 0   | 6 10 0   |
| COPPER—                            |          |          |
| British, cake and ingot.....ton    | 42 10 0  | 43 0 0   |
| Best selected " " " " " " " " " "  | 44 0 0   | 44 10 0  |
| Sheets, strong.....                | 50 0 0   | 0 0 0    |
| Cast, bars.....                    | 39 0 0   | 39 10 0  |
| YELLOW METAL.....lb.               | 0 0 0    | 0 0 0    |
| LEAD—                              |          |          |
| Fine, Spanish.....ton              | 12 7 6   | 0 0 0    |
| English, common brands.....        | 12 12 6  | 0 0 0    |
| Sheet, English.....                | 13 12 6  | 13 0 6   |
| SPELTIE—                           |          |          |
| Silesian, special.....ton          | 14 12 6  | 14 15 0  |
| Ordinary brands.....               | 14 10 0  | 14 12 6  |

| METALS (continued).   | £. s. d. | £. s. d. |
|-----------------------|----------|----------|
| TIN—                  |          |          |
| Straits.....ton       | 102 15 0 | 103 0 0  |
| Anstralian.....       | 103 0 0  | 0 0 0    |
| English ingots.....   | 106 0 0  | 0 0 0    |
| ZINC—                 |          |          |
| English sheet.....ton | 0 0 0    | 0 0 0    |

| OILS.                               | £. s. d. | £. s. d. |
|-------------------------------------|----------|----------|
| Linseed.....ton                     | 20 10 0  | 22 15 0  |
| Cocunut, Cochin.....                | 30 0 0   | 33 0 0   |
| Ceylon.....                         | 24 0 0   | 24 5 0   |
| Palin, Lagos.....                   | 21 10 0  | 0 0 0    |
| Rapeseed, English pale.....         | 21 0 0   | 24 5 0   |
| " " brown.....                      | 22 10 0  | 22 15 0  |
| Cottonseed, refined (accepted)..... | 21 5 0   | 22 0 0   |
| Tallow and Oleine.....              | 25 0 0   | 45 0 0   |
| Lubricating, U.S.....               | 5 0 0    | 6 0 0    |
| " " refined.....                    | 5 0 0    | 12 0 0   |
| TURPENTINE—                         |          |          |
| American, in casks.....cwt.         | 1 3 6    | 1 9 9    |
| TAR—                                |          |          |
| Stockholm.....barrel                | 0 14 0   | 0 14 6   |
| Archangel.....                      | 0 11 6   | 0 12 0   |

TENDERS

**BEDFORD.**—For the erection of shops in Silver-street, for the Trustees of St. John's Hospital. Messrs. Usher & Anthony, architects and surveyors, Bedford.—

|                         |            |
|-------------------------|------------|
| J. Fetter.....          | £1,960 0 0 |
| Melcombe Bros.....      | 1,947 0 0  |
| S. Foster.....          | 1,865 0 0  |
| T. Spencer.....         | 1,852 0 0  |
| G. Harrison.....        | 1,849 0 0  |
| J. Smith.....           | 1,847 0 0  |
| J. P. White.....        | 1,843 0 0  |
| Coleman & Paterson..... | 1,829 10 0 |
| Watson & Walker.....    | 1,819 0 0  |

**BEESTON (Notts).**—For erection of a double villa, St. John's Grove, Beeston, Notts. Mr. J. Bindon Carter, architect, Esckell Chambers, Market-place, Nottingham.—

|                               |          |
|-------------------------------|----------|
| Oscroft & Labram.....         | £890 0 0 |
| H. Bott.....                  | 845 0 0  |
| O. Phipps.....                | 785 0 0  |
| J. O. Thomas.....             | 741 15 0 |
| John Cooper.....              | 732 0 0  |
| Hayfield & Frost.....         | 723 0 0  |
| S. & J. Carehill.....         | 698 0 0  |
| G. Harrison.....              | 694 0 0  |
| Olthert & Oobitts.....        | 677 0 0  |
| Charles Starr, Beeston.....   | 663 0 0  |
| J. F. Price.....              | 631 0 0  |
| T. H. Artwell (accepted)..... | 619 0 0  |

[\* The rest of Nottingham.]

**BORROWASH (near Derby).**—For additions and alterations to Borrowash Mills, belonging to the Earl of Harrington, Mr. W. H. Badford, architect, Nottingham.—

|                                   |            |
|-----------------------------------|------------|
| F. J. Middleton, Nottingham.....  | £3,400 0 0 |
| R. Weston, Derby.....             | 2,701 0 0  |
| J. Hutchinson, Nottingham.....    | 2,500 0 0  |
| G. Bell & Sons, Nottingham.....   | 2,440 0 0  |
| Charles Wood, Nottingham.....     | 2,445 0 0  |
| F. Shaw & Sons, Ilkeston.....     | 2,440 0 0  |
| J. Bromhead, Nottingham.....      | 2,440 0 0  |
| F. Wernaby, Nottingham.....       | 2,366 0 0  |
| W. Walkeringe, Derby.....         | 2,360 0 0  |
| W. Eaton, Derby.....              | 2,315 0 0  |
| W. Vickers, Nottingham.....       | 2,298 0 0  |
| H. Bott, Nottingham.....          | 2,295 0 0  |
| Arthur Brown, Derby.....          | 2,290 0 0  |
| Robert Hookley, Grantham.....     | 2,285 0 0  |
| Wheatley & Maule, Nottingham..... | 2,260 0 0  |
| F. Slater, Derby (accepted).....  | 2,118 3 9  |

**BRISTOL.**—For forming and constructing new road and sewers at Bedminster, for Mr. J. B. Hasell, Mr. Herbert J. Jones, surveyor, Bristol.—

|                                 |          |
|---------------------------------|----------|
| E. Wallers.....                 | £230 0 0 |
| W. Church.....                  | 317 15 0 |
| R. Wilkins & Sons.....          | 298 0 0  |
| Eastbrook & Sons.....           | 274 0 0  |
| Beachin & Belmont.....          | 253 19 0 |
| T. R. Lewis.....                | 27 0 0   |
| Dunford & Son.....              | 275 0 0  |
| O. Humphreys.....               | 259 0 0  |
| S. Turner.....                  | 252 0 0  |
| J. Perrott (accepted).....      | 230 0 0  |
| W. Mereweather (withdrawn)..... | 210 0 0  |

[All of Bristol.]

**BRISTOL.**—For additions to the schoolroom of the Wesleyan Chapel, Redland-road. Mr. Herbert J. Jones, architect, Bristol.—

|                                |          |
|--------------------------------|----------|
| First portion. Second portion. |          |
| R. Wilkins & Sons.....         | £214 0 0 |
| G. Humphreys.....              | 238 0 0  |
| J. Perrott.....                | 222 0 0  |
| Eastbrook & Sons.....          | 219 0 0  |
| T. R. Lewis.....               | 187 0 0  |

[All of Bristol.]

\* Conditionally accepted.

**BRISTOL.**—For new roof, &c., to warehouse, Nelson-street, for Messrs. F. W. Gedge & Sons. Mr. Herbert J. Jones, architect, Bristol.—

|                           |          |
|---------------------------|----------|
| P. Young.....             | £184 8 8 |
| Eastbrook & Sons.....     | 177 0 0  |
| G. Humphreys.....         | 171 0 0  |
| H. Johnson.....           | 170 0 0  |
| E. Wilkins & Sons.....    | 164 0 0  |
| J. Perrott.....           | 156 12 0 |
| T. R. Lewis.....          | 168 0 0  |
| W. Church (accepted)..... | 169 15 7 |

[All of Bristol.]

**BUCKHURST HILL.**—For alterations to Nos. 4 to 9 (inclusive), Queen's-road; 1 to 3 (inclusive), Albert-road; 1 to 5 (inclusive), Albert-road, North; 2 (inclusive), Chabford-terrace, Buckhurst Hill. Mr. Banister Fletcher, architect.—

|                       |            |
|-----------------------|------------|
| Schooling & Wood..... | £2,625 0 0 |
| S. Blore.....         | 1,330 0 0  |
| Steel Bros.....       | 1,425 0 0  |
| A. W. Green.....      | 1,004 18 0 |
| J. Fanthorpe.....     | 847 0 0    |
| John Powell.....      | 728 0 0    |

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Table with 4 columns: Nature of Work, By whom required, Premium, Design to be delivered, Page. Includes entry for Technical School, Stockport.

CONTRACTS.

Table with 5 columns: Nature of Work, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Lists various construction contracts.

PUBLIC APPOINTMENTS.

Table with 5 columns: Nature of Appointment, By whom advertised, Salary, Applications to be in, Page. Lists public appointments.

CARLETON (Mon.). For proposed Boys' Upper School, Carleton, Newport, Mon. Mr. E. A. Lansdowne, architect, Newport, Mon. Quantities by the architect:—

CHROYDON.—For alterations to the Gun Tavern, Church-street, Chroydon, for Mr. C. Beaumont, Mr. H. I. Newton, architect, Queen Anne's Gate, Westminster.—

HALLSVILLE (Essex).—For the erection of a block of school buildings and appurtenances, to be known as the Beaton-road Schools, Hallsville, for the West Ham School Board. Mr. J. T. Newman, architect, No. 2, Fen-court, E.C. Quantities by Messrs. R. L. Curtis & Sons:—

HATFIELD.—For erection of One Bell Hotel and Drayhorse public-house at Hatfield, for Messrs. Frer, Rice, & Co. Mr. W. D. Church, architect:—

KETERING.—For the erection of six houses in Gordon-street, Kettering, for the Kettering "Manchester Order of Oddfellows, Mr. H. V. Bird, Mr. E. A. Cooper, architect. Quantities supplied by the architect:—

KETERING.—For the erection of two houses, The Broadway, Kettering, for Mr. H. V. Bird, Mr. E. A. Cooper, architect. Quantities supplied by the architect:—

LONDON.—For erection of King's Arms public-house and two shops, Charing Cross-road. Messrs. Wilson & Long, architects:—

LONDON.—For pulling down and re-building the premises No. 17, Catherine-street, Strand, for the executors of the late Sir Horace Jones, Knt. Messrs. William Reddall & Son, 10, South-street, Finsbury, architects:—

LONDON.—For gas-fitting work at the "Lord Hill," Waterloo-road:—

LONDON.—For alterations to No. 52, Strand, for Mr. J. Gianella, Mr. Banister Fletcher, architect:—

LONDON.—For alterations to Nos. 239, 241, 243, and 245, Manchester-road, Calcutt Town, Mr. Banister Fletcher, architect:—

LONDON.—For alteration at the George and Dragon, Hackney-road, for Messrs. Francis & Son, Messrs. Alexander & Gibbon architects, Great James-street:—

LONDON.—For alteration and additions to No. 37, Cleveland-square, Mr. W. Jacob Gibson, architect:—

LONDON.—For alterations and additions to No. 44, Cleveland-square, Mr. W. Jacob Gibson, architect:—

LONDON.—For the erection of iron staircase from the Victoria Embankment to the Charing Cross footbridge, for the Metropolitan Board of Works. Sir J. W. Bazalgette, engineer:—

NEWCASTLE-ON-TYNE.—For additional farm buildings, &c., for the Visiting Justices to the City Lunatic Asylum. Quantities, &c., by the architect, Mr. Arthur B. Plummer:—

NEWPORT (Mon.).—For six shop-fronts and other alterations at Bolton-terrace, Newport, for Mr. C. Pearce:—

NEWPORT (Mon.).—For the erection of new Children's Jubilee Ward and additions to the Newport (Mon.) Infirmary. Messrs. W. O. Haberton & Pawker, architects:—

NORTH KENSINGTON.—For the erection of a parish hall for the Parish of Christ Church. Messrs. J. E. K. & J. P. Catts, architects:—

NORWOOD.—For construction of swimming-baths, Upper Norwood, for the Norwood Public Hall Company. Mr. J. Watt, architect. Quantities supplied by Messrs. T. Marcus Houghton and Robert Henry Kerr:—

NEWCASTLE-ON-TYNE.—For additional farm buildings, &c., for the Visiting Justices to the City Lunatic Asylum. Quantities, &c., by the architect, Mr. Arthur B. Plummer:—

**PENGE.**—For the enlargement of the Melvin-road School, Penze (Greenwich AO), by 400 places, for the School Board for London. Mr. T. J. Bailey, architect.—

|                     |            |
|---------------------|------------|
| T. Simpson.....     | £3,744 0 0 |
| G. J. Kirk.....     | 3,381 4 6  |
| J. & C. Bonyar..... | 3,206 0 0  |
| C. Wall.....        | 3,018 0 0  |
| W. Johnson.....     | 2,960 0 0  |

\* Recommended by the Works Committee for acceptance, subject to the usual conditions.

**PIMLICO.**—For alterations and additions to the Windsor Castle, Wilton-road, Pimlico, for Mr. S. Ravan. Mr. H. I. Newton, architect, 17, Queen Anne's Gate, Westminster.—

|                                        |            |
|----------------------------------------|------------|
| Walker.....                            | £1,770 0 0 |
| Jackson & Todd.....                    | 1,470 0 0  |
| Godden.....                            | 1,565 0 0  |
| Burman & Sons.....                     | 1,645 0 0  |
| Haylock.....                           | 1,530 0 0  |
| Smith, Belgrave-square (accepted)..... | 1,341 0 0  |

**PUTNEY.**—For a new road called "Chelverton-road," with sewer, connexions, manholes, gullies, &c., for the British Land Company Limited, on their Putney Station Estate. Mr. Henry D. Mitchell, surveyor.—

|                                     |            |
|-------------------------------------|------------|
| Killingback, Camden Town.....       | £1,075 0 0 |
| Nowell & Robson, Kensington.....    | 1,068 0 0  |
| Dunmore, Hornsey.....               | 914 0 0    |
| Harris, Camberwell.....             | 898 0 0    |
| Bloomfield, Tottenham.....          | 888 0 0    |
| Jackson, Leyton.....                | 876 0 0    |
| Phizey, Hornsey.....                | 865 0 0    |
| Wilson, Walthamstow.....            | 844 0 0    |
| Peil, Bromley, Kent (accepted)..... | 841 0 0    |

**READING.**—For the erection of new cow-house, stores, &c., Whitley Rise, Mr. C. B. Stevens.—

|                                          |          |
|------------------------------------------|----------|
| G. S. Lewis, Castle-street, Reading..... | £200 0 0 |
|------------------------------------------|----------|

\* Accepted. [No competition.]

**READING.**—For rebuilding stores and cart-sheds for Mr. C. Marchant.—

|                                          |          |
|------------------------------------------|----------|
| G. S. Lewis, Castle-street, Reading..... | £110 0 0 |
|------------------------------------------|----------|

\* Accepted. [No competition.]

**SAWRIDGEWORTH.**—For the erection of new barley kilns, &c., at Sawbridgeworth, Herts, for Messrs. Barnard & Co., Messrs. Davison, Inskip, & Mackenzie, architects, 5, Bedford-row. Quantities by Messrs. R. L. Curtis & Sons.—

|                                   |            |
|-----------------------------------|------------|
| F. Hitch, Ware.....               | £2,247 0 0 |
| J. Morley, Stratford.....         | 2,175 0 0  |
| Burton & Son, Sawbridgeworth..... | 2,174 0 0  |
| T. W. Smith & Son, Islington..... | 2,148 0 0  |
| J. A. A. Brown, Baintree.....     | 2,090 0 0  |

**TEDDINGTON.**—For a house for Mr. C. T. Dym-Borchell. Messrs. J. E. K. & J. P. Cutts, architects.—

|                      |            |
|----------------------|------------|
| J. Treverman.....    | £2,696 0 0 |
| J. Holloway.....     | 2,550 0 0  |
| J. F. Collinson..... | 2,498 0 0  |
| Lather Bros.....     | 2,400 0 0  |
| W. Hinkinhotham..... | 2,370 0 0  |
| J. Fuller.....       | 2,327 0 0  |

**UPPER CLAPTON.**—For stables, &c., Upper Clapton. Mr. J. Hamilton, architect.—

|                                |          |
|--------------------------------|----------|
| Godfrey & Son, Clapton.....    | £287 0 0 |
| Exton & Burton, Kingsland..... | 255 0 0  |
| Bowden & Son, Walthamstow..... | 250 0 0  |
| W. Shurmur, Lower Clapton..... | 243 0 0  |

**WORKING.**—For new memorial house for six Indian students at the Oriental Institute, Working. Mr. William I. Chambers, architect.—

|                                        |          |
|----------------------------------------|----------|
| George Shears, Maybury (accepted)..... | £990 0 0 |
|----------------------------------------|----------|

**WORKINGHAM (Berks).**—For the erection of two houses, Langborough-road, for Mrs. J. Taylor.—

|                                          |          |
|------------------------------------------|----------|
| G. S. Lewis, Castle-street, Reading..... | £490 0 0 |
|------------------------------------------|----------|

\* Accepted. [No competition.]

**Duke of York P.H., Myrtle-street.**—In the list of tenders for works here published last week (p. 859), for "J. Wessle, £1,598," read "J. Beale (accepted), £1,568."

\* **SPECIAL NOTICE.**—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 48, Catherine-street, W.C., not later than 12 Noon on THURSDAYS.

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# The Builder.

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SATURDAY, JUNE 25, 1887.

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### Architecture in the Reign of Queen Victoria.



HE reign, the fiftieth anniversary of which the whole country has this week been celebrating with so much unaffected and loyal good-will and enthusiasm, includes what has

been in many respects a most eventful period; more eventful, perhaps, than many of those who have lived through the greater part of it altogether realise. It has been a time marked by immense changes, especially in political and in scientific thought. Whether the first-named class of changes have all been in the direction of progress is a matter on which there will be various opinions and on which we, on principle, abstain from expressing any opinion in these columns, the business of which is not with politics. But as to scientific progress, there can be no question at all. The last half-century has been one of the most remarkable epochs in modern history, perhaps in history of any date, in regard to the strides taken by science and the increased predominance of the scientific spirit. In mechanical science the development of steam locomotion by land and sea, and especially the development of the railway system, is a physical fact the results of which are before every eye, and which is, therefore, the most popularly appreciated. The invention and development of the electric telegraph comes only second to this in popular appreciation; and in comparison with this the science and art of electric lighting and electric motors, destined probably to play as important a part, are really only just at their commencement. But history will place even these achievements, which concern only our material convenience, as far inferior in importance to the great changes which have taken place in what may be called the higher strata of scientific thought. The great generalisation of Darwin, one of the greatest generalisations ever made by one mind, has permeated all contemporary thought, and altered the whole course of ideas in regard to the philosophy of life. The development of the spectrum analysis has placed us in chemical relations with other worlds situated at almost inconceivable distances from the earth, so that we can investigate the chemical constituents of a body whose very disc we cannot optically define with any telescope yet made; and the spectroscope is still, probably, in the infancy of its achievements. These two facts alone,—the promulgation of the Darwinian idea, and the discovery of the

power of the spectroscope,—would suffice to stamp this last fifty years as what it essentially is,—a great scientific epoch.

It is not without a direct reference to the subject indicated at the head of this article that we commence by a reference to the scientific achievements of the present reign. It must be admitted that this has not been a great artistic epoch,—not in the same sense and with the same extent of meaning in which we call it a great scientific epoch. And it is well to remember that this admission involves no depreciation of the standard of intellect of the present day. It is only that the most eager and gifted portion of the intellect of the time has been turned in the direction of science, not in that of art.

We cannot, therefore, expect to find the same definite progress, the same well-defined aims, in looking at the art and architecture of Queen Victoria's reign, which we find marking the scientific achievements of the same epoch. Science during this period has known what she wanted; Art has not. Art has been trying one experiment after another, satisfied with each for a time; satisfied permanently with none. But the spectacle is not without its interest, nor have we been without definite progress and improvement in certain respects.

The reign has, at all events, produced one great building; and that is something to say for the architecture even of a long reign, seeing how few and far between such achievements are. But we think the Westminster Palace does merit the title of a great building, and it is interesting to note that its commencement was very nearly coincident with the commencement of the present fifty years we have been celebrating. It represented a kind of forcing forward, in one particular instance, of the architectural movement which was in progress during the earlier portion of the Victorian era, the Gothic revival. There was not at that period any such general movement in favour of Gothic as would have led naturally to the adoption of the Gothic style for a national building of that importance. Some years after the commencement of the Westminster Palace, we were discussing in the columns of this journal, in 1843, the *pros* and *cons*. of the proposed unsuitable columnar Classic façade to the British Museum; Elmes's design for his great building at Liverpool was beginning to be spoken of as a new piece of Classic architecture, which would probably throw Smirke's proposed achievement at the Museum considerably into the shade; and two years later, one of the erections about which public and professional interest was excited was the big piece of Doric architecture which still forms the entrance *pylon* to

Easton Station. The employment of the Gothic style, therefore, for our great legislative building actually forestalled the general adoption of the movement in England,—a very unusual event in architecture. Whether Barry would have produced something finer than the existing building had he been left a free hand, instead of being saddled with a style with which he did not naturally sympathise, we can only conjecture now. It is very possible that he would. But the result, as it is, is not unworthy of the occasion.

The Gothic revival, however, was the most important architectural movement operating during a great portion of the present reign, which architecturally might, perhaps, be best remembered as the epoch of the restoring of the cathedrals. It is curious, and perhaps, in a sense, rather pathetic, to look back now to the days when Gothic architecture was the obvious faith and duty of every man, or almost every man, calling himself an architect; when mouldings and capitals were sketched and measured and drawn out as if architectural salvation depended on the work, as, indeed, in the eyes of many, both architects and clients, it actually did. We now regard the matter from a very different point of view. The crisis of Gothicising energy has passed away, and the reaction has some time since set in. There was a great deal of unreason in the blind belief in the efficacy of Gothic reproducing and Gothic restoration, as we have said upon occasion during the time when the movement was still the popular one. But there is no doubt that of late years the tables have been turned too violently. The erection of Gothic churches was really, in a sense, the architectural expression of the spirit of the day. There was a spiritual church revival, and it found its outward expression in part in a material church revival. It led to the erection of a good many mere copies of Mediaeval churches, which have lost most of their interest now, but it, at all events, substituted something better and more appropriate and more artistic in church architecture than what had immediately preceded it. The restoration of the cathedrals also has been most unfairly judged by the more recent school of architectural and popular critics. To some extent, restoration,—even as carried out by its most accomplished experts,—no doubt meant the destruction or impairing of the historical and often, to some extent, of the artistic value of a building. But it also meant, in many cases, the raising up of the structure from a state of decay and neglect into one of far greater fitness and serviceableness for the purposes for which it was to be used; and in some cases restoration included an investigation and development of the history of the structure such as reflected the

highest credit on the knowledge and perception of the restoring architect, and brought out facts in connexion with the history of the building dealt with, and that of others of the same type and date, such as constituted a real addition to our critical knowledge of this type of architecture. In looking on the restoring epoch, therefore, while recognising the mistakes that were made, and the over-importance, and even finality, which was then attached to Gothic architecture, let us hear in mind also the real architectural knowledge and study which directed it, and the architectural energy which carried out such an amount of work in church building and church restoring as was done during the earlier part of the present reign, and which at least substituted order and decency and architectural fitness for a state of neglect and decay.

We are now in a second stage of the architectural development of the reign, which began absurdly enough in the mere fashion of taking up a certain later phase of English architecture, which in its original eighteenth-century form pretty nearly represented the negation of all real architecture, except one important quality in architecture, sound and solid construction. But the movement is passing out of that mere fashion phase now, and is developing in a manner which seems to indicate that the later Victorian architecture, however oddly we have come by it in the first instance, seems, as far as one can judge, to have a vitality and a promise of development such as the Gothic revival did not evince. We have, at all events, got beyond the blind faith in copying ancient architecture as the one means of architectural salvation. Most, or at any rate many, of those who copy now *know* that they are only copying, which the Gothic revivalists really, in a sense, did not know; that is, they thought doing it over again was of just the same value to the world as originating it, provided it were correctly and learnedly done. We are not without frequent evidences at present of something like architectural originality, to an extent to which it never was aimed at or thought of in the earlier part of the present reign; there is an intimation of possible further life and growth for it in a new direction, and that is a great gain to be able to register; and it must be recognised, also, that there is at the present moment a greater general interest in architecture, and a greater desire to have something like architectural beauty in our mansions and street buildings, than there has been in any earlier portion of the present reign. Even the speculating builder has caught the noble infection, and makes clumsy efforts to produce picturesque brick houses; and when we remember the general nature and beauties of the new terraces and street architecture which used to be evolved in the London suburban districts thirty years ago, to the happiness and content of all concerned, we must admit that it is a promising sign if even the desire for architectural beauty and expressiveness, the perception that it is something worth taking trouble for, has come to be more generally diffused and tacitly accepted as reasonable.

Four important competitions for great Government buildings have formed architectural events of some interest during the present reign. The first was that for the Foreign Office, the result of which presented, oddly enough, a kind of reversal of the case of the Houses of Parliament, as concerns Gothic architecture. As we have observed, the employment of the Gothic style was enforced by official authority in the case of the Houses of Parliament, before the general taste of the country or of architects would have demanded the employment of the style. In the Foreign Offices, when the Gothic revival was almost at its zenith, and when the most successful Gothic architect of the day had been commissioned to undertake the building, the then favourite style was forcibly dismissed by official authority. Both the incidents are worth noting as curious exceptions to the usual course of architectural design, which has been generally, both before and since the Renaissance, carried out in unison with the general taste of

the day, and not in opposition to it. The result of this competition is not regarded by any one, probably, as a fortunate one. The next great competition and the largest and most important in this reign, was that for the Law Courts; and here the magnitude and importance of the work, the scale of the drawings, and the genius displayed in some of them, attracted a great deal of public attention. Here the successful architect was allowed, in the earlier stages at least, rather too much of his own way, even to the extent of pushing aside the colleague who ought, according to the official decision, to have shared the responsibility and honour with him, and whose co-operation would probably have ensured a more satisfactory practical result than we can he said to have obtained. The Law Courts is not a great success; though we think its practical defects have been somewhat unduly exaggerated by critics who had a constitutional antipathy to art-architects generally, or to Mr. Street in particular. It is a building of very marked character, and character of a powerful type, but as a whole we fear it must be taken as a practical expression of the fact that revived Mediæval architecture, however genuine and admirable, was the enthusiasm which the movement evoked in the country, has not been a success as a modern style. The Houses of Parliament is a success, independently of its Mediæval detail, but then in its main plan and architectural grouping it is really not Mediæval; as Pugin said, it is "Tudor details on a Classic body." The Law Courts reflects the true Mediæval spirit more faithfully and forcibly than any other large building of its epoch, a statement which its architect would have regarded as the hest compliment that could have been paid him, as indicating that he had achieved the result he aimed at; but the opinion which we expressed from the first, that the building is an illustration of the mistake of attempting to revivify Mediævalism in modern architecture, is now a pretty generally accepted conclusion.

The next important competition was the recent one for the War Office, which, owing to the way in which it was managed, or mismanaged, has had results certainly of less architectural interest than its predecessors, and the result seems likely to be, architecturally, much the same as that of the Foreign Office,—the erection of a common-place building, which no one cares about; though there is no reasonable doubt that the practical and sanitary arrangements of the structure will be much in advance of its predecessors. But the history of the recent War Offices competition also seems to furnish evidence of the growth of the influence of official dilettantism in such matters,—an influence at variance with the production of anything great in architecture; and if we are to credit what is said in the way of rumour and *on dit*, there is a disposition on the part of the Committee concerned with this important building to cut it down to a merely utilitarian structure. It is to be hoped that public opinion will be against such a view of the matter. It is a rather melancholy reflection that at the commencement of the present reign there was both public and official interest felt in the project of receiving something great and striking in architecture for the home of the Legislature, and that after fifty years the architectural result of a great public building seems to be a point about which both politicians and public are indifferent: for this means retrogression in more senses than one. It is to be hoped that the new Imperial Institute, the competition for which has resulted in the appointment of an architect who, though he has not done any great works hitherto, has always shown a distinct artistic power in his buildings, may result in something which will be an architectural gain to the country, and perhaps do something to stimulate again the idea that it is worth while for a Government to spend money in promoting architectural beauty, as well as in merely providing shelter from the weather for its officials.

One of the architectural characteristics of the reign has been the great activity, especially during the last five-and-twenty years, in what

may be termed municipal architecture in our large towns, and the number of town-halls, municipal buildings, assize courts, and other such structures, which have been raised here, there, and everywhere. Some of the largest of these have not been great architectural successes; but a good many, both small and large ones, have been very successful and interesting additions to modern English architecture. The great activity in this class of architecture almost dates, we should be disposed to say, from the Manchester Assize Courts, designed by Mr. Waterhouse in 1862, and finished three or four years later. This was the first important building of the kind, or the first which attracted much attention, during the full tide of the Gothic revival, and it had a great deal of influence in stimulating new efforts on municipal architecture. Very recently Her Majesty laid the foundation-stone of an admirable building of a similar class at Birmingham, and the comparison of the designs of the two is a good illustration of the course which architecture has been taking in the meantime. Mr. Waterhouse's building was pure Gothic. Messrs. Webb & Bell's design (which, by the way, was selected by Mr. Waterhouse) is Gothic in feeling, but distinctly avoids the reproduction of pure Gothic, and aims at originality and at new departures in detail. So far has this tendency been carried, to modify the models we follow even while using them more or less as models, that Gothic and Classic elements now frequently seem to run into each other in recent designs, and the line of demarcation between the two opposed styles, as they were once regarded, is almost lost.

In two subjects not precisely architectural, in the common meaning of the word, but of the highest practical importance, there has been an extraordinary progress during the last fifty years. One of these is the science of sanitation, which may be said to belong to this reign. Fifty years ago the current ideas upon the subject of drainage and ventilation were comparatively of the crudest kind, and it was hardly recognised that the subject was one specially demanding an architect's attention, except so far as some general perfunctory attention to fall and brick traps was concerned. A good many of the artistic architects are much in default in this respect now, but the knowledge that they are so, and that sanitation is a subject which some one, at all events, must attend to, is forced upon them; and in general there is now a degree of study given to the sanitary requirements of buildings which was not dreamed of fifty years ago; a study which, it may be added, has resulted in the condemnation or absolute reversal of some of the sanitary beliefs and expedients of that period. The other subject we refer to is the progress in regard to the improvement in the habitations of the poorer classes, and the recognition, to some extent at least, of the responsibility resting with landlords and with the Government in regard to this subject. The part taken many years ago by this journal in urging attention to this subject is known to all who are acquainted with the history of the amelioration of artisans' dwellings; and though much remains to be done in this respect, what has been already accomplished may count among the architectural achievements of the present reign; and while we have witnessed the foundation of a new cathedral (unfortunately only a good mediæval copy and with no Victorian *cachet* about it), we may perhaps be justified in thinking that the many blocks of healthy dwellings which have been built during late years, not indeed beautiful architecturally, but representing the possibility of decent, comfortable, and healthy housing for the poor, are as important architectural works in their way as cathedrals and churches. In regard to sanitary progress, by the way, it is worth remarking that one of the most recent pieces of work for which public money was voted was the rectification and putting on a proper and efficient footing the drainage of that same great House of Legisla-

tion, the commencement of which was nearly coincident with the commencement of the present reign; the architecture was done fifty years ago, and adequate drainage supplied now; a significant indication of the progress in practical matters which has been made during the period we are considering.

One of the great works of the present reign has certainly been the embankment of the Thames, which has almost remade that portion of London which borders upon its time-honoured river. Architecturally speaking, perhaps the most has not been made of the opportunity; but still it is a great public improvement, to be numbered among important achievements of the period. The present reign has also witnessed the construction of three important new bridges over the Thames, of which that at Putney, comparatively small in scale, reproduces, however, the essential qualities which went to make London Bridge not only a great engineering, but, in its way, a great architectural work. On the larger bridges lower down the river, Westminster and Blackfriars, one looks with rather a sigh, and on looking to London and Waterloo Bridges, we are disposed to say "the old is better." Though there has been a good deal said of late as to the desirability of drawing architecture and engineering closer together, as a matter of fact the two professions are farther dissociated in the manner and aspect of their works than ever; and the greatest piece of constructional work at present going on, the greatest in some ways that has ever been attempted, is the gigantic structure at the Firth of Forth, from which everything that we generally call architectural design has been entirely eliminated, nothing being left, so to speak, but the bare poles of construction. Such a work as this is an appropriate culmination to a half-century in which the most numerous and remarkable constructional works have certainly been those of the engineers. Engineering has known what it wanted, and the public have known what they wanted from it; that is the secret. In architecture there has been doubt and experimenting on one side, and a good deal of public indifference on the other side. As to the latter drawback, we see little immediate prospect of improvement; architecture is still a kind of sealed book, and a subject of indifference to the public. But the art itself appears to be in a healthier and more promising condition than it was at the beginning of the present reign; it has more of life and originality, is less fettered by precedent, and has a sounder basis of sanitary and constructional knowledge; and these are conditions which may make us hopeful for the future achievements of English architecture during the remainder of a reign which we all trust may still be prolonged for many years.

#### THE TREATMENT AND UTILISATION OF SEWAGE.\*

**T**HIS work was originally published in 1869, after the author had taken an active part in a committee appointed on this subject by the British Association. A second edition was soon called for, and now a third edition is given to the world, with revisions and additions. The general value of the work has, therefore, been sufficiently acknowledged. It consists mainly of extracts and compilations from authoritative reports and other published statements of facts and opinions on the various topics which enter into the subject, and although this deprives the book of much claim to originality, yet it must be remembered that the selection of the matter from such an enormous mass of material involves judgment and knowledge, for which the authors are entitled to credit. The book gives, on the whole, a fair general idea of the question, pointing out its importance, the difficulties attending its solution, and the present state of knowledge and practice in regard to the

measures applied, and, so far as opinions are expressed by the authors, they seem fair and reasonable.

There are only a few points we may remark on. In the first place, it is unfortunate that the authors have not been able to make more use of the proceedings and Reports of the Royal Commission on the Metropolitan Sewage Discharge which sat from 1882 to 1884, under the Presidency of Lord Bramwell. The Commissioners, in dealing with this gigantic and most difficult problem, were obliged to extend their investigations over the whole range of subjects connected with sewage treatment and disposal, and it is allowed on all hands that, independently of their judgment and verdict on the special case before them, their published documents contain probably the most valuable and admirably arranged collection of facts and arguments on these matters that has ever appeared. Dr. Corfield's book testifies, in an Appendix, to the value of the Commissioners' Reports, and gives some extracts therefrom, but mentions that they "could not be conveniently included in the body of the work."

Dr. Corfield sets his face against all proposals for the collection of town excreta, asserting that their removal by water carriage is, on sanitary grounds, the only proper system. This is, of course, natural enough. The inhabitants of towns desire to get rid of this disagreeable stuff as quickly as possible, for "out of sight out of mind"; and if when the excreta were turned into the sewers, and carried into the nearest stream, there was an end of them, the opinion would be right enough. But when their further progress, and the mischief they subsequently do, have to be traced, as Lord Bramwell's Commission had to trace them, the case assumes another complexion, which led the Commissioners to say (II. Report, par. 138) that "considering the difficulties that attend the modern drainage system, the question [of town collection] is one that ought always to receive candid attention and fair discussion." They evidently did not think it beyond the power of engineering and chemical skill to devise, some day, a method of removal of such refuse which, while it would be unobjectionable on sanitary grounds, might prevent the destruction of our rivers and streams, and might do what water carriage probably can never do, namely, preserve to the refuse its high manurial value.

There are two systems in vogue for treating sewage,—application to land, and chemical precipitation; and unfortunately most people who have to do with the subject are strong advocates of one and strong opponents of the other. Dr. Corfield is no exception, he advocates irrigation, in which he is right; but he despises precipitation, in which he is wrong. It is true, as he says, that precipitation has not yet succeeded in drawing from the sewage any valuable product, and also that it will not effect thorough purification. But precipitation will do very great good by extracting the most offensive matters, and it will give greatly increased facility for rendering the whole innoxious and inoffensive.

Dr. Corfield is also, we think, somewhat inclined to undervalue the spontaneous natural purification which takes place by oxidation and other influences in running streams. This is a most important element in sewage considerations, and he may learn much about it from the Sewage Discharge Commission.

The book, in treating of house-drainage, says something about water-supply fittings. The authors have evidently taken their information chiefly from London practice; but they are not aware that London has been about the worst-fitted town in Europe, having been given over largely to the tender mercies of plumbers, patent jobbers, and brassfounders, whose interests are anything but consistent with effectively carrying out a constant water supply. To see how this is done, Dr. Corfield must go to Manchester, or Sheffield, or Norwich, or Nottingham.

We are tempted to say something more on the great London sewage drama, but we had better not give way to the temptation, or we shall not only exceed our space, but lose our temper.

#### NOTES.



**I**T is much to be hoped that the Bankruptcy Offices Sites Bill, now before a Committee of the House of Commons, will not be allowed to pass in the shape in which it has been presented to the House by the Government. If the measure he carried it will inflict an irreparable wrong upon that portion of central London in which it is proposed to erect the new buildings. We have previously referred to the scheme, but may here say that the Bill proposes to empower the Government to perpetuate, in a scarcely modified degree, some of the narrow and tortuous courts which lie between King's College Hospital, Clement's Inn, and Clare Market. We are glad to learn that the Hospital authorities and the Strand District Board of Works are opposing the Bill. The Hospital authorities are chiefly concerned on account of apprehended diminution of access of light and air to their premises, especially to their dissecting-rooms. The Strand District Board of Works oppose the Government scheme on the ground that the erection of the new Bankruptcy Offices on the particular site defined by the Government will effectually preclude the making of a very necessary and long-needed street from the west end of Carey-street to the Strand. That a Government should propose such an ill-conceived measure as this would be incredible did we not know what blunders have been perpetrated in regard to public works and buildings in years gone by. But the metropolis has now a strong phalanx of Members, and it behoves those gentlemen to see to it that the Bill does not pass in such a form as to stand in the way of a very necessary street improvement in Central London.

**A**LTHOUGH the Jubilee decorations and illuminations have been very general in London, there were few that were very notable. The streets which were traversed by the Royal processions naturally made a very profuse display of flags, red haize, mottoes, and flowers; while foliage, flowers, and tinsel were strung together to form festoons dependent from Venetian masts and from house-to-house across the streets. The effect of all this, as seen, for instance, at Regent-circus and Piccadilly, was very bright, though somewhat "higgledy-piggledy." The nondescript "decorations" suspended over the roadway of Waterloo-place, Regent-street were poor in design and wretched in colour, though they were, no doubt, economical substitutes for triumphal arches. In regard to the illuminations, among the most striking and successful effects were those obtained by the use of small incandescent electric lights arranged in rows along or up the main lines of the buildings. The Grand Hotel at Charing-cross was most successfully illuminated in this manner. Messrs. Defries did a great deal of successful work with gas and oil, and a brilliant display was afforded by the illumination of the three principal façades of the Royal Exchange, the Bank of England, and the Mansion House. Another notable display of light in the City was that of the North British and Mercantile Insurance Company, Threadneedle-street. The *Times* office, in Queen Victoria-street, was illuminated by coloured lamps marking the angles of the building, the pediment, and each of the windows, but the colours were not well selected. The *Daily Telegraph* office had a brilliant display of crystal devices, while the *Daily News* advertisement offices were illuminated by electric arc lights embowered in shrubs. The naked perforated iron gas pipe devices (such as stars, crowns, initials, mottoes, &c.), capable of very good effects when there is no wind, did not show to advantage in the breeze which prevailed on Tuesday and Wednesday evenings. Some of these devices of fire were at times nearly completely blown out, and were a long time in regaining their proper forms, only to lose them again very speedily. One of the most successful effects, seen far and wide along the river banks and from the northern and southern suburban heights, was

\* *The Treatment and Utilisation of Sewage.* By W. H. Corfield, M.A., M.D., &c. Third edition. Revised and enlarged by the author and Louis G. Parker, M.D. London: Macmillan, 1887.

the illumination of the tower of the new National Liberal Club on the Victoria Embankment. Just below the base of the conical roof were suspended ten or twelve powerful arc lights. As seen from the immediate vicinity they looked like a circlet of gigantic pearls; from Blackfriars Bridge they looked like a cluster of diamonds. The Junior Carlton Club, in Pall-mall and St. James's-square, had also a very brilliant effect, given by a large number of arc lights.

WE cannot altogether congratulate the country on artistic advance in its new coinage. The head of Her Majesty is a well-executed piece of work, but the additional height given to the effigy by the crown and by the addition of a portion of the bust renders the whole much less adapted to fill the circular area of the coins, the obverse of which has a very awkward appearance, the effigy cutting vertically across it and leaving a large blank space on each side; on the old coins the larger head fills up the space much better, and produces a more correctly decorative effect. The reverse of the half-crown, with its symmetrical circle of delicate alternating devices, is pretty, and shows better decorative treatment than the old one. The new florin, on the contrary, is distinctly inferior to the old one in design: the four radiating sceptres between the shields have a symbolical meaning, no doubt, but they are awkwardly fitted into the design, leaving disagreeable unfilled spaces. The reverse of the old florin is a far better and richer piece of design. The new double florin, or four-shilling piece, is merely an enlarged copy of the new florin.

THE great work on Norman architecture by the late M. Ruprich-Robert is about to be published by MM. Des Fosse & Cie., of Paris (the successors to Morel & Cie.). It will be in quarto form and will contain 100 engravings on steel, eleven in heliotype, four chromolithographs, and a map of ancient Normandy, as well as historical and descriptive text accompanied by more than 200 drawings. From the known ability of its author, the time and care which he devoted to it, and the intrinsic interest of the subject, this ought to prove one of the finest and most valuable architectural publications of modern times. According to the circular sent to us by the publishers the author has preferred, in most cases, to give, not entire buildings in his illustrations, "but portions, separate bays, drawn in plan, section, and elevation, so as to show the system of construction and decoration adopted, rather than more or less picturesque wholes. A common scale has been adopted for certain series of drawings: plans, bays in section and elevation, spires, and other details." Thus it will be gathered that the work is likely to be such as to be specially valuable to architects, and not a mere series of picturesque illustrations.

THE 'Εβδονάς (No. 15) reports the following new discoveries in the Acropolis,—a colossal marble statue which has, unfortunately, lost the head and the greater part of the feet, date not given; a life-sized also headless figure made of polished marble, a small head of very early style, several bases of statues which may possibly be fitted on to figures already found. The next find sounds almost too good to be true,—two bronze statues of Athens are reported, each of about 25 centimetres in height, of very remarkable workmanship. In what way they are remarkable is not told. One of the statues appears to have been discovered between the Erechtheion and the north wall of the Acropolis. It is said to represent Athene in her aspect of Promachos. She wears a long garment and high-crested helmet; her right hand is raised as if she were hurling a spear; her left carries a shield. After discoveries such as these and those which have preceded there will be no excuse if the future historian of Greek art fails to trace the clear sequence of early Attic art. Cannot M. Rhomaides give us a second issue of his book the "Museums of Athens," which began with such fair promise a year and a half ago?

THE death of M. Daremberg, joint-editor of the great "Dictionnaire des Antiquités Grecques et Romaines," is deeply to be deplored, not only on personal grounds, but because the issue of this invaluable work has been no doubt delayed by the fact that M. Saglio, the co-editor, has had to work single-handed. We are glad to find he has at length joined forces with a new and most able coadjutor, M. Edmond Pottier, of the Louvre. The result is the issue of the eleventh part of the work (Cup-Del), and we may now feel assured that the issues will go forward with no unnecessary delay. We sincerely hope ourselves that the next "Encyclopædia" that appears will begin at Z and work back to A. Any one who relies on a lexicon for information on mythology will find himself with a plethora of information as regards Apollo, but he must probably wait some years if he wants to be up to date on Poseidon. Among the most important articles in the new issue are "Curus," by M. Saglio, a really exhaustive treatise on Greek and Latin chariot forms; "Cyathos," by M. Pottier, which will surprise some students of vase shapes; and "Cupidon," by M. Collignon,—this last by no means the best.

SIGNOR GIUSEPPE COLBACCHINI, of Venice, has recently published a brochure of 250 pages entitled "Quattro dipinti di sommi Maestri," giving a description with critical notes of four pictures in his possession attributed to Raffaele, Titian, Leonardo da Vinci, and Andrea del Sarto respectively. The pictures are an Entombment, by Raffaele, signed and dated 1508-9; Diana and Endymion, by Titian, said to have been painted about 1528; a Madonna and Child, by Leonardo da Vinci, believed to have been painted about 1490; and the "Disciples at Emmaus," by Andrea del Sarto. The Raffaele is said to be a hitherto unknown work which is sought to be identified with the picture referred to by the painter in a letter to his uncle Simone di Ciarla dated April 21st, 1508. This picture is signed "R. S." The picture attributed to Titian is said to have been transferred from the Suracco family to the Lombardo family by a deed dated in 1690, and to have remained the property of the Lombardo family from that date until the year 1883, when it came into the possession of the present owner. The book is illustrated by some well-executed photographs of the pictures described.

IN a letter to his friend the editor of the *Berliner Philologische Wochenchrift*, Dr. Milchhöfer reports his discovery of a new dome-shaped grave at Thoricus. He has during his long stay at Athens made a special point of examining, so far as he could, every promising tumulus he came across, but until the present moment with small success. The tumulus in question lies near the high hill Viglaturri, and its circumference at the base is 150 paces. It has been pierced in three places, and it is possible to look down the borings and obtain a tolerably distinct view of the masonry of the interior. The plan of this masonry differs, Dr. Milchhöfer says, from any of the dome-shaped substructures so far known in Greece, but it has a near parallel in the well-known Regulini-Galassi grave. Dr. Milchhöfer is trying to stir up Dr. Schliemann and Dr. Kabbadias (general ephors of antiquities) to a systematic exploration of the tomb, and unless funds be lacking they are not likely to want much stirring, unless, as is possible, Dr. Schliemann prefers to unearth his own fox.

THE Church of St. Lawrence-on-Sea, near Ramsgate, was extensively restored some years ago; it is now proposed to complete the restoration in commemoration of the Queen's Jubilee. The central tower is late Norman; but the rest of the church is of later date, having been remodelled in the beginning of the fifteenth century, when the aisles and transepts were pulled down, the church lengthened, and aisles added, the central tower was raised 6 ft., and aisles added to the nave, and a porch built on the south side. Mr. J. L. Pearson, R.A., has examined the tower and reports that the

piers are substantially upright, the deviation from the perpendicular being in no case more than one inch and in some instances much less. On cutting into the north-west pier the mortar was found to be good and the work substantial. Mr. Pearson proposes, however, to expend 400l. upon the tower. It is also proposed to erect an external staircase to the ringing loft at a cost of 140l., and a further sum of 1,370l. is proposed to be spent on the repairs to the roof and south porch.

IT is now nearly ten years since we noticed\* the proceedings of the Salford Town Council in regard to the "Wilton Hospital Competition," when the designs of Mr. Stephen Salter, of London, were accepted for altering and adding to a row of houses at Cross-lane, Salford, in order to adapt them as a hospital for patients suffering from infectious fevers within the borough. Since that time the hospital has been used for the purpose with, we believe, more or less success, upwards of 4,000 patients having been admitted into its wards up to the end of 1886; but it could never be regarded as a good infectious hospital worthy of so important a borough. It now appears that the London and North-Western Railway Company, requiring to enlarge their premises adjacent to the hospital, have arranged to purchase it from the Corporation, and the latter have accordingly in contemplation the erection of a new hospital elsewhere for their district, and an opportunity is afforded for the erection of a new hospital not only adequate to the wants of the borough, but embodying all the most recent improvements in this important branch of Local Government buildings. The Corporation appear to be fully alive to the opportunity thus afforded them; for, acting under their instructions, Dr. Tatham, the Medical Officer of Health, has prepared a very instructive provisional Report upon the whole subject. Dr. Tatham has taken great pains to obtain the latest information upon infectious hospitals. He acknowledges assistance received from Dr. Thorne Thorne and Mr. Gordon Smith, of the Local Government Board; and likewise from Dr. Collie, of the Eastern Hospitals at Homerton; and likewise Mr. Shirley Murphy, late Medical Officer of Health to St. Pancras, and formerly Resident Medical Officer of the London Fever Hospital. According to this Report, it is recommended that the new hospital should be arranged for 200 patients, though it is considered that, in the first instance, accommodation for only 160 patients may be sufficient; and a site 10 acres in extent is advocated. The amount of space requisite for each patient and the most suitable sub-division of patients, and the arrangement of ward blocks, are next considered; likewise the necessary administrative arrangements and extent of staff that may be requisite for such a hospital. In all these matters the Report is of special interest and value as affording much detailed information respecting the planning and management of hospitals for the treatment of patients suffering from infectious diseases, and, as such, it will be found useful by architects and others engaged upon such works.

IN the course of this season the Hesleyside, Northumberland, and the Langton Hall, Yorkshire, estates will be offered for sale. The former is a manorial freehold of some 22,000 acres, locally famed for its picturesque situation in the North Tyne Valley, to whose scenery it largely contributes. Within the confines of this property lie portions of the quaint old town of Bellingham, site of a Roman Station. Here is excellent fishing for salmon in the North Tyne, which forms a wide stretch of water within the park, and for trout in the Irthing. The holdings on the estate comprise several stock-breeding farms, of good repute in the county. Langton Hall, of red brick, in modern Gothic style, is distant five miles from Northallerton. Approached by a stately avenue, it overlooks the Vale of Mowbray, and the Swale, renowned for its grayling. The agricultural portion of the

\* See the *Builder*, Nov. 2nd, 1878, vol. xxvii., page 1159.

estate, which is 1,230 acres in all, yields an annual rental of 1,300*l.*

WE have to mention two more memorials to the late Earl of Shaftesbury. On Friday, June 17th, Louisa, Lady Ashburton, laid the first stone of the Shaftesbury Memorial Mission Hall, in Kerbey-street, East India Dock-road, where the committee's labours will be devoted to gospel services for adults and the young, a Sunday ragged school, winter lectures, and above all, to the providing of meals for destitute children. On the same day the Prince of Wales performed the same function on behalf of the new Home in Shaftesbury-avenue, which has been established by the Society of National Refuges for Homeless and Destitute Children. The Society began their operations in 1843, with a first year's income of 180*l.*, in a cow-shed left in a now demolished St. Giles's rookery. In 1852 they opened their Ragged-Schools and Home in Broad-street, St. Giles's, and secured a lease of No. 8, Great Queen-street, where 150 boys are housed. In addition to the training-ships, *Chichester* and *Arcthusa*, they have opened industrial schools at Fortescue House, Twickenham; Bisleys, Surrey; at Sudbury; Ealing; and elsewhere. They have accommodation for 1,000 boys and girls. For twenty years past the Society's income has exceeded 20,000*l.* per annum. This new Home, to be styled "Shaftesbury House," is intended to take the place of a temporary home at 25, Great Queen-street. The architect is Mr. E. P. Loftus Brock, F.S.A.

ON Thursday, June 16th last, the President and Council of the Zoological Society celebrated the Jubilee by a reception of the Fellows and their guests in the Gardens. The Society was founded in 1826 mainly by the exertions of Sir Stamford Raffles, Sir Humphry Davy, and Lord Darnley: the first-named giving to it as a nucleus for the museum his fine collection which was originally stored at No. 33, Bruton-street. Sir Francis Chantrey and Decimus Burton laid out the ground which the Government allotted to the Society; Burton also built the animals' houses and other enclosures; and the Gardens were opened in 1828. King George IV.'s menagerie was removed hither from Sandpit-gate, Windsor, in 1830, and four years later the last of the "lions" from the Tower. The Aquarium, being the first of its kind, was constructed in 1854.

THE Crown Lease of St. John's Lodge, at the northern side of the Inner Circle, Regent's Park, together with its twelve acres of private ground, is about to be sold. This finely situated mansion, designed by Decimus Burton, was long the residence of Sir Isaac Goldsmid, and is now occupied by his widow.

THE Reform Club, which has just celebrated its fiftieth anniversary, was established by the Right Honourable Edward Ellice from out of the old Westminster Reform Club, which existed, rather than flourished, for two years. Brooks's refused to countenance the enterprise, and the members were at first fain to rent some rooms in Carlton House-terrace. Nevertheless, on the Princess Victoria's birthday their numbers had reached to 1,000 subscribers, of whom, it is said, ten are yet living. In June, 1838, certain houses were demolished in Pall-mall,—one of them being Angerstein's, No. 103, and which had held his picture gallery,—for the present building, whereof the elevations were adapted by Barry from the Farnese Palace in Rome. Here the Reform Club was installed on March 1st, 1841, removing from Gwydyr House, Whitehall, since occupied by the Local Government, or old Poor-Law, Board and now by the Charity Commission. At Gwydyr House they gave their historic Coronation feast.

IN virtue of the Medina Suhway Act, 1884, a company has been incorporated to construct a subway beneath the mouth of the Medina river, in order to connect the two towns of East and West Cowes, Isle of Wight. The existing ferry is about 140 yards

across, its traffic, being carried in boats and a steam chain vessel, is at present leased by the Commissioners of Her Majesty's Woods and Forests. Failing the ferry, a detour has to be made inland, *via* Newport, which is distant between four and five miles. The new subway will be about 430 ft. in length (with easy approaches), and high enough for the passage of a four-horse coach. A contract has just been made with Messrs. Green, Parker, & Co., of Cardiff, for the construction of the works within eighteen months, for the sum of 43,000*l.* The company's engineer is Mr. James Aher-nethy, of 4, Delahay-street, Westminster.

ON Saturday, June 11th, the Baroness Burdett-Coutts laid the foundation-stone of St. Augustine's Church, Archway-road, Highgate. It replaces the little iron church in All Saints' parish, which the congregation have, much to their credit, voluntarily supported for the past twelve years. When completed, the new buildings (Mr. J. D. Sedding, architect), including vestries and classrooms, will cost altogether 7,500*l.* The purchase-money, 500*l.*, of the site was originally met by a grant from the Bishop of London's Fund, and a loan, in 1874. All Saints' parish had then just been taken out of the ecclesiastical district of St. Michael's; and all this part of it, with a now population of 4,000, was green fields.

A FEW days ago the Marylebone Cricket Club commemorated their first centenary by giving a banquet in the Tennis Court at Lord's. The oldest recorded match of the Marylebone Club is one in which the members took part, May 27th, 1788, on the ground that is now covered by Dorset-square. They migrated to Lord's ground in 1814 or 1815. The present cricket-ground, originally about 7½ acres in extent, has been somewhat enlarged of late years along its eastern side by the florist's garden. The reshulding of the tavern, the erection of stands and turfed ranges of seats, together with the making of new entrances and carriage drives, have quite changed the pristine aspect of the ground.

A MONGST the pictures of the late Earl of Lonsdale which were sold on Saturday last [June 18th] at Christie, Manson, & Wood's, were two large views, by P. Pannini, of the exterior and the interior of St. Peter's, at Rome, together with his Forum, and composition of Roman ruins. The collection included Hogarth's portraits of Mrs. Garrick, in straw hat and pink and white dress, from the Wadmore collection; and of Peg Woffington, in a blue and white gown, and having a canary bird on her left shoulder; some "heauties" by Lely; Gainsborough's "Horses Drinking at a Spring," formerly in Mr. J. L. Parker's collection; Reynolds's laughing girl, which was exhibited, together with the last-named, at Burlington House in 1867; a Teniers; several Watteaus; Lawrence's portrait of J. Wilson Croker; and so on. Three views of London by S. Scott are worthy of record. The largest, being 36 in. by 54 in., is a perspective of the Tilt-Yard, or, as it is more commonly termed, the Horse-Guards' Parade, St. James's Park, as seen from before the now demolished Gun House. The troops are shown as exercising; in the distance stand the Treasury Chambers and the Prime Minister's Lodgings on the northern side of Downing-street. The other two, 18 in. by 36 in., delineate London and Westminster as seen from the Thames,—that is, from a point about level with the Privy stairs below Labeyle's Westminster Bridge (1747); and from what we take to be the earlier Temple Gate, near to Whitefriars. Scott's view of Blackfriars and Bridewell Dock may now be seen in the Guildhall Art Gallery. His Westminster shows Derby House, and the Bear at the bridge foot: this painting was engraved by Canot in 1758. The Lonsdale Canalettos include two paintings of the Rialto and the Grand Canal.

ONE of the best positions for viewing the procession on Jubilee Day was the stand erected by Messrs. John Mowlem & Co.

in front of the large block of buildings in course of construction on the south side of Piccadilly, at the corner of Arlington-street, belonging to Lord Walsingham. The stand was gaily decorated, and an excellent hand, hidden in the building, played at intervals. Among the company were Lord and Lady Walsingham, Hon. W. Gody (Buffalo Bill, whom Her Majesty recognised as she passed), Mr. Alfred Waterhouse, Col. Haywood, Mr. Thos. Blashill, Mr. T. Cuhitt Nicholls, Mr. W. O. Milne, Mr. Geo. Crickmay, and others.

IT appears from a paragraph in last week's *Illustrated London News*, before which, as the Laureate says,—

—"He bare  
The abyssal depths of personal(j)ty."

that the will of the late Mr. George Devey, architect, who died on the 4th November last, was proved on the 2nd inst., the value of the personal estate amounting to over 32,000*l.* This is a pretty large sum, as times go, for a man to have accumulated by his own exertions in a profession the emoluments of which are not over-liberal, and proves that if some members of the profession are scarcely remunerated there are others who must be looked upon as fully compensated for their exertions. The three richest men in the profession of late years were Sir Wm. Tite (who, as he was wont to boast, inherited one fortune, made a second himself, and married a third), Mr. J. B. Bunning, and Mr. Lewis Vulliamy. Mr. Devey leaves legacies of 100*l.* each to the Architects' Benevolent Society, the Artists' Benevolent, and other societies. The residue of his property the testator, who was unmarried, bequeaths to his brother and sister, in equal moieties.

A CORRESPONDENT writes:—"In your issue of the 4th inst., 'An Architect' is stated to have said, 'Temple Bar has been sold and will shortly be erected in private grounds,' and in your next issue the *City Press* is stated to have contradicted this. Allow me to state I had a conversation with a contractor just a month since, who stated he actually had the contract to erect this ancient relic in a gentleman's park not fifty miles from the City." Is this the case?

ARCHITECTURE AT THE ROYAL ACADEMY.—IX.

1760, "Church of St. John the Baptist, Brighton: Proposed new Façade and Tower," Mr. Samuel J. Nicholl. A good water-colour drawing (illustrated in the *Builder*, May 21) of a very clever and original design, which has the unusual merit that, while it looks well, it is impossible to pigeon-hole it under any special style. A deeply-recessed round-arched doorway between two solid masses of masonry is richly decorated with ornamental details and figures of cherubim; in the tympanum of the arch, over the square-headed doorway, is a mosaic subject on a dark blue ground. A strong dentil cornice terminates the sides of this portion of the building, and runs round across part of the front, but is interrupted over the doorway to give space for a large circular window, with mullions in the form of a cross, and a boldly-sculptured wreath surrounding the architrave. The whole front is finished with a pediment with a raking cornice. The manner in which the main architrave is broken and lifted up to form a lintel to the two windows on each side of the entrance is an eccentricity which would shock an architectural purist; but it does not look bad. The tower is not quite so effective as the façade, but harmonises with it in general treatment; the detail might be improved here. The building is one of the most distinctly original designs in the room.

1761, "New Church at Stratton, Hamp-shire," Mr. T. G. Jackson. A small and unpretending country church with a low tower at the north side of the chancel, with a slated or tiled spire; apparently built of flints or small rubble, with ashlar dressings; a chequer work of squares is formed over the east wall above the sill line by the arrangement of the two materials, and an inked wall arcading formed below the east window in the same manner; a similar arcading is repeated on the plinth of the tower. The whole is very

"country-church" looking, with a touch of novelty about it, though strictly Gothic in detail. The windows in the upper stage of the tower seem crowded rather too closely up to the eaves.

1762, "Design for Roman Catholic Church, N.B.," Mr. A. J. Gordon. An exterior of a Gothic design shown in a rather mechanical pen drawing; the only notable point about it is the curious treatment of the tower, a large square one with no buttresses, built with a considerable batter, finishing with a heavy corbel table in a castellated style, with a solid stone lantern or short spire above, and heavy angle turrets. This is apparently by way of assimilating a Scotch church to the Scotch castellated style, and the feature is effective in its way, and would have been still more so if the author had kept the stalk of his tower a more unbroken mass instead of cutting it up so much with windows of various shapes and having no particular relation to each other.

1763, Chapel, St. Chad's College, Denstone," Messrs. Carpenter & Ingelw. A simple Early Gothic interior with an open timber roof; hung too high to be well seen.

1766, "A Parsonage," Mr. John Cash. A pretty and artistic sketch in pen-and-ink of a picturesque house, but the author in his anxiety to escape from the hardness of anything like rigid lines has gone to the other extreme and been unnecessarily "shaky" in many places. There is a reaction against rulers at present in architectural drawing, — a reaction long wanted; but it does not follow that one should go to the opposite extreme and draw a building without a straight or even a clean line in it. To draw clean lines without the ruler is the desideratum.

1767, "The Old Gatehouse, Lanhydrock, Cornwall," Mr. J. M. MacLaren. A very harmonious and artistic water-colour drawing of a charming old gate-house, with octagonal turrets flanking a semi-circular archway; a curious mixture of very Late Gothic and half Classic details, with a battlemented finish and singular pinnacles with hall terminations, and apparently supported on groups of similar ball objects.

1768, "Entrance Porch, Quarrydene, Westwood, Leeds," Mr. W. H. Thorp. Apparently this is hung under the last-named as a modern comment on it, for here are seen, carefully drawn out, the same ball-supported and ball-terminated finials. The drawing is a clean well-executed pen perspective of a porch dated visibly "1885," but imitating the manner of the English Renaissance.

1769, "Byrkyte Lodge, Staffordshire, North-East View," Mr. R. W. Edis. A very good "architectural draughtsman's" water-colour of a large red brick mansion with stone dressings, mullioned windows, angle quoins, and Classic columns to the porch. The tower over the entrance, with octagonal angle turrets, is the only departure from general Elizabethan detail. The general appearance is dignified and has the proper "English gentleman's mansion" appearance, though with nothing special to remark in it. There is no plan.

1770, "Bank of England: New Fleet-street Branch," Mr. A. W. Blomfield. We may refer our readers to the illustration of this, published in the *Builder* for May 21 last. It is a powerful-looking design, with a "bank" appearance given to it by the heavy rustication up to the line of springing of the entrance-door, a less marked rustication being continued up to the first-floor cornice. The symmetrical square pavilions at the four angles increase the look of solidity characteristic of the whole. Classic style, we presume, was an imposed condition, the branch Bank of England buildings having all been erected in a style intended to connect them with the central establishment; indeed, the present design shows considerably more breaking away from Bank of England precedents than we have noticed in any other of these buildings.

1771, "New Chancel and Transepts, Dewbury Parish Church," Mr. Arthur E. Street. This is a large and rather bare-looking water-colour of an interior with a marble floor of various colours, and piers and arcades white in one portion of the drawing and brown in the other; this seems like an attempt to differentiate to the eye the new and old portions, but if so it is overdone, and the result on the drawing is not happy. The new (?) portions show arcades without any impost (at least in the chancel) of late Gothic type, carried out with

knowledge of the style, but with no feature calling for special comment.

1772, "Killesley Hall, near Scarborough," Messrs. S. E. Smith and J. Tweedale. Two exteriors and an interior of a house apparently very picturesquely treated, and which might have claimed to be hung lower than it is. The effectiveness of the building is derived in great measure from the characteristic grouping of the features; the rows of small windows in one portion, the two large mullioned windows grouped on the other front, the half-timber marking another portion. There is no plan, so we cannot tell how far these variations express the interior.

1773, "House at Bickley," Mr. Ernest Newton. Over-acted simplicity; a house that seems to say, "Observe how humble and unpretending I am." That is a kind of architectural affectation, though by no means so disagreeable as the affectation of the opposite kind.

1774, "Scheme of Decoration for a Drawing-room," Mr. John J. Shaw. This is an effective piece of work, though better suited for a dining-room than a drawing-room. There is a door and dado of dark wood, with carved panels (medallion heads of Homer and Dante in the two principal panels); a frieze over the door of gilded Cupids and seahorses with entablature over; crimson wall panels with a floral diaper; a peacock frieze at the top of the wall in long panels, and interrupted by gilded winged genii between the panels. The general effect is rich, though a little sombre, and the peacock frieze very finely and decoratively treated.

1775, "Lower Ince Church, Wigan," Messrs. Paley & Austin. This is a charming little church exterior with a good deal of character, with its double transepts and picturesque bell-gable with an octagonal spire rising from the middle of it; but why did the authors do injustice to it by so hard and mechanical a drawing? The ruler has had it all its own way here, at any rate.

1777, "New Church at Northington, Hampshire," Mr. T. G. Jackson. A church in Late Gothic style, with four-centred windows, and treated otherwise much in the same manner as No. 1761, already mentioned, with a similar inlaid wall arcade under the windows of the octagonal east end; the church is a rather larger one, and is battlemented throughout, giving a different and less rural expression. The small pinnacles springing from the buttress slopes look very feeble; they may be proper to the *genius loci*, but they have no other recommendation.

1778, "Interior of Notre Dame, Châlons-sur-Marne," Mr. Arnold B. Mitchell. A very well-drawn perspective of this fine Early Gothic interior, executed with the same white spaces and brush-shading as in the author's other drawings exhibited; it has the advantage of getting an effect very quickly, and with little labour on the drawing, and the author knows thoroughly how to use it.

1779, "Entrance Lodge, Walmer, Kent," Mr. James Neale. A study of a large tree trunk, with the lodge behind as a secondary object. The whole makes a pleasant little picture.

1780, "Club-house, Ship-ton-on-Stour," Mr. E. W. Mountford. A small drawing of a village club-house, looking like what it is intended for.

In concluding these brief notes on the architectural drawings of this year, from which we have omitted only those drawings which seemed to present nothing for remark (which were not many), we may draw attention to what we have more than once adverted to in passing, the too great prominence which seems to be given, in the choice of drawings for hanging and in the placing of them, to mere effectiveness of draughtsmanship. It seems to have now come to this, that if you can get one of two or three favoured draughtsmen to make your drawing, you are pretty sure to get her, even with an indifferent design. We never remember to have seen before such large groups of drawings with the names of various architects attached to them, but obviously all drawn by the same hand. This is just what ought not to be. It is reducing the architectural room to an exhibition of draughtsmanship. There ought to be special favour shown to those architects who make their own drawings, provided the designs are good, rather than to those who merely exhibit their capacity of appreciating and paying a popular draughtsman.

#### THE NEWCASTLE EXHIBITION.

We have not had an opportunity before this of giving any special account of the exhibition at Newcastle, which, though on a much smaller scale, and in other ways less important than the Manchester Exhibition, holds a very good place among general exhibitions of this kind, and has the merit of being well classified and arranged.

The buildings are arranged in a quadrangle extending about 600 ft. from north to south, and 500 ft. from east to west, enclosing a centre court or garden 340 ft. by 270 ft. The North Court, at the east end of which is the main entrance from the north road, is much the largest in area, being about 200 ft. in width; the South Court being only a comparatively narrow one of about 60 ft. width. Outside the North Court, and adjoining its north side, are the exterior gardens, where an artificial lake has been formed, chiefly for the purpose of giving as much of realistic effect as may be to the reproduction of the old Newcastle bridge, which is built in an oblique line stretching over the water. Various pavilions are disposed about this part of the grounds, many of them partaking rather of a "fancy fair" character, including a Paris panorama, a camera obscura building, a chalet of Swiss goods, a toboggan slide, &c., though there are also more practical exhibits to be seen in the grounds.

The North Court contains the exhibits in illustration of the great engineering industries which form the most prominent portion of the exhibition, and some of the most important of which are specially connected with the neighbourhood of the Tyne. Marine architecture, steam engines, heavy forgings, and ironwork generally, are here represented; forming a curious commentary on the history of the neighbourhood which first became notorious, and had a name, by the building of "the new castle on the Tyne," still in such excellent preservation, though now the oldest conspicuous monument in the place to which it still gives the name of "new." The material progress is extraordinary enough, as also the change from the feudal domination of the castle to the development of a great industrial centre; but possibly the moral progress in some ways is not so great, after all. The building of a castle with walls of some dozen feet or so in thickness was one way of overawing your neighbours and imposing your own will upon other people; it seems a clumsy way now, and would, at all events, be inefficient in the present day; but, after all, the scientific manufacture of guns at the Elswick works, which are very largely represented here, is only a highly-elaborated effort in the same direction.

However, the arts of peace occupy, no doubt, the larger portion of the Newcastle Exhibition. The right-hand alley of the North Court, as we enter, is mainly devoted to ship-building exhibits. We may observe that the numbering of the exhibits for cataloguing has been done in a much more systematic manner than is generally the case in such multifarious exhibitions as this; exhibits being ticketed in numerical order down the right-hand side of the first aisle, up the left-hand side, and then down the right-hand side of the next, and so on: a simple matter, it may appear, but one which is seldom properly attended to. The result is that in the Newcastle Exhibition it is in most cases possible to find an exhibit which you wish to see, from its number in the catalogue; and we have been in few such exhibitions where this was the case; certainly it was not so at the large shows held during the last few years at South Kensington, and notably not in the permanent South Kensington Museum itself, where nothing can be found except by chance. Armstrong, Mitchell, & Co. are the great exhibitors in the marine architecture department; their works being represented by a great number of beautifully-executed models, some of them sectional, and representing vessels of almost all classes and for various Governments, but fighting vessels of various types predominating. Among the specialties in the exhibits of this firm are half models of vessels built for service in the Caspian and Black seas for burning petroleum fuel; a half model of the twin screw steamer *Faraday* built in 1874 for cable laying, with how and stern-alkie, and a rudder at each end for moving either way with equal facility; and a model of the 100-ton floating crane *Atlas*, built in 1885 for the Mersey Docks and Harbour Board, five-knots speed, built to lift 100 tons at a radius of

30 ft., the counterbalancing being regulated by water ballast. The Italian Government, "per H. F. Swan, Esq., Newcastle-on-Tyne," are large exhibitors of marine models, including sectional models of some of the largest of the Italian ironclads. Among their exhibits is also a model of a Venetian galley of the fifteenth century, with three banks of oars on each side; but the accuracy of this reproduction seems doubtful; at least, if it correct the efficiency of the three tiers of oars must have been more imaginative than practical. Among various exhibits in this gallery we noticed Messrs. Dohson & Co.'s patent steam hopper vessel, as used on the Onse improvements for the construction of training walls and embankments; a vessel constructed for carrying ballast and stone in hoppers, to be dropped through the bottom for deposit in building up embankments. Messrs. Call & Davis's exhibit of steel and iron sheets shows the ductility of their mild steel by a sheet bent cold in eight folds lying one upon another,—a pretty good practical test.

The next aisle of the North Court shows some large locomotive engines, among which, exhibited by the North-Eastern Railway Company, is "Locomotion," the No. 1 engine on the Stockton and Darlington Railway, built by G. Stephenson in 1825, with two vertical cylinders rising from the top of the boiler, working with cross-heads and long connecting-rods on the wheel-cranks. A curious spectacle it must have made when in motion. The position of the cylinders seems, at all events, calculated to avoid the difficulty of cooling of the cylinder, and consequent condensation of steam at starting, which in the modern locomotive requires the provision of a special tap for blowing the water from the cylinder. Next to this, in effective contrast, is a new engine of the largest size from the Doncaster workshops of the Great Northern Railway Company. Near this is a locomotive exhibited by the North-Eastern Railway Company, designed by their locomotive superintendent, Mr. J. M. Worsdell, which is of special interest: it is a modification of the principle of Mr. Webb's three-cylinder engine for utilising waste steam at low pressure, in use on the London and North-Western Railway, and to which we have more than once referred. Mr. Worsdell's engine works with only two cylinders,—a small high-pressure (18 in. diameter), and a large low-pressure one (26 in. diameter), side by side; the high-pressure one can be used alone at starting. Whether this simplified arrangement gets rid of any of the difficulties experienced in the three-cylinder engine at starting only practical trial can prove; the engine has been running for three months on the North-Eastern Railway, but what its performances have been we have no direct means of knowing. Near this we observe in the catalogue, but did not notice it at the time, what, if it acts well, ought to be a very useful improvement in tramway cars, by the Ashbury Railway Carriage Company, namely, a reversible tram-car turning round on a hogie frame, so as to avoid the necessity of uncoupling the horses and taking them round at the end of every journey. Among the rolling stock exhibits is an engine specially made by Messrs. Hawthorn, Leslie, & Co., of Newcastle-on-Tyne, for a light 3 ft. 6 in. gauge line in Australia; and boiler and furnace arranged for wood-burning. There is also a locomotive by Stephenson & Co., of Newcastle, from the designs of Mr. Adams, of the London and South-Western Railway Company, described as fitted with Adams's patent vortex blast pipe, which has been in use on this railway since 1885, and is stated to have effected a considerable economy in fuel, but the principle of the blast pipe in question is not illustrated. The engine is on the well-known pattern in use on the London and South-Western Railway, with a front hogie carrying four leading wheels, with the wheel base far in advance of the main bulk of the engine. How does this hogie frame, pushed in advance, with the weight of the engine behind it, behave in running fast on a down gradient, is a question we should like to see put. We believe some of the drivers have opinions on the subject.

It is impossible to do more than note a few more of the principal exhibits among the mass of work to be seen in the North Court. As before mentioned, the Elswick gun manufactory is very largely represented, and the description of the work occupies some pages of the catalogue, and constitutes a kind of brief sketch of the recent history of English gunnery. A

model (full size) of the 110-ton Elswick gun is exhibited, with a lengthy description; a 30-pounder "rapid-fire gun," field guns, howitzers, and Gatlings; also projectiles, including the shell for the 110-ton gun, weighing 1,800 pounds. A statement of the cost to the country of firing each round of this gun would have been an interesting statistic. From the great guns to the surfaces for resisting them is a natural transition; and Messrs. Brown & Co., of Sheffield, exhibit, among various other specimens of forging, some steel-faced armour plates. The Darlington Forge Co. exhibit some fine work in solid and "hull" cranks and other heavy forgings; and the Leeds Forge Company show, among other things, a very large frame plate flanged at one heat from a single plate of Leeds steel. Among the specially illustrative exhibits are those of the Darlington Steel and Iron Co., who illustrate the process of rolling railway iron, giving pieces showing the forms taken by the bar after each successive roll, from the square "bloom" to the finished rail; and those of Messrs. Bell Bros., of Middlesbrough, who give a very complete set of specimens showing "what it takes to make one ton of Clarence pig-iron" in the shape of examples of the ironstone, the coal, the quantity of limestone used, and one ton of iron, and the slag resulting from the smelting of the materials. The Kirkstall Forge Company show rolled shafting in steel and iron, which boasts to be of such finish that no turning is required, and the specimens shown are certainly admirable examples of what can now be done in rolling-mills. Messrs. J. & F. Howard, of the Britannia Ironworks, Bedford, exhibit the materials for a patent portable railway, with steel sleepers, the sleeper and chair "in one piece, and the rail keyed up with a metal safety key. The Wallsend Slipway and Engineering Company send a fine specimen of boiler architecture, built up in Siemens-Martin steel, manufactured by the Steel Company of Scotland. Among the engine exhibits we should not have passed over Messrs. Hawthorn, Leslie, & Co.'s triple expansion engines, with cylinders of 20 in., 27 in., and 42 in. diameter respectively, for developing a large power with a light weight: this type of engine being specially intended for torpedo cruisers. Messrs. Taylor Bros. give a number of samples of iron and steel castings and forgings; and Messrs. Tozer & Son have a good exhibit of steel sleepers, with self-fastening cast-iron chairs, clipped on without the introduction of any bolts or other fastenings. If these are to be relied on, they ought to constitute a considerable economy in platelayers' work on railways.

Messrs. Donlon & Co., it may be mentioned here, have two elaborately decorated interior pavilions erected just within the entrance to the North Court, exhibiting both the artistic and the sanitary work of their firm.

In the East Court, to the left from the main entrance, are grouped a good many exhibits of a class coming more or less under the head of furnishing and decorative work of various types. The first object numbered in the catalogue is a "Jubilee Mining, Engineering, and Science trophy," in silver, of which the less said the better; the main portion of it is a poor model of the famous tower of St. Nicholas Church, one of the well-known architectural attractions of Newcastle. The second number is a much less pretensions item, which, however, deserves praise; an "excelsior" blind-cord and pulley, by Messrs. Hargreaves, of Stockton-on-Tees, in which the blind-cord is kept stretched by a neat looking brass weight attached to the pulley-slide; simple enough, but entirely effectual, and which cannot get out of order until the cord breaks from age. There are a set of decoratively furnished rooms here, a feature one meets with in every exhibition now, whether it be "Healtheries," "Inventories," or whatever else in "ies." There is nothing very remarkable about these for the most part; but they are well up to the usual mark. Some of them are by well-known London makers. Messrs. Jeffery & Co., and the Lincrosta Company, have stands representing the class of work for which they are so well reputed; others are by local firms; among these a very good display is made by Messrs. Robson & Sons, cabinet-makers, of Newcastle, including a lobby, morning-room, and bondoir furnished, which are very well done, with the exception of the mistake of waxing and polishing the mosaic floor of the lobby,—a complete mistake to make in the treatment of mosaic. The hono-  
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has a very fine wall fabric, and a good ceiling in fibrous plaster. Messrs. Bainbridge & Co. have also a good suite of rooms in what they rather freely call the Italian Renaissance style; the title may do for want of a better; the general effect of furnishing is rather out of the common way in colour, and mostly rich, and good in effect; too much blue in the dining-room upholstery. Messrs. Sopwith & Co. exhibit an "Oak Jacobean Dining-room," with some very well-excited furniture of a rather heavy type, including a black oak cabinet, made, so we are informed, from "out of part of the oak taken from the old Tyne bridge built by the Emperor Hadrian, A.D. 120,"—a respectable antiquity for any wood. Messrs. Chapman & Son's furniture is also to be commended. But the most extensive, and, in some respects, most striking native exhibits of this class are those coming from Messrs. Emly & Co., of Newcastle, Gateshead, and Glasgow. These comprise a considerable amount of furniture of various kinds, costly, and highly finished, but, to our thinking, rather handsome than artistic. Another room by this firm represents the saloon of a passenger steamer in marble; that is, a complete veneering of the bulkheads with this material. The marble work and upholstery accompanying it are in excellent taste and of the best finish, and form a curious example of the present idea of luxury in regard to the fitting of passenger vessels. But the question is, how far is this practically suitable for a ship? It must be very difficult to ensure such rigidity in the bulkheads of even the largest iron vessel, straining in a heavy sea, as would leave no chance of disturbing a veneer in a substance so rigid as marble; and, to our thinking, such a material is quite out of place on board a ship. The third exhibit by the same firm is open to no such objection. It consists chiefly of an altar and recesses of Pavonazza marble for the new Church of St. George, Jesmond. The material is a grand one, and nothing could be better in its way than the work, especially the execution of the deeply-cut floral diaper on the panels on each side of the altar. The work is from the designs of Mr. T. R. Spence, of London, and does credit both to designer and executants. Among other exhibits in the same court Messrs. Hobbs, Hart, & Co. show a steel hull safe in one piece of steel, door also in one piece; a new method for special security; besides a number of other examples of work of the highest class of its kind. Mr. J. Farthing's very elaborate inlaid walnut cabinet deserves a special word of recognition as a very fine piece of work; and, though not quite on the same grounds, we cannot pass over the enterprising manufacturers (Rolls & Son, of London, and Coxon & Co., of Newcastle) who have challenged attention to their linoleum and floor-cloth exhibit by arranging the rolls and sheets of the material "so as to represent a Byzantine arcade!" Their staff, as well as that of Messrs. Anderson & Lee, near them, shows some good and tasteful patterns, however.

In the West Court is a good exhibition of the work of the Royal School of Art Needlework. A considerable portion of this court is occupied by exhibits of which it does not come within our province to notice; but we may mention that there is a large exhibition of carriages of various kinds by Messrs. Prond (Carlisle), Lawton & Co. (Liverpool), Atkinson & Phillips (Newcastle), and the Institute of British Carriage Manufacturers (London). These latter exhibit, as we observe from the catalogue, a large number of drawings and engravings illustrating the progress of carriage manufacture, which ought to be of much interest, but which we were unable to spare time to examine. Various presentation carriages and harness suites are lent by the Queen, and among other carriage exhibitors are Messrs. Mason & Co. (Birmingham), Forder & Co. (London and Wolverhampton), Ridges & Co. (Newcastle), Angus & Co. (also of Newcastle), and Selby & Co. (Birmingham), who exhibit some "safety axles" and other improvements in various carriage accessories.

Machinery in motion, of which, however, there is not a very large exhibition, finds place in the West Court; this includes, however, a considerable amount of exhibits which we have not space just now to notice in detail. Among things we specially noticed as of interest in connexion with buildings is Walker's "Anti-Vibration Shnter" for air-driving fans, the principle of which consists in partially

closing the opening through which the air is propelled by two cheeks in the shape of long triangles, following the curve of the periphery of the fan, and leaving an opening for the air-passage in the shape of a long inverted  $\Lambda$ , the blast of air coming into play gradually by a kind of *crescendo* arrangement, with less marked pulsation than through a rectangular opening. A working Blackman propeller is also shown, with satisfactory results. Among materials exhibited, we noticed the blocks of Frosterley marble from Messrs. Pease's Weardale quarries, a remarkable-looking marble showing a diaper of fossil-vegetation marks on a black ground. The "North of England School Furnishing Company" have a good exhibit of various types of school furniture, including a "Hygienic Chair," fitted with an "adjustable spinal pad," to be moved up and down of the centre vertical rail of the chair back, as required by the special conformation of the sitter. Messrs. Armstrong, Addison, & Co. show a considerable number of examples of creosoted wood, including specimens that have been in use as railway-sleepers and in other somewhat similar situations for many years, and give a good account of the preservative influence of creosoting. Messrs. Walker & Son, of Newcastle, have a good exhibition of stoves and grates, and Messrs. Emley & Sons, of the same city, a large and multifarious exhibit, including door-springs, lock-furniture, hand-lifts, kitchen-ranges, &c. Messrs. Dinning & Cooke's (Newcastle) stable fittings are worth attention, especially their granite-concrete floor; and the Carron Company are well represented in ovens and cooking apparatus, especially designed for large establishments. Messrs. Craggs & Son's (Newcastle) chimneypieces and decorative work in British and foreign marbles, is a good exhibit, as also that of Messrs. Smith & Co., of Coalville (Leicestershire), of ornamental floor and wall tiles. Messrs. Duffy & Son exhibit their "unwearable" system of wood-block flooring, the pieces grooved at the sides and tenoned at the ends.

A series of "artisans' exhibits" in this portion of the exhibition is a good idea in itself, but it cannot be said that it shows in most cases anything beyond diligence and neatness in the construction of models of various kinds. Mr. C. Bain, of Gateshead, is to be credited with a well-executed model of artisans' dwellings for large towns, executed in wood; but there is no new suggestion in it. Models of engines and ships, many of them very well executed, are tolerably abundant. Among things that are more than mere models is the model by Mr. Macallum (of Leanington, Northumberland) of an improved accommodation ladder for ships and tidal landing-stagings, in which the steps remain level at whatever inclination the ladder has to be placed, and the ladder can be lowered to suit boats at whatever draught the ship may be. This is an ingenious, and appears a practical exhibit. Mr. E. Rowe (Chilton Moor, Durham) exhibits a model of what should be a very important idea, if practical or practicable, a "coal-getting machine," consisting of "a simple wedge" acted upon by hydraulic power; "no explosives required." The model, however, is rather a sketch than an actual model; at all events, it is not sufficiently worked out in detail to enable one to judge of the feasibility of the idea, which we should rather doubt.

The "outside lean-to" or shed adjoining one side of the buildings is chiefly devoted to materials connected with building. Messrs. W. B. Wilkinson & Co. (Newcastle) have a good exhibit here, including what they call "spectacular granite" pavements and flaggings, a good looking material, probably capable of a great deal of wear; they show a fireproof concrete floor without iron joists to carry a safe load of 2 cwt. per superficial foot, and a concrete bar with iron inserted, carrying weights, to show its resistance to transverse strain. "The rod alone will bend with 1 cwt., the concrete alone will break with 3 cwt.; the two combined carry 6 cwt." We are quite prepared to believe this, but the value of the "preparation" would have been increased if the size and position in the concrete of the iron rod, had been shown in section.

Grindstones take a considerable place among the exhibits here, being articles of great importance in a manufacturing district. The Lunley Brick Co. show some good-looking glazed bricks; Messrs. Ferens & Love (Durham) some sanitary ware. The Nor-

manby Brick and Tile Company show some good terra-cotta glazed ware and bricks, and Messrs. Harriman & Co. (Newcastle) show an excellent quality of bricks, sanitary pipes, and traps, &c. Messrs. Rimmington Bros. (Newcastle) are also well represented as producers of this same class of work. Messrs. R. Boyle & Co. exhibit their various ventilators. We may mention, while touching on the topic of sanitary exhibits, that there is, or was, or was to be, a model sanitary dwelling, the position of which is, indeed, shown on the map of the grounds, but which, as far as we could ascertain, was at the time of our visit unfinished, at all events not to be seen.

Among the exhibits in the North Gardens is to be seen a door giving access to the "model coal-mine," which, on being entered, introduces one to a whole catacomb of artificially-constructed low and dark passages, representing the working passages of a coal-mine; the total length of the passages, which form a kind of labyrinth dimly lighted by electric glow lamps of low power, being about 600 yards. Additional realism is imparted by the whole ground being strewed with coal-dust. But the exhibition is really an interesting one, showing the coal-wagons used, the means of ventilation, the system of support to the sides of the galleries, the manner of dealing with a "faul," &c. A similar but shorter catacomb near it illustrates in the same manner the working and characteristic features of a lead mine; and in another part of the grounds is a series of illustrations of various methods of haulage employed in mines; but how complete or instructive this is we had not time to observe.

The model of the old Newcastle Bridge is very well done, and looks very picturesque; but this kind of thing is not difficult to do when the idea is once started, as it was by "Old London"; and probably every exhibition of this kind will now contain an archaeological model of this kind, and the promoters of exhibitions will create an archaeology for their district even when it has none to speak of. Among other things of interest in the North Garden grounds are two temporary bridges constructed by the First Newcastle Engineer Volunteers under command of Col. Palmer; a treble sing bridge made of spars and ropes, and a floating bridge on casks. These are both made with such materials as might be found on the ground or carried with troops in the field; and they are very good specimens of temporary work of the kind, put together with rough materials, but in a perfectly workmanlike manner.

The fine art section is the least important part of the Newcastle exhibition, containing, indeed, a considerable number of drawings and paintings, but of which the average merit and interest are not very high. There are some great paintings scattered up and down among them, however, of which the most noteworthy are Cromie's grand views of Carrow Abbey (722) and "Bridges" (728), the latter a moon-light, an unusual subject with Cromie; Mr. Watts's "Creation of Eve" and a second edition of "Love and Life"; Mr. H. Moore's grand sea-shore painting, "The Beached Margin of the Sea" (758); Corot's "Dawn" (881), one of the greatest works he ever painted; Mr. Alfred Hunt's "Durham" (916), and Mark Antony's "Night Storm and Darkness" (773), the old picture of the big tree, under a new name. There are other lesser works by well-known names (Mulready's "Careless Messenger" it is interesting to meet with again); and several very good paintings bearing names not familiar to us, but not the less welcome on that account.

**Imperial Institute.**—We understand that Mr. Collett's design for the Imperial Institute is accepted; as far as we can ascertain, there appears no doubt of the fact, though we have seen no official announcement of it. The Queen is to lay the foundation-stone on the 4th of July.

**Exhibition of Mosaic Work at Venice.** Attention has been called by the Continental press to the Art Exhibition at Venice, one of the most interesting features of which is a mosaic executed by Dr. Salvati for the Loggia of the Dusseldorf Kunst-Halle.

**The New Law Courts, Birmingham.**—The contract for the Victoria Law Courts, Birmingham, of which the Queen laid the first stone some weeks since, is assigned to Mr. John Bowen, of that town. His tender was for 78,860*l.*

#### A DUTCH DESIGNER. BOLTEN VON ZWOLL.

In this, the concluding article of the series\* which we have devoted to the early engravers who worked chiefly in France and Germany, and who flourished from the fifteenth to the seventeenth centuries, we hope to serve some useful purpose by glancing rapidly through the work which we have illustrated, and by gleaming therefrom a sheaf of those elementary principles on which the art of those old designers was built, and which are too often ignored by the designers of the present day.

With the exception of those precursors of Albert Dürer noticed in our first article published on December 6th, 1885, it will probably have pleased some of our readers to adopt one broad classification for all the artists whose work we have passed under review. There are those for whom all ornament, or at least all the ornament of Central Europe, is either Gothic or Renaissance; and by far the largest proportion of the works we have sketched will by them be generalised, at the best, as interesting specimens of the Renaissance. It seems to us that mere broad generalisation can serve but little good unless we go further and dissect the work which the influence of the Renaissance called into existence. One thing this influence did was to foster a servile imitation of the classical models, to produce through all succeeding time a multitude of copyists whose work was as blemished as the models were themselves; copyists who ignorantly reproduced the faults of the Roman workmen, and in the reproductions made them infinitely more faulty. The imitators rapidly formed a school of their own, producing work characterised by the same methods, the same devices, and the same tricks as the Roman antiquaries, which served for models. It is this work specially which we have termed Renaissance work, and the faults of which we have so frequently and without hesitation pointed out. It is not to be wondered at that among the students in this school some should have been found of originality and skill sufficient to produce some very charming work, in which the blemishes of style were reduced to a minimum. Such men were Aldorfer and Aldegrever in early days, and Pierre Bourdon in the beginning of last century; but the very excellence of their work only serves to emphasize the villainies perpetrated in the name of the Renaissance by a lower order of beings who are with us even to this day. But of this lower order we feel that we have already said enough. And we may turn with a feeling of relief and satisfaction to the influence for good which may undoubtedly be attributed to the Renaissance.

That influence for good was, as has been often said, a revival of the search for principles. Many of the unthought examples may have been bad, but at least the principles on which they depended were of the highest excellence. With such of the principles as related to decorative art we are now perfectly familiar, and here it is necessary only to mention them briefly. They involve the complete ascendancy of the conventional over the realistic; the complete dependence, nevertheless, in certain cases, of the conventional on natural forms and principles of growth and structure, i.e., in the tangential flow and radiation of the lines of design; the proportion of all parts of the design to each other; and the even covering of the space or surface ornamented.

In the first and foremost of these lies the spirit of true conventional work, and from the study of the methods of conventionalising adopted by the Classic artists came the power of conventionalising other natural forms, and of breaking away from the use of the eternal acanthus-leaf on every occasion, whether appropriate or inappropriate. It must be confessed, however, that the Gothic designers, when they make use of foliage decoration, are not much freer from the charge of artistic tautology than the servile copyists of the Classic models. To many, though not to all, minds the Gothic serrated leaf possesses charms as potent as those of the Classic acanthus. It is not so

\* The following is a complete list of the series, with the dates on which they have appeared:—1883: Dec. 8, The Precursors of Albert Dürer; Dec. 12 and 19, Albert Dürer and his Followers. 1886: Oct. 30 and Nov. 6, Hans Holbein. 1887: Jan. 1, Jean Bourdant; Jan. 8, Pierre Bourdon; Jan. 15, Harist, Le Blond, and Gentsch; Jan. 22, A Cluster of Decorative Artists; Feb. 5, The Two De Brys; Feb. 19, Some Unknown Designers; April 28 and 30, Some Designers of Grotesques; June 4, Virgilius Solis; and the present one on Bolten von Zwoll.



cumbersome, and consequently lends itself more easily as an ornament to the flowing curves of a design; but there must of necessity be a feeling of monotony attending its too constant use. In the varieties and modifications of it which make Israel von Meckemur's work (created at length in our issue of December 5th, 1885) so charming, we find this Gothic leaf in its least rigid form. In many instances Von Meckemur's foliage is, as it were, the connecting link between the Gothic and the Classic styles.

In the same way that Von Meckemur broke away from the severe Gothic models and produced conventional floral designs of striking

In the monkey-panel (figured in our issue of February 19, 1887, on page 279), by an unknown German engraver, we find the leaf of the black bryony treated in a rigidly conventional manner. The quaint and irregular serration of these leaves, which, hanging from the vines, add to the countless beauties of every wayside hedge, make them in conventional form specially serviceable to the decorator. It is a wonder that they are not more used. We have seen them very effectively treated in plain gold on a delicately-tinted diapered background, with here and there a brilliant scarlet berry. Then there is the flower-scroll (fig. 6 on the same

page) sprang into existence, and was endowed with vitality by the discovery of the great antiques which lay for so many hundreds of years beneath the Italian soil.

Of the remaining principles which concern the structural formation of a design we have already spoken at sufficient length and with sufficient emphasis in our former articles; it is unnecessary to dwell on their characteristics again, though we may without fear of wearying our readers repeat that their recognition is essential to good and perfect ornament.

To-day we present our readers with a few sketches of some curious designs from the hand of an unknown Dutchman,—Bolten von Zwoll. They are taken from a large collection of the original drawings pasted into a folio scrap-book in the British Museum Print-room. Beyond the facts that the book passed into the Museum from the Earl of Arundel's collections; that the drawings, to the number of about 300, were probably got together by the Earl; and that the date impressed on the cover is 1640, nothing is known about them, nor of Bolten their producer.

We give the sketches to-day more as curiosities than as first-rate specimens of decorative art. They are essentially Dutch, and none of the designs can be said to possess any very great beauty; but, albeit somewhat grotesque, they are strikingly original, and show a most remarkable force and purity of outline. In fig. 1 are two quaint pilasters. Fig. 2 is one of a large series of lamps and tazzas, all of which are very charming in form. Fig. 3 is a very boorish grotesque, probably designed for the hoses of a cap; there are a great number of these grotesques, the faces of the men and animals being full of a Batavian grace and humour, which makes us regret that our space for sketches is but limited. In fig. 4 we have sketched the largest of three or four designs for silver cups; the outline is vigorous and well proportioned; and, if we omit the portly *frau* and the bunch of fruit, the ornament is simple and in good taste. In the chasing of the base will be seen the better half of a Batavian face much resembling that depicted in fig. 3, and pointing the noses to which these fantastic figures were put by their prolific designer, Bolten von Zwoll.

In concluding this series of articles we cannot fail to express our thanks to Professor Colvin, to Mr. Fagan, and to their many assistants in the British Museum Print-room for the unwearied attention and unfeeling courtesy which they have shown us during the pleasant hours spent in foraging among the priceless treasures committed to their care.

Illustrations.

REREDOS, LANGPORT CHURCH.

THE reredos for this church, in the neighbourhood of Tannock, has been executed by Mr. G. W. Seale, from the designs of Mr. J. D. Sedding. We gave a full description of it in the *Builder* for March 12th of this year, page 409.

MONUMENT TO THE LATE BISHOP OLLIVANT.

This fine and expressive monumental figure, which is now in the Royal Academy, has been designed by Mr. Armstrong, R.A., as a monument to the late bishop, to be placed in Llandaff Cathedral. The face is a very fine example of the sculptor's art, and ranks, to our thinking, as one of the best productions of its author. The altar tomb on which the figure is to repose, which is not shown in our illustration, has been designed by the late Mr. John Pritchard, of Llandaff.

MONUMENT TO THE LATE BISHOP FRASER.

This monument, to be placed in Manchester Cathedral, is also in the present Academy exhibition. It is designed by Mr. Jas. Forsyth, and will rest on an altar-tomb designed by Mr. Crowther, the Cathedral Architect, and executed by Messrs. Earp & Hohhs, of Manchester.

ST. ERMIN'S MANSIONS, WESTMINSTER.

The block of mansions of which we give a view and plan (half entrance-floor half first floor) in our issue of to-day is in course of erection by Mr. A. Steer on a site about three-quarters of an acre in extent, adjoining St.

originality, did many artists in later days, after imbibing the principles which the Renaissance brought prominently to the front, break away from the perpetual use of the one model with which it supplied them. The three-petalled leaf which appears so frequently in Aldorfer's and Aldegrever's panels (see our issue of December 12, 1885) is a good example of this original work. Its curves are always exceedingly graceful, and when multiplied to make the corolla of a flower give a very charming result. In Aldegrever's panels additional variety is obtained by frequent introduction of the side view of this leaf. This leaf reappears in a simpler form and with less surface modelling in some of Bourdon's work, together with some more complicated variations (see our issue of January 8, 1887, more especially the scent-bottle or handle, fig. 12).

page) on whose originality and beauty we have already dwelt.

In the best work of the younger Theodore de Bry (see our issue of Feb. 5, 1887) we noticed what great power that artist showed in conventionalising natural forms which hitherto had not been pressed into the decorator's service: notably the seed-pods of a papilionaceous plant open, half-open, or shut, and in segment. Once more we find the principle carried to its utmost limits in the charming floral designs of Herbst (see our issue of Jan. 15, 1887). But instances might be multiplied without end: those we have given are sufficient to show what the chief influence of the Renaissance really was on decorative art, and in what direction it worked: notwithstanding the bad work so often alluded to, that influence is with us as great to-day as it was when it first

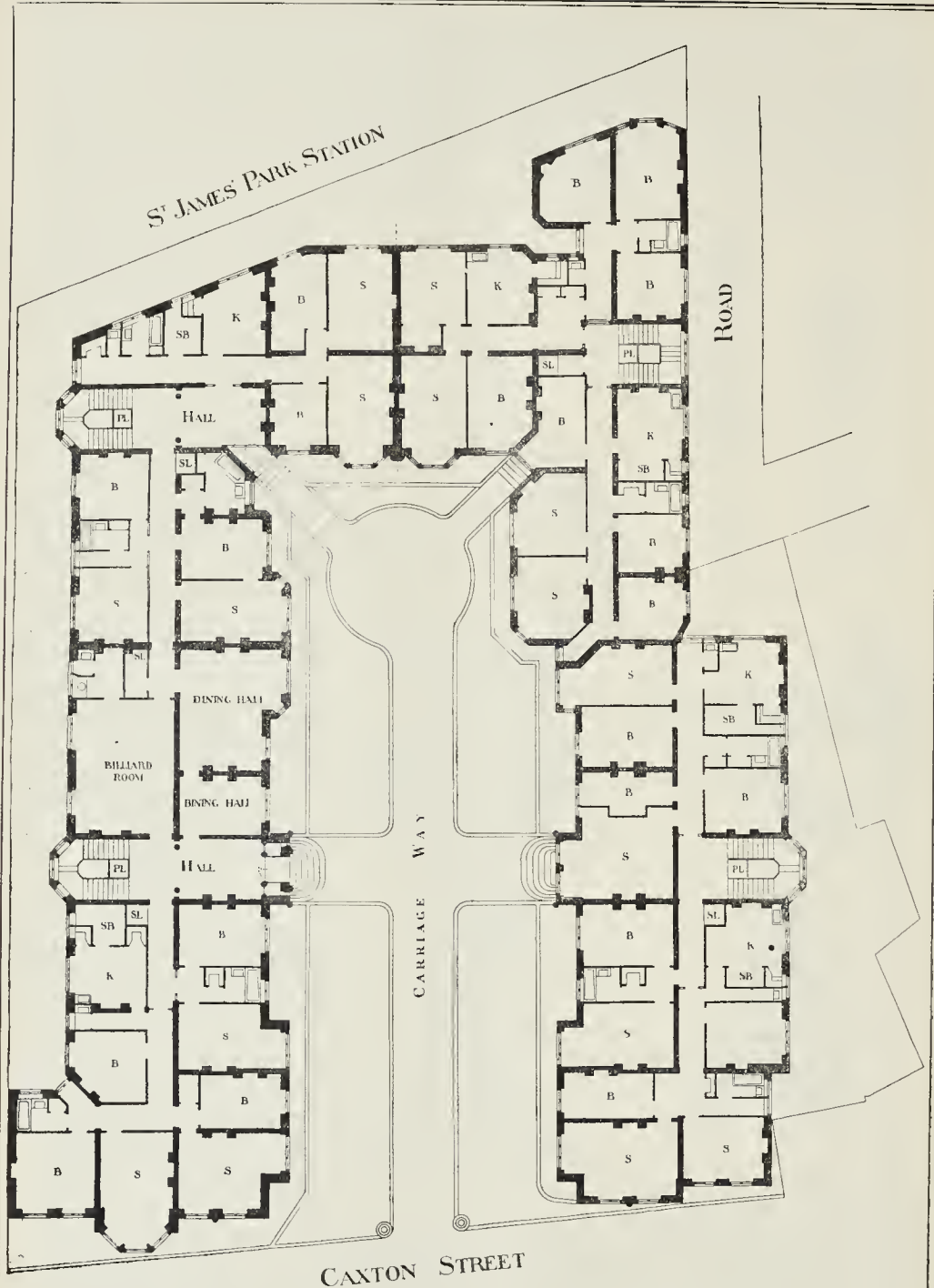


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.



GROUND FLOOR PLAN

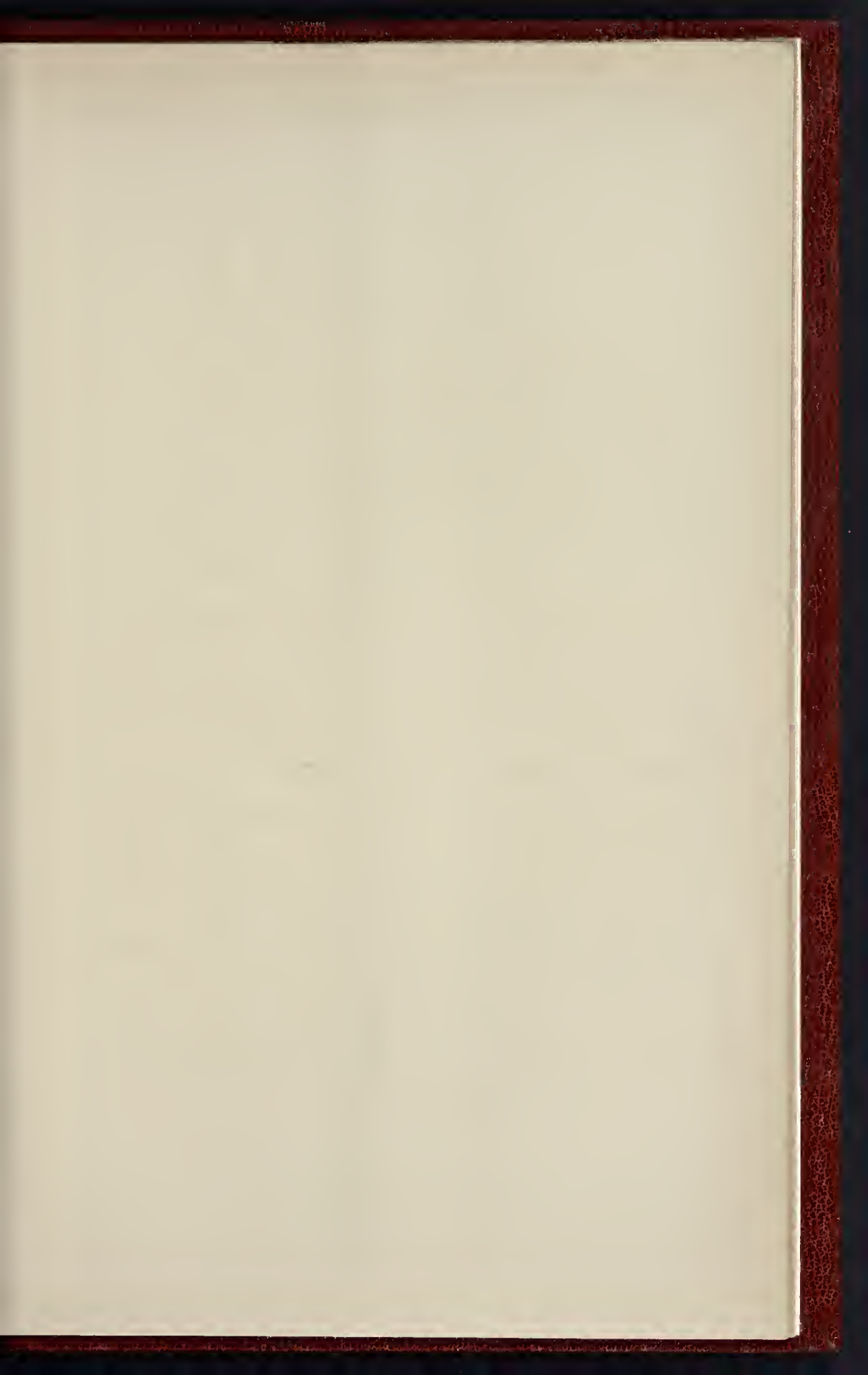
FIRST FLOOR PLAN

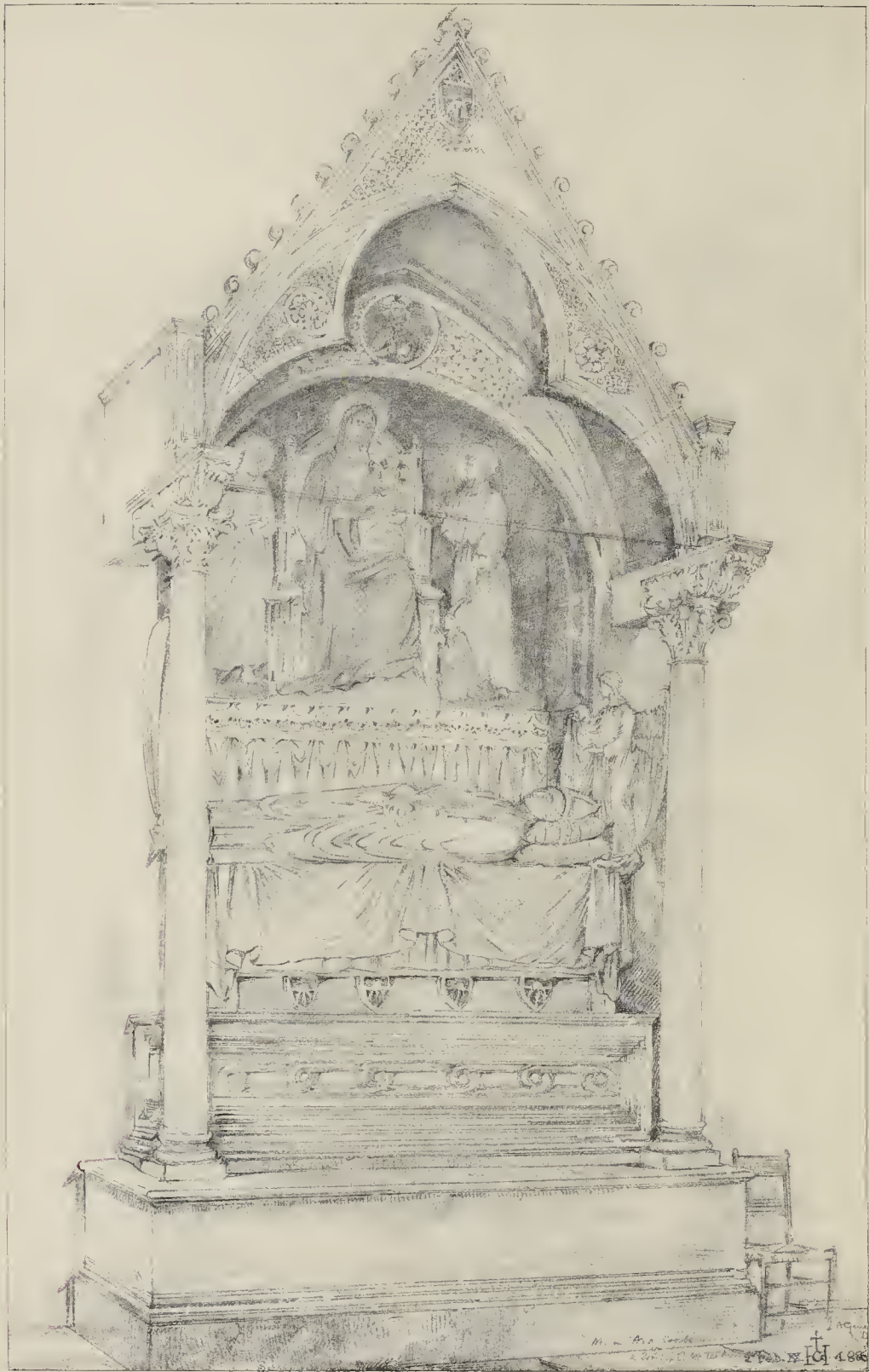
S. Sitting-room.  
B. Bedroom.

REFERENCES.  
S.B. Servant's Bedroom.  
P.L. Passenger Lift.

S.L. Service Lift.  
K. Kitchen.

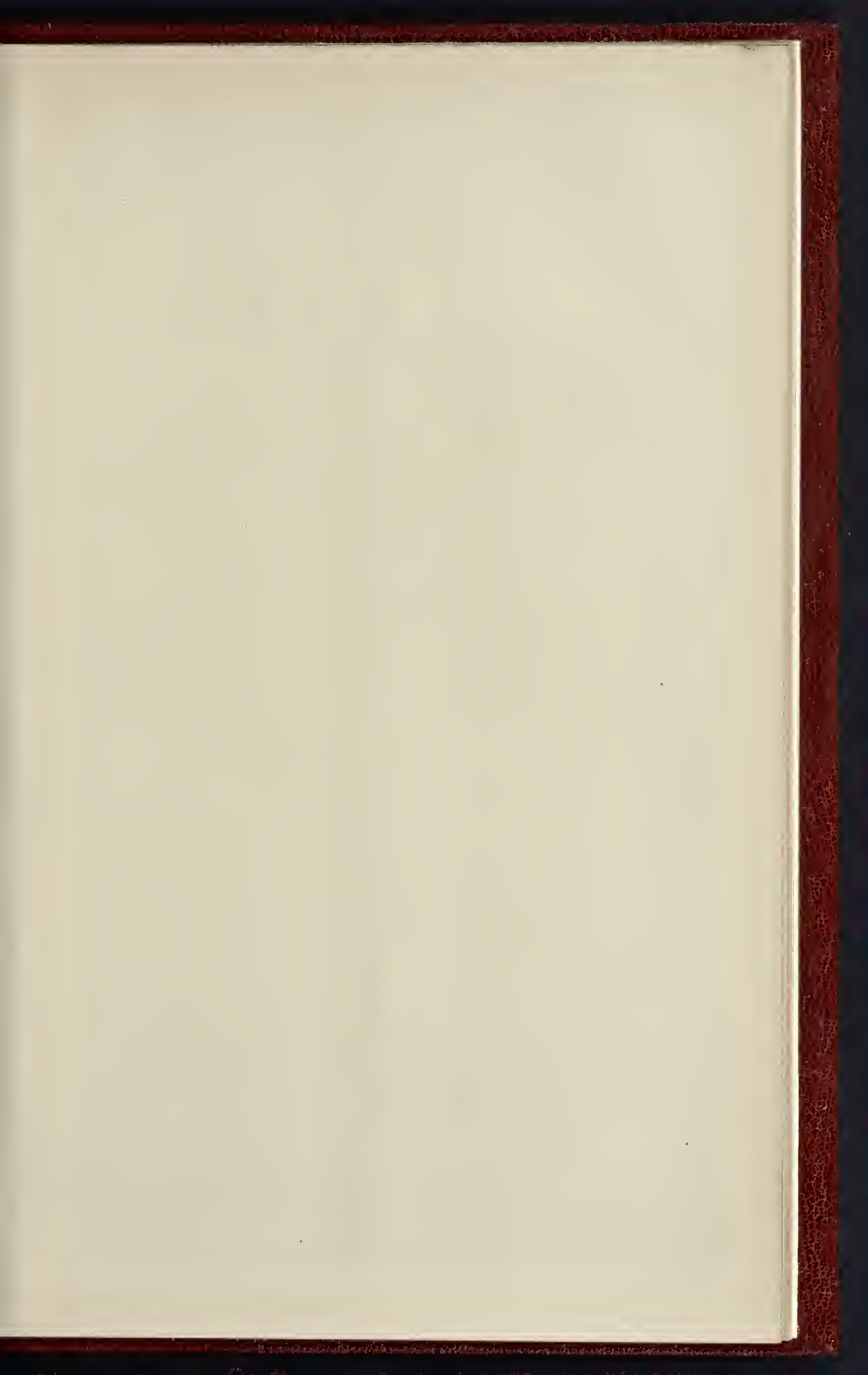
St. Ermin's Mansions, Westminster.—Mr. E. T. Hall, Architect.





TOMB IN S.M. IN ARA COELI, ROME.—DRAWN BY MR. GERALD HORSLEY, ALDWINCKLE STUDENT, 1887.

PHOTO BY BRADSHAW & CO., MARINE LANE, CANON ST. LONDON E.C.





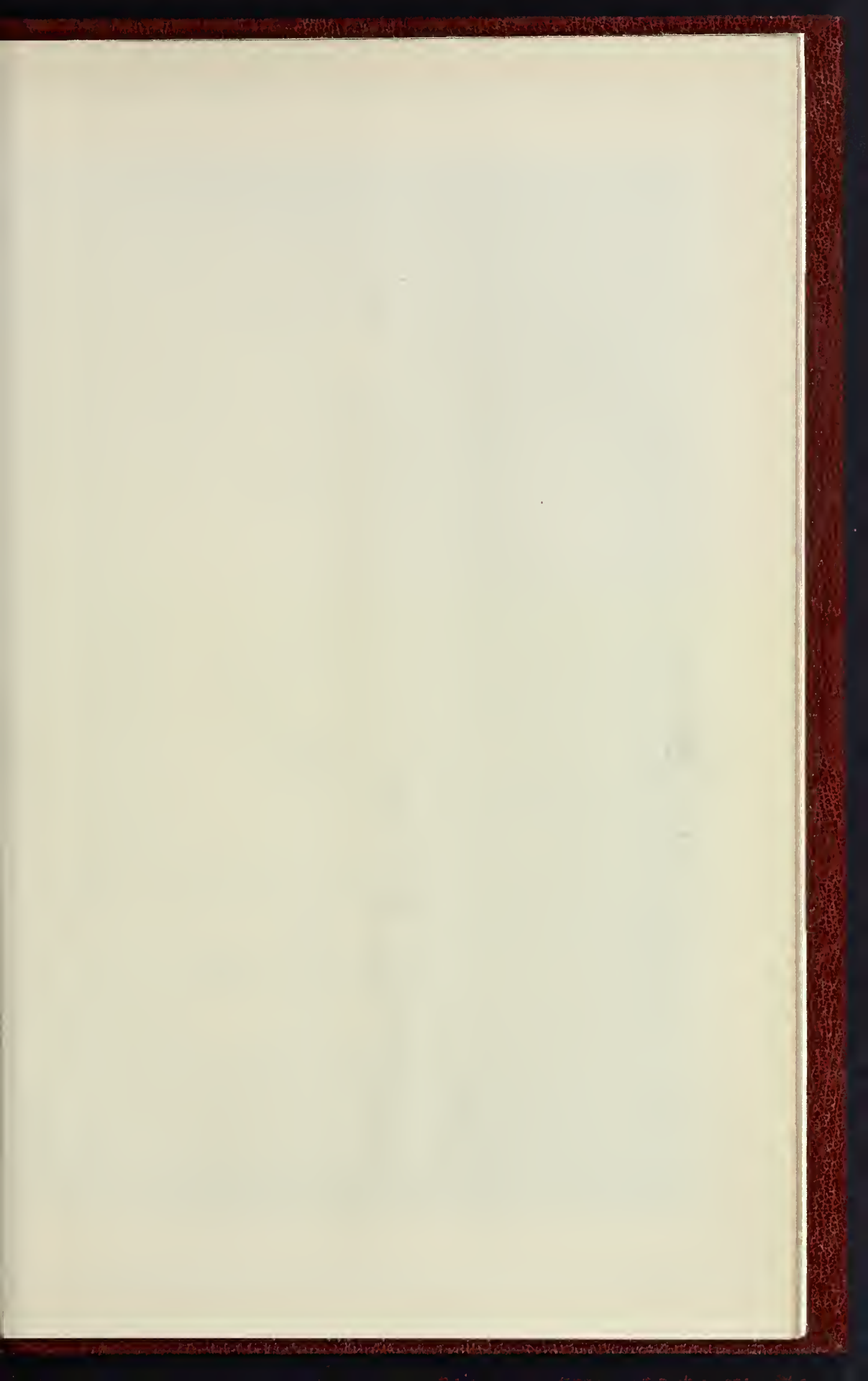
ST. ERMINS MANSIONS, WESTMIN



PHOTO LITHO. SPRACUE & CO. 22, MARK LANE, CANON ST. LONDON, E.C.

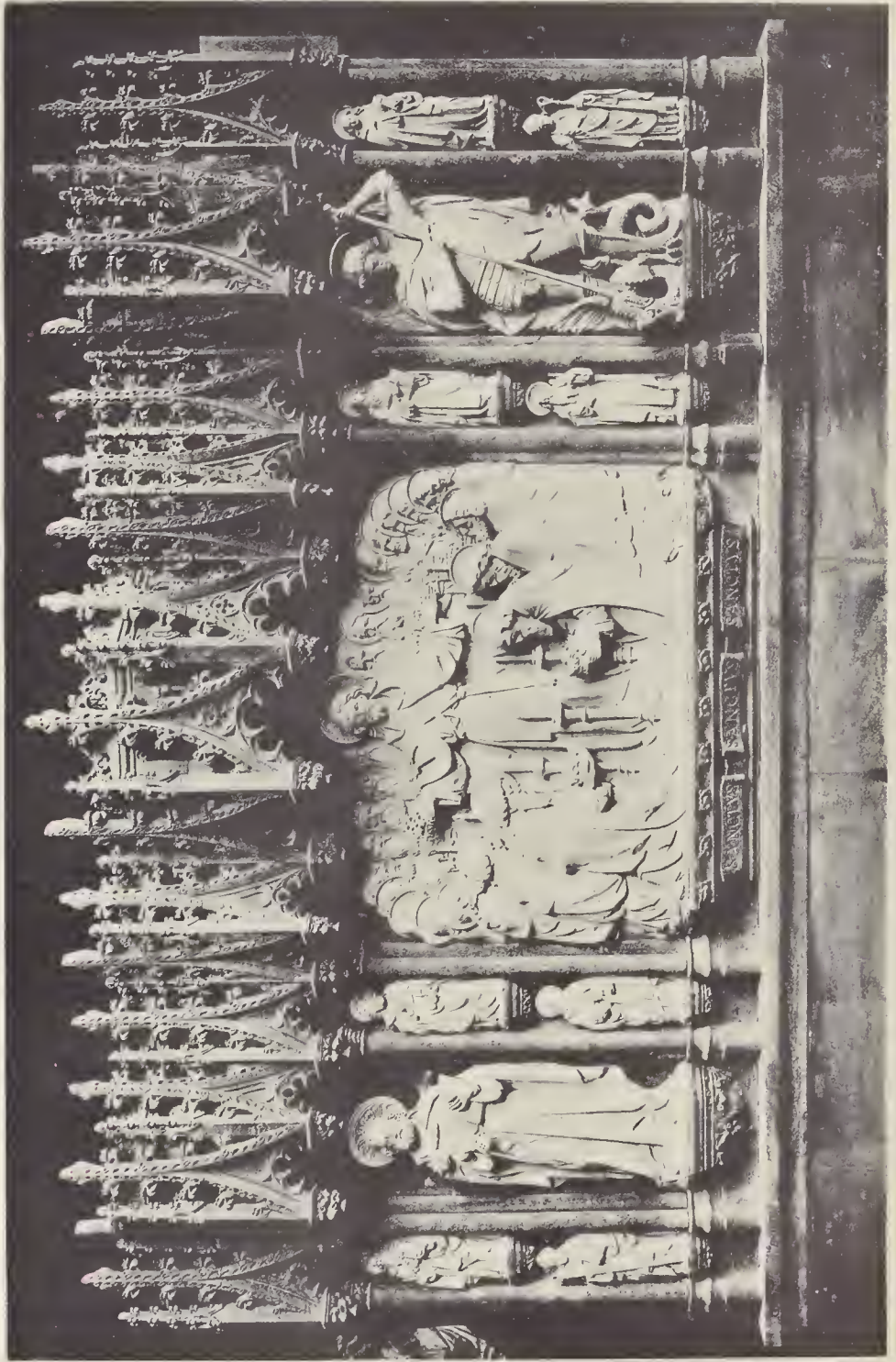






THE PHOTOGRAPH BY THE PHOTOGRAPHIC COMPANY, 1887.

THE BUILDER, JUNE 25, 1887.



REKEDOS, ANGPORI CHURCH, TAUNTON.—Mr. L. D. SIBBING, ARCHTCT.; Mr. G. W. SEAF, SCULPTOR.  
The Phototype Co., 435, Strand, London.



MONUMENT TO THE LATE BISHOP FRASER.—MR. JAS. FORSYTH, SCULPTOR.



MONUMENT TO THE LATE BISHOP OLLIVANT.—MR. H. H. ARMISTEAD, R.A., SCULPTOR.







James's Park Station and the Westminster Town-hall. The main frontage is to Caxton-street, parallel with Victoria-street, from which it is separated by the garden of Christ Church, the Hotel Windsor being to the right and Members' Mansions to the left.

It will be seen that the building forms three sides of a quadrangle, open on the fourth side to the south, the centre being laid out as a private garden for the use of the residents,—a feature unique in London as attached to residences "in flats."

The view was drawn from the preliminary design, and considerable alterations have been made in the actual working drawings from which the plans are copied.

The whole range is constructionally divided into four blocks, each having a spacious hall, large staircase, and hydraulic passenger and service lifts. For convenience of supervision, and as an additional means of escape in the event of fire, there are corridors for communication between all the blocks on the sixth and lower ground floors.

The buildings are divided into suites of from two to nine rooms, each having its own private entrance, bath-room, and water-closet, with store-closets, and in the larger suites its separate kitchen and larder, and servants' water-closet.

To each pair of blocks is attached a staff kitchen, 36 ft. by 19 ft. (with a complete set of offices), in close proximity to the service lifts, enabling the management to undertake, as in a hotel, for all or any of the tenants who may desire it, the entire culinary and other domestic service.

There are also public dining-rooms, billiard-rooms, &c., for the use of tenants and their friends.

Residences for housekeepers and bedrooms for a number of house servants are also provided.

The staircases and floors throughout will be of fireproof construction. Special attention will be paid to the sanitary arrangements, including the ventilation, automatic flushing, and provision of means for inspection of drains. All rain-pipes and bath and sink wastes will be disconnected from the drains. The window areas generally are large, to make the rooms bright and cheerful.

It is proposed to supply the buildings with pure water from an artesian well on the premises, sunk deep into the chalk.

The site possesses the advantage of being in the heart of Westminster, in close proximity to the Houses of Parliament, the park, clubs, &c., while it is retired from the noise of a main thoroughfare.

The estimated cost of the building, exclusive of the land, is about 80,000*l.* The architect, from whose designs and under whose superintendence the work is being carried out, is Mr. Edwin T. Hall.

**TOMB OF CARDINAL MATTEO OF ACQUASPARTA, IN THE CHURCH OF S. MARIA IN ARA COELI, ROME.**

This tomb stands in the north transept. It has no inscription upon it. The Cardinal died in 1302, and mention of him is found in Dante, where he is spoken of as the General of the Franciscan Order, wise and moderate in his rule.

The representation of the Madonna with the two monkish saints is in fresco, as well as the small head of Christ, and the underside of the arch.

The spandrels, coats of arms, &c., are in mosaic. The colour of the marble is very beautiful and delicate. On the drapery is carved diaper work. In Santa Maria Maggiore is a somewhat similar tomb, signed and dated Johannes Cosmo, 1299, but the picture of the Madonna is in mosaic. G. HORSLEY.

**WESTERN TOWERS, ABAYE AUX HOMMES, CAEN.**

The spires to these towers (*temp.* William the Conqueror) were added in the thirteenth century. G. HORSLEY.

**Truro.**—St. George's Schools are about to be considerably extended. The alterations include the erection of a new infants' school which will accommodate over 100 children. Mr. A. H. Clemens, of Truro, is the architect.

**CANONS, MIDDLESEX.**

"At Timon's villa let us pass a day,  
Where all cry out, 'What sums are thrown away!'"

Who then shall curb or who improve the soil?  
Who plants like Balthus or who builds like Boyle.  
'Tis us alone that sanctifies expense,  
And splendour borrows all her rays from esse."  
Pope, "Moral Essays," Epistle iv.

We have adverted as occasion arose to the purchase of the Jervanix Abbey Estate,\* and the projected sale of Walpole's seat at Houghton, county of Norfolk,—which latter property was withdrawn by Sir J. W. Ellis on a highest bid of 300,000*l.*, at the auction of the 27th of July last year. Next month another historic property will be put up for sale by auction, by direction of the trustees under the will of the late Dr. Begg. We speak of Hendel, Pope, and the

"magnificent" Duke of Chandos. Being now some 600 acres in area, the property lies within Whitechurch, or Little Stanmore, parish, which extends over about 1,570 acres of Gore Hundred, Middlesex. Distant eight miles and a half from the Marble Arch, the estate stands on the verge of the great northern forest, whereof we still find vestiges at Enfield Chase, Epping, and Waltham. Its eastern boundary rests against the straight high road,—Watling-street, and perhaps a former British causeway,—through London to Caswallon's fastness of Brigha's Wood (Brockley Hill), the Sullonicae of Antonine's Itinerary; and thence to Verulamium and the tracts of the Cassii. In proof of the main road's antiquity we may here observe that its middle line separates the parishes of Kingsbury and Hendon, and of Whitechurch and Edgware or Edgworth.

Lysons tells us that the manor in Stanmore Parva, which had been held by Alger, servant to Earl Harold, belonged in the Conqueror's time, as is recorded in Domesday, to one Roger de Raymes. The Raymes family owned wide lands in Essex, constituting a barony. At the marriage of King Henry III.'s sister Isabel to Frederic Emperor of Germany, "half a knight's fee was paid by Henry Bocoynne for his lands in the parish of Stanmore Parva, held of the barony of William de Raymes." This property

next passed to the prior and canons of St. Bartholomew-the-Great, West Smithfield, from which circumstance its name, like to that of Canonbury, is commonly deduced. Yet many derive it from a religious house or chantry that had been established on this spot in connexion with Bentley Priory at Stanmore. However this may be, Canons in 1544 was given to Hugh Losse,† under the style of "the Manor of Canons and Wimborogh in the Parish of Whitechurch." The Losses were succeeded, or joined, in possession by the Franklyns, *temp.* Elizabeth. Yet it was a Sir Hugh Losse who sold the estate to Sir Thomas Lake, Secretary of State to King James I., and who died here on October 19th, 1630. Sir Thomas's granddaughter and heir brought the property in marriage, on February 27th, 1697, to James (Brydges), ninth Baron Chandos of Sudley Castle, who, on April 30th, 1719, was advanced Duke of Chandos. His Grace's house derived from the Montaguerys, Earls of Arundel, and could boast descent through the Tudors and Plantagenets.

In 1712 the Grand Duke, as he was locally designated, had begun to build, and in a style seldom attempted before, a mansion whose memory chiefly lives in Pope's trenchant albeit inaccurate and ungrateful satire. Its total cost, including that of the park and gardens, amounted to nearly one million sterling of our present money. For architects he employed Gibbs, Shepherd, and James. The pleasure-ance, with its lake covering seven acres, and fishing temple, was laid out by Dr. Alexander Blackwell.† No adornment was spared for the interior. Thornhill painted the ceilings; even the door-locks and hinges were of silver or gilt. Constructed of stone, the house was square in plan, set diagonally before an avenue of elms. Each of the four front elevations had three rows of eleven windows with a sculptured head above every opening. The principal front had a row of six fluted columns, in marble, standing on a rusticated base, ascended by steps. The pediment covered heraldic achievements, trophies, and so on. The outer walls were 12 ft. thick at the base,

diminishing to 9 ft. at the ground-floor. The celebrated main staircase now owned by Lord Burton, of Chesterfield House, May Fair, is built of blocks of white marble, 22 ft. in length. The balustrade was of silver.\* Two lodges by the main road gates are of a design to correspond with that of the house. The long avenue reaching northwards from Sir Lancelot Lake's Almshouses (1656), by the church, is now a wilderness, interspersed with firs, beeches, and pines, and traversed by a winding path. Traces exist of the private road which, as the story goes, the Duke planned in London. He wanted to pass over his own land in riding between Canons and the town mansion that he proposed to build in Marylebone Fields along what is now the northern side of Cavendish-square. Of this house the eastern wing stands at the corner (north-eastwards) of the square and Chandos-street. A view of its entire elevation, after John Price's design (1720), is preserved in one national collection, British Museum. The Duke, by the way, was twice attacked by highwaymen along this same road, and on two successive days, Monday and Tuesday, February 6th and 7th, 1720, as stated in the *British Gazetteer*.

Various anecdotes survive of the Duke's precautions against imprecident profusion in his plan of living. He used to sell such garden fruit as was not required for his own table,— "It is as much my property," said he, "as the corn and hay and other produce of my fields." An aged man who had been his servant was wont to tell how his occasional bounties to the labourers never exceeded 6d. at a time. "This," he would say, "may do you good; more may make you idle and drunk." He engaged an able accountant,—one Watts,—to settle a scheme of household expenditure with totals for a year, a month, a week, and a day: the particulars being engraved on a large copper-plate. On the other hand, we have testimony by the author of a "Journey through England" to the Duke's sumptuous order of service at table; his stately progresses to and from chapel escorted by a band of pensioner sergeants equipped as Yeomen of the Guard, his regal choir of vocal and instrumental music at the parish church. The vast fortune he had amassed when Paymaster-General to the Forces under Queen Anne suffered three shocks by his concern in the African Company and the South Sea and Mississippi schemes, 1718-20. Yet he lived on in scarcely diminished splendour at Canons until his death on August 9th, 1744. His son and successor, Henry, had married, 21st of December, 1728, Mary, daughter to Charles (Bruce), third Earl of Ailesbury. Lord Ailesbury, as trustee for his son-in-law, found the estate, already encumbered, to be quite unequal to the charge of such a costly inheritance. So he determined to sell the property, and, failing a single purchaser for the whole, in separate lots. The sale (1747) did not realise more than a net amount of 11,000*l.* Relics of the house were scattered over the country. Lord Chesterfield bought the hall staircase for his new house at May Fair; its silver balustrade, and the main portico, went to Lord Tynes's seat (Wanstead House); the equestrian statue of George I. was taken to form the ornament, though in our day it became the relic, of Leicester-square; a marble mantelpiece was bought for the Goldsmiths' Hall. Some of the stained glass was removed to Witley Court. It is said that the two stone houses on the northern side of Cavendish-square were built out of one lot of materials; with the materials of another lot the purchaser, Mr. Hallet, a cabinet-maker, of Long-acre,—who also bought the land,—constructed the existing house, on a site close to that of the original residence. William Hallet, his grandson, parted with the property to Colonel O'Kelly, the wealthy owner of Eclipse, which famed racehorse and sire was buried within the grounds. A nephew of Philip O'Kelly, the colonel's brother and heir, sold the property to Sir Thomas Plumer, Vice-Chancellor of England and Master of the Rolls. Meanwhile, James (Brydges), third and last Duke of Chandos, had died leaving a daughter and sole heir, Anna, who on April 16, 1796, married Richard (Nugent-Temple-Grenville), second Marquess of Buckingham, advanced February 4, 1822, Duke of Buckingham and Chandos.

In 1715-20 the Duke of Chandos rebuilt of pale red brick the nave and chancel of the parish church, which had been dedicated to St. Lawrence, *temp.* Henry VIII. The register

\* The *Builder*, February 26th, 1887.  
† The initials R. L. (Robert Losse) above crest and coat-arms are carved on a mantel-piece that was taken from the Chandos Arms,—now, alas! "a hotel,"—the supposed manor house.  
‡ *Gentleman's Magazine*, September, 1747.

\* Vide Virtue's account in a MS. owned by Lord Orford at Strawberry Hill.

dates from 1558. In mute protest against the parishioners' greed, he left the Gothic tower. This, having battlements and a north-eastern turret, is stuccoed over, and defaced with an Italian, or Classic, doorway in stone. Taking for model a royal chapel at Versailles, the Duke engaged the labours of Bellinchi, of Laguerre and Verrio, and of Gibbons and his father-in-law, for the paintings, carvings, and ironwork with which the church's interior is so profusely decorated. Setting aside the carving and ironwork, and perhaps one or two of the coloured paintings, the general effect of the interior, enforced as it is by the fresco Evangelists, Saints, and Virtues, and the sham columns, arches, pavements, &c., on the walls, is to our mind that of a Vauxhall by daylight. The altar stands beneath a curved pediment, which is supported by a pair of coupled columns and pilasters,—the work of Gibbons, and of oak grown in the grounds. In a lighted recess behind this, and itself flanked by the "Adoration" and the "Glory," is the organ, by Father Schmidt, its case by Gibbons, also. Subject to certain enlargements of 1878, this is the instrument on which Handel played whilst resident chapel-master at Canons, 1718-21. With Handel's greater name should be cited, too, those of Dr. Randall, of Cambridge; Dr. Pepmeh, whose morning and evening services were long used; and of Savage and Beard, in the choir. In a southern window is a brass tablet to the memory of Sir Harry Smith Parkes, who died at Peking on March 22nd, 1855. The Chandos memorials are in two chambers next north of the nave. Of these, the inner one is on a higher level than the outer; it covers the vault wherein lie the remains of the Duke, some of his descendants, and other members of his house. In the outer room rest his banner and coronet, ranged over the flight of steps which cover the vault door. Around the painted walls are fixed numerous hatchments, conspicuous with the emblazoned cross saltire, *gules* on *or*, of the Bruces, and the cross *sable* with *logherhead, gules* on *argent*, with the motto "Maintien le droit" of Byrdes. Facing the steps is the great duke's large but commonplace monument. Supported by kneeling figures of Mary Lake and Cassandra Willoughby, two of his three wives, he stands in full-bottomed wig and conventional Roman attire,—an ambitious but poor performance without. Amongst his titles of honour are those of Chancellor of St. Andrew's University, High Steward of Cantremelenith, and Ranger of Enfield Chase. Much of the marble in this "Monument Room" is turning green; the ceiling is out of repair, and the stains of trickling rain-water do not improve Verrio's painted columns, arches, &c. By the doorway which opens into the rectory-garden stands a tombstone, on which are carved in relief an anvil and hammer with initials "W. P.," intertwined in a bay wreath, under a musical staff with notes B and E, being the opening notes of a well-known melody. The stone is thus inscribed:—"In Memory of /William Powell/ the Harmonious Blacksmith /Who was buried 27 February, 1780/ Aged 78 years./ He was parish clerk during the Time/ the Immortal Handel/ was organist of this church/ Erected by Subscription/ May 1868." Powell's reputed smithy, wherein Handel, taking shelter from a storm, heard him singing a German air at his work, stands on the western side of the main street; it is now the sweep's stable, and goes with the premises hard by. After some difficulty we succeeded in identifying Powell's home with the Bee Hive public-house, a few yards distant, its front defaced with stucco. The house is some 300 years old; the landlady told us she is endeavouring to re-purchase the board which formerly distinguished it as the blacksmith's residence. A few good subjects for the artist's pencil may be found in the town of Edgware, particularly some quaint little shop-fronts by the forge, the church tower, and the Old George tavern and Chandos Arms.

**Nonington, Kent.**—The church here is about to undergo restoration under the supervision of Mr. Ewan Christian. The chancel was restored some few years since, leaving the nave and north aisle yet to be done. Chiefly owing to the munificent donations of Mr. Plumpton, of Fredville Park, and Mr. W. O. Hammond, of St. Ahans, these are now to be taken in hand, which include new roof to the nave and restoration of the north aisle roof, and reseating the body of the church. Mr. Wise, of Deal, is the contractor.

### MACHINERY AT THE MANCHESTER EXHIBITION.

(SECOND NOTICE.)

A VERY fine display of electric lighting is to be seen in Manchester, the directors of the Exhibition having profited by the experience gained at previous Exhibitions in London and elsewhere. The installation of arc lights is carried out almost entirely by the Anglo-American Brush Electric Light Corporation (Limited), London, and the incandescent installation by the Manchester and District Edison Electric Light Company (Limited). The Anglo Brush Company supply no fewer than 546 arc lamps; of these 476 lamps are used inside the Exhibition buildings, or one to about every 1,254 square feet. The brush dynamos supplying the current are of three sizes, feeding 15, 25, and 35 lamps each. The current is distributed by conductors carrying 50 lamps to a circuit.

Messrs. Mather & Platt, of Salford, have in operation two 500-light Manchester dynamos and two 800-light Edison-Hopkinson dynamos. These are constructed by the exhibitors. The illumination of the fountains is undertaken by Messrs. W. & J. Galloway & Sons, of Manchester; the lights placed below the water consist of 18-arc lamps, arranged in groups of two lamps of 60 amperes each. These are fed by two Siemens B 13 dynamos.

The gardens are illuminated by arc lights, and oil or fairy lamps arranged in the shrubs and grass. The arc lamps are suspended from lofty hollow masts, and are raised or lowered by ropes and a winch placed inside each mast.

The incandescent lighting consists of some 4,000 Edison-Swan 16 c.p. lamps, and use the Swan coiled filament. They are fitted into brass sockets, and opal shades are used to reflect the light downwards.

Safety fuses are fitted at various points to get rid of any excess of current that may arise. The lighting of each room in the picture annexes is sub-divided between two different mains, so that should there be a breakdown in one circuit the rooms would not be left in darkness. Many of the lights are placed amongst foliage or softened by glass shades of different colours. The effect in some instances is extremely good.

Amongst other dynamos in use is a large 500-light one by Elwell-Parker: this is a slow-speed compound wound one.

The electric lights are generally extremely steady and good, and individually equal to any we have seen; but as a show the effect of the garden illuminations is certainly not equal to the recent Colonial Exhibition in London.

**Pumping Machinery.**—The Worthington Pumping Engine Co., 114, Queen Victoria-street, London, exhibit, amongst others, a compound steam pump. This is designed more particularly for use in countries where fuel is expensive. Two steam cylinders are fitted and are so arranged that the steam having acted for the full length of the stroke of the small piston, expands on to a larger one, which works in the opposite direction, and so the return stroke is made. A feature of all the Worthington pumps is the employment, for a steam-valve, of an ordinary slide-valve working upon a flat face over ports or openings similar to those used in most steam engines. The motion of the valve is produced by means of a vibrating arm, which swings through the whole length of the stroke. It is claimed for this arrangement that greater certainty of action than steam-moved valves is obtained, and the blow inseparable to the tappet system is done away with. The plunger works through a deep metallic packing ring. The details of these pumps have been well thought out, and all the working parts are readily accessible for adjustment or repair,—an important point sometimes lost sight of. Where high-pressure steam is available this compound pump should be worked with economy. A neat form of water-meter, a low-service steam pump, and several boiler feed pumps are also to be seen here.

Amongst others a long-stroke double-ram pump known as the "Manchester" is exhibited by Messrs. Frank Pearn & Co., Manchester. It is designed chiefly for use as a fire-engine; it is of vertical type and has its main frame with pedestals for carrying crank-shaft cast in one piece. The chief feature of this engine is the length of stroke obtained, which is considerably longer than is usually found. It appears that in a recent trial at Ashton-under-Lyne a pump

of this make with two 7 in. rams and two 10 in. steam cylinders, with a stroke of 14 in., a speed of ninety-two revolutions, and 150 lb. pressure, threw 1½ in. jet of water 190 ft. high in the face of an adverse wind. This must be pronounced a very satisfactory result, and the pump should be particularly useful as a stationary fire-engine in lofty buildings.

Messrs. W. H. Bailey & Co., of Salford, show a number of their double-acting fly-wheel steam pumps adapted for various duties. In these pumps ordinary flat slide-valves similar to those used in high-pressure steam engines are employed. The use of these valves for pumping purposes has extended considerably of late, and much can be said in their favour. The pump valve chambers are fitted with doors for adjustment or repair of working parts. The valves are considerably larger than is usual in pumps of similar construction, and are well adapted for lifting large quantities of water to a low head, such as is required in ballast or some contractors' purposes. The pump valves are made of india-rubber or gun-metal, as the condition of usage may require.

Mr. John Wolstenholme, of Radcliffe, shows a strongly-designed duplex rotary steam pump with bed-plate, front covers, and pedestals in one casing. Common flat slide-valves are employed, and the pump being double-acting on both suction and delivery is suitable for rough usage, as the concussion often found is here greatly modified, all parts in contact with the water being enclosed. The motion work is of steel.

Messrs. Holme & Lund, Manchester, exhibit samples of their patent direct-acting steam pumps, for which they claim that there are only three moving parts for the distribution of the steam, viz., one small flat slide-valve in the top valve-box, and one main flat slide-valve, which is worked by one auxiliary piston. Both main and auxiliary pistons are steam-cushioned. The chief novelty in this pump is the method of moving the main flat slide-valve. This is done by a small auxiliary cylinder placed above the main steam cylinder, and a small flat slide-valve is attached to the top valve-rod, on which rod are adjustable collars; these are moved at the end of each stroke by the crosshead-arm on the pump-rod. The collars on the middle rod,—which is a continuation of the piston-rod of the auxiliary cylinder,—are set further apart than the others, so that the crosshead-arm only comes in contact with them when the steam from any cause fails to move the auxiliary piston quick enough; in such case the crosshead-arm, by contact with these collars, assists the steam to move the main slide-valve. Although the parts are somewhat increased by this arrangement, there is little doubt it makes the pump more certain in its action, and the outlay of steam for working the small auxiliary piston should be small.

Mr. John Cameron, of Manchester, shows samples of his well-known single and double acting vertical ram-pumps. The general design and construction of these pumps well maintain their reputation.

A stationary steam fire-engine is shown by Mr. Charles Walsmsley, of Bury. It consists briefly of a three-throw pump, with air-veiled and receiver driven by steam cylinder and slide-valve of the ordinary type; this latter is worked by an eccentric. The plungers, buckets, foot-valves, and glands are made of gun-metal and the pump barrel is gun-metal lined. A treble-throw pump, with 12-in. cylinder, 10-in. pump, and 7-in. plunger, is stated to be capable of throwing 60,000 gallons of water per hour 100 ft. high, in jets ¾ in. diameter. In large establishments this pump should be useful.

Several engines and pumps are exhibited by Messrs. Tangy (Limited), Birmingham, including a vertical engine and dynamo, a 12 in. by 24 in. horizontal engine fitted with Jefferis' patent automatic expansion gear, a centrifugal pumping engine, colonial ram-pump, and a selection of their direct-acting steam-pumps.

Mr. W. Gunther, of Oldham, shows a selection of Girard turbines, including one of 102-h.p. for a fall of 200 ft. This is coupled to a 40-light dynamo. Exhaust and blowing fans are also exhibited, and several centrifugal pumps.

Mansfield's apparatus for manufacturing oil gas is shown in the grounds by Messrs. E. Mansfield & Co., Manchester. The apparatus consists of a simple form of retort and gas-holder, and is designed to produce gas from any kind of oil or grease. A special sort of oil is usually used; this is non-explosive, and will not



give off inflammable vapour under a temperature of 212° Fahr. In comparison with the Salford town gas, the light of this oil gas is much more brilliant, and, tested by Wright's photometer, the result has been given as four to one in favour of the oil gas. This is a highly satisfactory result, to say the least, and in districts where coal gas is unobtainable this gas should be of good service.

The Dowson Economic Gas and Power Company, Limited, Westminster, exhibit in the grounds their apparatus for producing fuel-gas, suitable for driving gas-engines, heating ovens, type-founding, soldering, &c. The apparatus is fitted with a governing arrangement, by means of which the production of gas is regulated automatically to suit a varying rate of consumption. The gas made is used in driving an engine. The process of making is very simple. It consists briefly in passing a jet of superheated steam, mixed with air, through red-hot anthracite, or small gas coke, contained in a generator. There is no exterior fire, and to make 1,000 cubic feet of gas, it is stated that only 15 lb. of anthracite and about seven pints of water are required, and, with fuel costing 10s. a ton, at a cost of about 2½d. per 1,000 cubic feet.

A patent cylinder filter, for the treatment of large quantities of liquids, especially water, is shown in the grounds by Messrs. Mather & Platt, of Manchester. Each filter consists of two vertical perforated metal tubes, one placed within the other, the space between them being filled with sawdust, charcoal, or other filtering material. The liquid to be filtered has to enter through the perforations in the outer cylinder or tube, and, after passing through the filtering material, is collected in the inner tube, whence it is conveyed in the service-pipes. The makers claim that it will remove from water all solid, greasy, or slimy matter, and that it is also applicable to the treatment of sewage.

Messrs. Howard, of Bedford, have a specimen of their patent portable railway, 24 in. gauge and 14 lb. rails; also an iron tipping wagon and samples of sleepers for portable and permanent railways.

Portable railway wagons and accessories are also exhibited by Messrs. Decanville, of Idolane, London. The rails used are of steel of very light section, and permanently riveted to cross sleepers. The rails are jointed in a simple way. The rail to the right hand is furnished with two fish-plates; that to the left with a small steel plate riveted underneath the rail and projecting beyond it. The lengths of rail are laid end to end, making the rail, which is fitted with the small plate, come in between the two fish-plates when the joint is made. The wagons are made chiefly of steel, and as the whole can be readily laid without skilled labour this system should be particularly useful for quarries, brick-fields, or contractors' purposes.

A self-acting cold-iron and steel circular sawing-machine is shown by Messrs. Lee & Hunt, of Nottingham. The girder or iron to be seen is placed on a table and held by a powerful clamp, the saw is traversed and set by a screw feed and is fitted with a quick return motion. The rate of traverse can be varied according to the material being cut. This machine should prove itself very useful to contractors of wrought-iron work, where many pieces have often to be reduced to one exact length.

A band-sawing machine for cutting iron is to be seen at the stand of Messrs. B. & S. Massey, Steam Hammer Works, Manchester.

The Blackmen Air-Propeller Ventilating Company, Limited, 57, Fore-street, London, show a selection of their propellers.

Windmills are represented by the Ontario Pump Company, of Toronto, who exhibit one of their 10-ft. Halliday windmills working a vertical pump; a deep-well pump, a general purpose pump, and force-pumps are also shown. These, in conjunction with a windmill, should be very useful for irrigating and similar purposes.

A simple form of water-meter is shown by Mr. T. Kennedy, Kilmarnock. The measuring parts of this meter consist of a cylinder and piston,—the former of cast-iron and the latter of vulcanite,—on which an india-rubber roller forms an elastic separation between the top and bottom of the cylinder. A four-way cock directs the water alternately above and below the piston. This is actuated by a weight. All the moving parts move round on an axial line;

friction and consequent wear are therefore considerably reduced. It is stated that this meter registers the smallest leak or ball-cock supply, yet does not sensibly reduce the pressure. For instance, the effect on pressure or delivery of fixing a 1-in. meter on a 1-in. pipe is the same as adding 3½ yards horizontally to the length of pipe, and it is also claimed that this meter cannot register against the consumer, while the facts that it works with a small flow, and that the index does not hang at the reverse, are conclusive that it is accurate.

A centrifugal pulveriser (Lucop's), and Mumford & Moodie's patent separator, are shown by Messrs. Askham Bros. & Wilson, Limited, Sheffield. The separator consists, briefly, of a tapering wrought-iron chamber with spout at the bottom; this chamber is divided, and also has an inner casing. A fan-blower is placed in the upper chamber, and as the ground material,—which is fed in from the top,—descends, a current of air circulates through it, the fine dust is thrown into the outer casing, and descends through the spouts into hags or casks. The coarse material falls down the inner casing, and passes out through a branch pipe to be returned to the pulveriser for regrinding. This apparatus is of simple construction, and will produce finished material of any degree of fineness. It should prove useful.

The Grinding and Polishing Machine Co., Birmingham, exhibit a grindstone with attachments which possess some fresh features. The stone is mounted in a trough in the usual way, but parallel guides are fitted to the trough, and the work is passed along these guides and over the top surface of the stone; consequently a true face is produced and the surface of the stone also remains true. Flat, bevel, convex or concave surfaces may be produced, and by the use of guides prepared for a required curve work may be ground to any radius. An adjusting table and parallel vice for gripping rounds, squares, and tapers is fitted, and altogether this must be pronounced an extremely useful machine.

Messrs. Clark, Bunnett, & Co., Limited, London, show one of their hand rope safety lifts, and a sample of Clark's patent self-gripping crab. In this crab the ordinary winding drum is done away with, the lifting chain being arranged to pass in and out between small rollers shaped to suit the links of the chain and to grip it as it passes. The crab is worked with a handle in the usual way, and thrown in and out of gear by a clutch. A strap break is fitted, and the whole space occupied is much less than with crabs of ordinary construction.

We must not omit to notice the 173-h.p. patent water-tube boiler erected in the grounds by the Bahcock & Wilcox Company, of Glasgow and New York. This type of boiler has met with considerable success of late, and there is little doubt it possesses advantages in making steam economically, combined with comparative safety in use. The boiler is made of lap-welded wrought-iron tubes placed in an inclined position and connected with each other, and with a horizontal steam and water drum, by vertical passages at each end. A mud-drum connects the tube at the rear and lowest point of the boiler. The end connexions are in one piece for each vertical row of tubes; and the tubes are "staggered." Openings for cleaning are provided opposite the end of each tube. The steam and water drums are made of steel or wrought iron, and the mud-drums are of cast iron, to better withstand corrosion or "pitting." The chief points claimed for this boiler are that, owing to the thinness of the heating surface-plates, heat is very rapidly transmitted from the fire to the water, consequently steam is rapidly and economically raised, and, owing to its construction, it is readily cleaned or repaired, and there is much less chance of an explosion than with boilers of the ordinary type.

A good display of steam traps and various engineering fittings is made by Mr. John Boyle, 27, King-street West, Manchester. Amongst these we noticed a steam trap for discharging air and condensed water from steam apparatus especially adapted for dirty situations or where there is dirt in the water. In this trap a ball-float in combination with a siphon is used. The cover is held on the trap by wing-bolts, to retain a slight pressure of steam within the box, sufficient to eject the water by the siphon, so long as steam continues to come to the inlet. If water accumulates behind the inlet the ejection

action ceases temporarily; the water thus accumulates in the cistern, raises the ball, and rapidly discharges the water until the pipes are again dry, when the ejection action by the siphon lowers the ball and nearly closes the inlet. The outlet is open to the atmosphere to secure a free discharge. A patent return steam trap and hot-water (212° Fahr.) boiler feeder, patent reducing valves, hydraulic test-pump, improved swivel unions and hends, &c., are also exhibited.

A self-acting gas governor is exhibited by Messrs. Jas. Stott & Co., 10, Market-place, Manchester, and although there is justly a prejudice against gas regulators, owing to many failures, the one under notice has several fresh features about it.

What appears to be a distinct improvement in fusible plugs for steam boilers is shown by the English and Scottish Boiler Insurance Co., Limited, of 58, Fountain-street, Manchester. The improvement consists in the introduction of a packing pad of asbestos between the steam and the fusible metal, in such a way that when the metal becomes melted it drops into the furnace, and the pressure in the boiler forces out a lead washer and the asbestos wad, leaving a clear opening for the steam to escape. By this arrangement, direct contact of the steam or water with the fusible metal is prevented, thus obviating partial fusion, as it is generally concluded that a flow of steam coming in contact with partially-fused metal stops further fusion. The use of the asbestos wad prevents also the cooling effect of the steam on the fusible metal, it then facilitates the melting. The fusible metal and asbestos wad are readily removable.

*Pulleys, &c.*—A large number of the pulleys used in the Exhibition are wrought iron or steel split ones, made by Messrs. Perkins, Sun, & Barrett, of Bradford. They appeared to run very true, and we were informed that all pulleys made by this firm are carefully balanced and turned in a lathe.

The Power Pulley Company, of Manchester, show some of their Shepherd's patent perforated pulleys. These contain a large number of perforations through the face of the pulley, the object being to prevent driving-belts slipping by rapidly discharging the air found between the belt and the pulley through the perforations.

With the same object, i.e., to prevent belt slipping, Messrs. Wilkinson & Co., Manchester, exhibit samples of perforated covering for pulleys.

As was to be anticipated, there are a great number of exhibits connected with steam and the steam engine, such as pistons, steam traps, boiler-fittings, economisers, &c. Some of these are well worthy of notice but the limits of our space permitted.

Altogether Manchester must be congratulated on its exhibition, as it possesses features of interest in certain departments that have rarely if ever been surpassed.

#### ARCHITECTURAL ASSOCIATION SUMMER VISITS.

The second summer visit of the Architectural Association was made on the 11th of June to a house at Banstead, Surrey, erected for the Hon. F. Baring, from the designs of Mr. Norman Shaw, R.A. The ground-floor story walls are of thin red brick, with Ham Hill stone dressings. The upper part of the house is of half-timber work, with some portions tile hung, the rain-water pipes having very elaborate lead heads. The entrance-hall and staircase are panelled with oak of a very light colour; the drawing-room is panelled with painted wood-work, which still has to be decorated.

The third visit was made on Saturday, the 18th inst., to Cambridge, under the guidance of Mr. W. M. Fawcett, M.A. The first College visited was Christ's, where the entrance gateway and the oriel over the entrance to the Master's Lodge are the only portions of the sixteenth-century work left, the clunch stone used having become so decayed that the walls were cased in the eighteenth century, and the windows inserted in the Classic taste. The Round Church was next visited, and thence the party proceeded to St. John's College, the Divinity School, by Mr. Basil Champneys, being noticed in passing. Professor Mayor conducted the party over St. John's College, which was founded by Margaret, the mother of

Henry VII, the entrance gateway, like that of Christ's, which was also founded by Margaret, having the Tudor rose and portcullis and "Marguerites" carved over the archway. The Hall was lengthened in 1863 by the addition of a large bay, and the Chapel was pulled down to make way for the sumptuous building from the design of Sir Gilbert Scott. The three arches forming the entrance to Fisher's Chapel have been built into the south wall of the ante-chapel. The Combination-Room has a handsome plaster ceiling, and beyond this is the Library, a new set of rooms now being built from the designs of Mr. Penrose, and connected with the old buildings at this point. Passing over the bridge, the "New Courts" built in 1826 from designs by Mr. Rickman were inspected.

Trinity College was next visited. The entrance-gate, which dates from 1535, was until recently covered with plaster, but this has been removed, and the original bricks and stone exposed, the latter is very much marked with holes to give a key to the plaster but otherwise is not much damaged.

The next College visited was Cains, and then King's, where the Chapel, with its magnificent fan vault, was examined, and the screen of Flemish woodwork was compared with the Jacobean stalls. The party went on the roof and examined the upper side of the vaulting, and then passed into the Hall. From this college they passed to Clare College, and subsequently to Queen's, after passing down "The Backs" and by the mill-pond. This college, founded by two queens, is an interesting example of the form of the early colleges; Prof. Willis, when he measured it, found that it corresponded closely to the plan of Haddon Hall. Additional buildings are being erected from the designs of Mr. W. M. Fawcett. St. Catherine's and Corpus were next visited. In the latter, the old ball is now used as the kitchen. The new buildings were designed by Mr. Wilkins. The Church of St. Bennet, which adjoins the College, was formerly used as the college chapel, and is connected with it by means of a gallery (now used as a vestry by the church). Pembroke college was then visited; the Chapel, designed by Wren, and the ceiling of the Combination-Room, being regarded with special interest. The new buildings are from the designs of Mr. Waterhouse and Mr. Gilbert Scott. Peterhouse was the last college visited. The Church of St. Mary-the-Less was used by the College, and connected with it by a corridor (also now used as a vestry).

#### THE SANITARY INSTITUTE.

SIR,—As a member of the Referee Committee of Council of the Sanitary Institute of Great Britain, it is my duty to make arrangements for the reception of papers to be read at the forthcoming Sanitary Congress at Bolton in September next.

Will you be so good as to allow me to call the attention of the profession to this yearly opportunity of recording the advances made in the practical application of the principles of sanitary science to civil architecture?

EDWARD C. ROBINS.

#### THE PRESERVATION OF STONE.

SIR,—With reference to your recent articles on the above subject, I trust you will permit me to point out that syenite and syenitic granite are not synonymous terms for the same rock, and that syenitic granite does contain mica as an essential constituent, with hornblende, quartz, and felspar. Syenite is not a variety of granite, but a distinct rock. In the trade, I know, several different kinds of stones are embraced under the term "granite" (some of them being limestones), but it is impossible for science to assist in the selection of these rocks for building purposes unless each kind is separately dealt with.

I quite agree with your remarks on lichens, &c. (p. 860).  
GEO. F. HARRIS, F.G.S.

SIR,—In your article on the above in your issue of the 11th inst., you state, "It has, at various times, been more or less authoritatively stated that lichens which form frequently on stone surfaces in country places help to preserve such stone, but this idea is not supported by any reasonable argument."

In this district (Isle of Portland), where lichens, &c., are abundant, it is always maintained that whilst the lichen may not preserve the stone, the very fact of its being on the face, proves the stone to be a good weathering piece, as, were it otherwise,

and constantly crumbling away, the lichens could not take root and thrive, as every rub or shower of rain removes the disintegrated parts. There is a wall near me, built of brown (exterior or weather) Portland stone, and a few pieces of white (or interior) Portland, the former, being covered with a greyish lichen, exhibiting every tool-mark, although centuries old, whereas the latter is constantly, but almost imperceptibly, wasting, and has a yellow, decomposed appearance, without any lichen on it.  
F. J. BARNES.

#### THE CONGRESS OF FRENCH ARCHITECTS.

MONSIEUR,—J'ai lu avec grand intérêt le Comptendu du Congrès des Architectes Français publié dans *The Builder* du 18 juin, mais permettez-moi d'attirer votre attention sur trois points, non à l'état de rectifications, mais seulement comme complément d'informations:—

1. *Caisse de Défense mutuelle des Architectes.*—Comme tous les ans, le compte-rendu de la séance annuelle de cette Association a été analysé devant le Congrès, qui a constaté, avec l'accroissement des membres de la Caisse, l'importance et l'intérêt des affaires dans lesquelles la Caisse de Défense est venue en aide aux associés.

2. *Propriété Artistique.*—MM. Ach. Hermant, Ch. Lucas, et Al. Normand, membres du Conseil de la Société Centrale et H. et C. M. R. I. E. A., ont soumis à la dernière séance du Congrès un vœu pour que le Gouvernement Français ratifiât la Convention signée à Berne le 9 Septembre, 1886, en vue de la création d'une Union Internationale pour la Protection des Œuvres Littéraires et Artistiques (les dessins d'architecture étant compris dans ces dernières).

3. *Droits des Architectes des Administrations publiques.*—La Commission qui a étudié cette dernière question a soumis au Congrès, qui l'a adoptée à l'unanimité, une suite de vœux en réponse à la lettre de M. le Ministre des Beaux-Arts, vœux dont le plus important est ainsi libellé: "Qu'il ne peut être accordé à un Ministre ou à tout autre fonctionnaire ayant appelé un architecte à un emploi public, de conserver à l'endroit de cet architecte le droit absolu de révocation; mais que ce droit doit être entouré, pour l'architecte, comme pour le magistrat, l'officier, le professeur, ou tout autre fonctionnaire de l'Etat, de garanties équivalentes dont les principales pourraient être une enquête, la nécessité de faire la preuve de la faute reprochée à l'architecte et l'examen de la cause par une Commission composée en partie d'architectes, devant laquelle l'architecte incriminé serait appelé à se défendre."

CHARLES LUCAS.

Paris, 19 Juin, 1887.

#### GUILDFORD SHIRE HALL RESTORATION.

SIR,—I wish to ask the question, whether town-halls built in the last quarter of the seventeenth century had, as a rule, open roofs or flat ceilings? My reason for asking is that the old Shire Hall in this town (date 1683), whose quaint facade and bell-turret are the most noticeable objects in the High-street, has been undergoing restoration, and one of the first steps taken by the architect was the removal of the flat ceiling in the hall, and the substitution of an open-timbered roof.

The plea for this alteration was that one of two tie-beams had its lower face chamfered, as if formerly exposed to view. On the other hand, there was the clearest evidence of the flat ceiling having been the original one in the state of the other timbers, which are finely striped, of unequal size, and destitute of ornament. In place of kingposts, there was an unsightly arrangement of struts rising obliquely from the centre of each tie-beam to the roof in the form of an inverted pyramid.

The question, of course, is not whether an open-timbered roof is the better architectural feature or not, but whether it is historically correct, and in its right place in a Late Jacobean hall.

And as this is a point for archaeologists to decide, I hope to elicit an opinion in the pages of your journal.

Guildford, June 19th, 1887.  
H. S. T.

**Preservation of Archaeological Remains in Prussia.**—The Prussian Minister of the Interior has issued a circular to the civic and rural authorities in Prussia requesting that careful returns be made of all archaeological remains existing within each commune. The circular also ordains that in future the vestry of every parish shall, on excavations or finds of graves being made within their boundary, superintend the same, and in case of discoveries being made of ancient remains, monuments, and archaeological objects, report such, and see that no further excavations take place unless directed by a qualified archaeologist. The sale of archaeological objects thus discovered is also strictly forbidden.

#### The Student's Column.

FIELD WORK AND INSTRUMENTS.—XXVI.  
Leveling Instruments.

XII.—HAND LEVELS.

THESE instruments are of great service in preliminary work, or for arriving at an approximate comparison of levels in places where a larger instrument would be placed off. They commend themselves chiefly on account of their portability, as they can be easily carried in the pocket when not in use. Fig. 1, which shows the longitudinal section of a reflecting level, illustrates the manner in which the detailed portions shown in fig. 2 are connected. B is an inner tube carrying half a convex lens, which magnifies a horizontal line marked across the reflecting-plate E. This plate or mirror occupies one-half of the interior of the tube to which it is attached underneath the centre of the spirit bubble A. The remaining half of the interior of the tube is left open to enable any distant point to be observed, the open and mirror portions being respectively placed upon opposite sides of a vertical diameter, as indicated in fig. 2. The object seen when the bubble is in the centre of its run is, therefore, on a level in the line of sight, A D, with the observer's eye at A. A stop-piece is introduced to aid distinct vision, and is attached to the centre of the outer tube, as shown in fig. 1. It will be noticed that as no magnifying power is employed to observe distant points, the distance at which the divisions upon a level staff can be distinctly read is very limited.

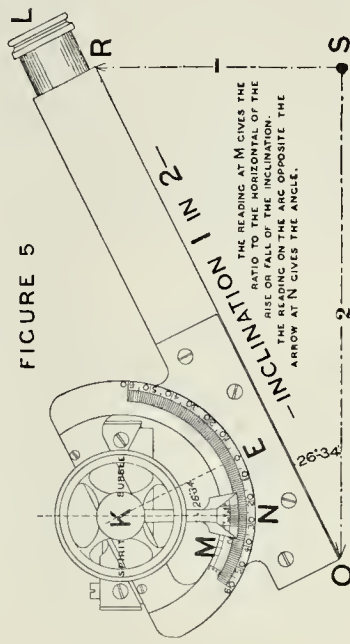
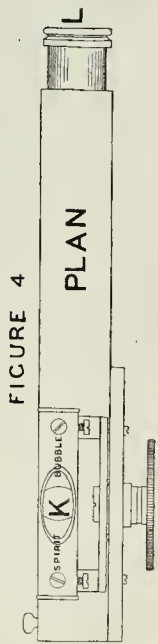
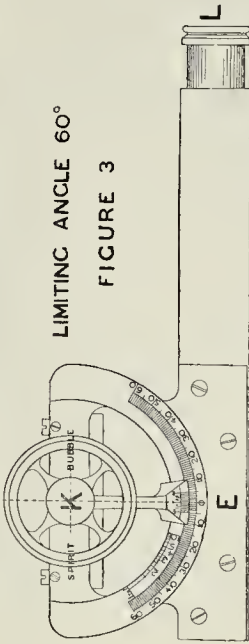
Fig. 7 illustrates a reflecting balance level hung upon gimbals. It is constructed upon the principle that a small mirror suspended vertically, when held at a short distance from an observer at the level of the eye, will reflect the pupil of his eye. As in the instrument previously described, a portion of the space is either open, or the glass is left plain, through which to view a distant object; and the eye of the surveyor is directed upon the line marked E across the silvered glass, so that when the reflection of half of the pupil of the eye is seen upon this line at the edge of the mirror, the observer is guided to read points at a distance in a horizontal plane upon a level with the eye. The height of the instrument from the ground, if required, is readily determined. In some instruments the mirror is fixed horizontally. In the illustration it is placed vertically. The instrument is held in the hand at arm's length by the ring H in fig. 7, and a level staff being held at any desired stations, such as F and G in fig. 6, first at one point, then at the other, with the instrument at the same level, the readings upon the staff can be compared in order to determine the rise or fall in the ground.

In Captain Abney's level illustrated by figs. 3 and 4 we have a reflecting level and clinometer combined. It consists of a spirit level so fixed at K to a limb carrying a vernier that by turning a milled-edged wheel at the side of the telescopic tube as shown in plan in fig. 4, the vernier arm is made to move at right angles to the run of the bubble and upon the same transverse axis. The arc traversed by the vernier is graduated to indicate certain angles of inclination together with the corresponding ratio to the horizontal of the rise or fall of the gradient. The sight tube is divided horizontally in its interior by a glass ball silvered fixed immediately below the bubble tube, in a similar manner to the detail shown in figs. 1 and 2, but the open portion in fig. 1 is in this instrument filled in with plain glass so that the central horizontal line is marked across both the silvered and unsilvered portion of the glass.

To test the accuracy of the instrument select two distant points which shall previously be determined upon the same level. Set the arrow head upon the vernier arm to the point indicating zero upon the graduated arc, as shown at E in fig. 3, and look through the sight tube at the two points under observation. The bubble should then stand in the centre of its run, and be half reflected exactly upon the dividing line of the silvered portion of the glass. To arrive at the inclination or vertical angle of any given slope the telescopic tube is held upon or placed parallel to the slope, as shown in fig. 5, and the side milled edged wheel is then turned by the hand until the bubble appears in the centre of its run. The reading upon the arc at N will give the

ABNEY'S LEVEL

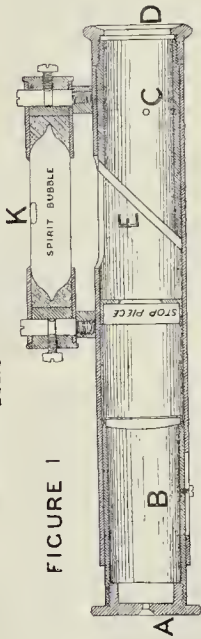
ELLIOTT PATTERN



THE READING AT M GIVES THE  
RATIO TO THE HORIZONTAL OF THE  
LEVEL OF THE SURFACE ON  
WHICH THE READING ON THE  
ARROW AT N GIVES THE ANGLE.

HAND LEVEL

ELLIOTT PATTERN



NOTE IT WILL BE OBSERVED THAT THERE IS NO MAGNIFYING POWER EMPLOYED TO READ THE STAFF IN THESE REFLECTING INSTRUMENTS, AND THEREFORE THE DISTANCE AT WHICH THE STAFF CAN BE DISTINCTLY READ IS VERY LIMITED.

FIGURE 2



THE HALF LENS MARKED B IS A PLANO-CONVEX LENS EMPLOYED IN REFLECTING THE BUBBLE IN THE MIRROR AT E.

FIGURE 6

NOTE THE INSTRUMENT IS HELD BY THE RING H, IN SUCH A POSITION THAT THE SURVEYOR'S EYE IS REFLECTED IN THE MIRROR-PORTION E - IN FIGURE 7 AND THEN THE LEVEL STAFF IS READ AT ANY REQUIRED STATIONS F, AND C, IN ORDER TO ASCERTAIN THE FALL IN THE GROUND.

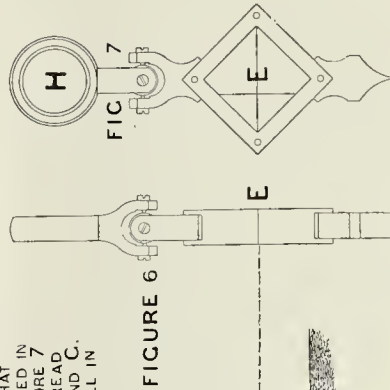
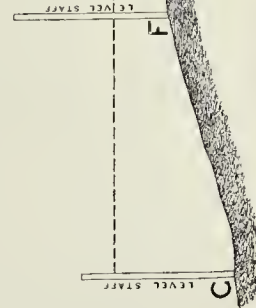


FIGURE 6



REFLECTING LEVEL SUSPENDED ON CIMBALS --- CAPTAIN ABNEY'S LEVEL GIVING INCLINES ---

angle of the gradient. It will be seen that the angle R O S is equal to the angle E K N, and that if in fig. 5 the angle E K N equals  $26^{\circ} 34'$ , the vertical height R S will equal one unit at a distance O S of two units from the point of observation.

We have now provided our readers with an account of the principal optical instruments employed in land surveying and levelling, and such as we trust may enable the student to properly handle and use the same. Great patience must be exercised by the young beginner. He must remember that it is better to be blamed by his employer for being slow, than for being inaccurate, and he will find with the exercise of care and precision, that he will acquire speed in proportion as he is diligent in practice.

### Books.

*The Steam Engine.* By George C. V. Holmes. London: Longmans, Green, & Co. 1887.

HERE could hardly be a more ambitious title than that selected by Mr. Holmes. As we are reminded in the opening paragraph, "the complete study of the steam-engine involves an acquaintance with the sciences of heat, of chemistry, and of pure and applied mechanics, as well as a knowledge of the theory of mechanism, and the strength of materials," thus opening up an acquisition of knowledge Baconian in its immensity. The author is undismayed by the task he has set himself, and ranges through the five hundred odd small octavo pages from the "hollow cylinder of indefinite height, the bottom of which is closed while the top remains open," &c., up to the theory of strains on crank shafts and the action of governors, which cannot be adequately dealt with without the aid of the calculus. It is well to say at once, however, that whatever has been attempted has been well done, and the book proves the author to possess a mastery of the subject and a gift of lucid explanation, which must give it a high position amongst text-books of the steam-engine.

The work is one of that most excellent series of "Text-hooks of Science" which Messrs. Longmans have been publishing for some years past for "the use of artisans and students in public and science schools." We think artisans might be dropped out of the announcement; for, though there may be a few of those paragons of intelligence and industry in humble life (met with by Mr. Smiles and writers of his class) who might profit by such a work as that under review, their number must be so few as to make it unnecessary to appeal to them as a class. If for "artisan" we were, in the present instance, to substitute "practical designers of engines," the case would not be a great deal more hopeful. It is not a generally acknowledged fact, but fact it is none the less, that ninety-nine out of every hundred engines designed are plotted out by "the grand old rule of thumb." Years ago we had a vision of a simple but complete text-book on the steam-engine, compiled for those employed in the practical designing of engines for commercial purposes. Such a work was to have shown the way in which scientific principles were involved in construction, and were unconsciously applied (or misapplied) in practice. The vision has fled, along with the conviction of the usefulness of the work. When once a draughtsman attains to the head of his department in any important engineering establishment, he has little time for work other than that absolutely demanded from him; and he has a vast accumulation of proved data to work from. So science goes to the wall, and trial and error carry the day. Even those ingenious persons who devise new applications of mechanical laws do not, as a rule, call overmuch science to their aid in their inventive labours; although some of them bring a heavy battery of scientific jargon to bear on their hearers in subsequent explanation of their devices. But it does not follow on this account that text-books of science are not useful and necessary. As a matter of fact, they are becoming every day of increased utility; but it is to the second string to Messrs. Longman's bow,—the student,—that they must appeal. Rule-of-thumb designing is like learning to play the piano by ear: it precludes the hope of a more scientific method. Therefore, we must catch

our designer young, and train him early to virtuous habits. Fortunately the possibilities to this end are increasing year by year. It is to the technical students of the present day that we must turn for the hope that this country will be able to battle for that engineering supremacy which, although threatened, has happily not yet been wrested from its grasp.

To return to Mr. Holmes's hook in particular, we find it opening, as we have intimated, with the first elements of the subject, and the clear manner with which the subject-matter is treated must render it plain to the most uneducated.

The next section of the book treats of the nature of heat, and gives the reason for accepting the theory that heat is a form of energy. The subject is one that may, and, in less skilful hands, undoubtedly would, lead to the student reader being led considerably out of his depth; but here, again, Mr. Holmes's talent for simple exposition stands him and his readers in good stead, so that the phenomena by which the conversion of heat into work is accompanied are clearly set forth. The next chapter is no doubt the natural outcome of the one just referred to, but it carries the reader a long step, and is indeed a sort of *pons asinorum*, which will not be altogether a pleasant surprise for the student. There are, however, many hard nuts for the sucking engineer to crack; and, undoubtedly, he had better consider the requirements of "theoretically perfect heat engines," whilst the knowledge gleaned in the last chapter is still in his mind. But if Mr. Holmes shows, on this occasion, not overmuch mercy to his inexperienced readers, he is at least a safe guide, and those who do master the chapter will find they have acquired sound knowledge. It must not be supposed, however, that this chapter has only an academic interest. The descriptions given, especially the graphic representations of the various problems, are of very real and practical interest, and must necessarily be understood by those who would soar above rule-of-thumb designers. The laws connecting the pressure, volume, and temperature of dry steam, as laid down by the best authorities, are set forth, and the reasons why a practical working steam-engine falls so far short of the theoretically perfect engine are explained. The subject is further pursued in the next chapter, and here the necessity for higher mathematics arises in considering the applications of principles laid down by various authorities. In the succeeding chapter the student is introduced to a fresh branch of the subject in "the mechanics of the steam engine." Here, again, the author begins with those elementary principles which underlie the problems involved, taking nothing for granted, but working upwards from sure foundations of fact. The consideration of the twisting moments on crank shafts is a good example of this; the relation between those results and their source in the varying pressure of steam on the piston is well illustrated by means of the indicator. The influence of inertia of reciprocating parts is another part of this chapter well worthy of attention. It is a subject which in times past has been too much neglected in practical work, but is happily receiving more attention in the present day of high piston speeds, to which the best designed modern engines owe much of their success. In Chapter VI. the student finds himself amongst simpler details of general practice relating to various parts of the mechanism. The consideration of strains on crank shafts and the action of governors naturally require mathematical treatment of a comparatively complex nature, but there is nothing that the ordinary student will find above his powers.

The treatment of valves and valve gears occupies a large section of the book. There are simple illustrations showing the manner in which steam distribution is effected with an ordinary slide valve, and the reader, having mastered this elementary knowledge, is introduced to some of the less common arrangements met with in practical work. The theoretical aspect of the case is mainly taken up, as of necessity almost it must be, by an examination of Zeuner's well-known diagrams. We can cordially recommend to the attention of all students this part of the hook, especially those who have not the time to go through Dr. Zeuner's original work.

The next chapter is hardly so satisfactory. Probably Mr. Holmes says all that he well can in the space at his command about the steam-engine indicator, but the subject is far

too large to be treated of within the limits of a single chapter. We think it would have improved the work had the succeeding chapter on the boiler been omitted, and much that is left out have been inserted respecting indicator diagrams and the lessons they teach. We are inclined to find fault, too, with the lack of more moderate instances in this part of the book. What there is, however, appears to be sound, and the governing principles are well explained, besides some useful hints being given as to common faults revealed by some typical diagrams. A single chapter on boilers is far too little space in which to deal with the subject. Of course it is impossible to treat of one part of the most important heat engine without including to some extent the other, but to give a few illustrations of various types, to partially discuss proportions and details of construction, and to describe fittings and mountings, is, we think, expending valuable space in an unsatisfactory matter. This, however, is a question that lies between Mr. Holmes and his publisher,—as the hook is one of a series,—and we are bound to add that what is said is, so far as it goes, unexceptionable. It is a great pity, however, that the question of forced draught is not dealt with at greater length. It is a subject on which the author might have enlarged with advantage, considering its importance and the scarcity of information in existing text-books.

There is a short chapter on condensers, which leads up to the question of condensation of steam in cylinders. This subject naturally introduces super-heating and steam-jacketing, the reasons why the former has been abandoned, and why the latter is too often unsuccessful, being stated. We next find the compound engine discussed, the distribution of steam, as illustrated by indicator diagrams, theoretical and actual, being dealt with. A considerable appendix and a useful index conclude the hook.

We have not said much in criticism of this work. Indeed, there is very little to criticise, for Mr. Holmes has not attempted to advance any new theories or introduce fresh discoveries. His duty as the compiler of a text-book has been observed throughout. He has selected the best authorities on the various subjects and plainly set forth their views, combining them with those recognised facts for which there is no authority. There may be a few points in which the opinions expressed will jar with some engineering theorists of repute. This, however, was inevitable, and Mr. Holmes has generally taken his stand on the least assailable ground.

*Warm-Blast Steam Boiler Furnace.* By J. C. HOADLEY. New York: John Wiley & Sons. London: Trübner & Co.

This book is a "report of a series of trials of a warm-blast apparatus for transferring a part of the heat of escaping fire gases to the furnace." It seems rather an extensive business to devote a by no means inconsiderable volume to a record of one set of experiments; but Americans have a way of doing these things very thoroughly. The task the author had to accomplish was to test the efficiency of an economiser or heat-extractor which was then devised, and is constructed on much the same principle as a well-known economiser in use in this country. As a result we may at once state Mr. Hoadley came to the conclusion that a net saving of 10 to 18 per cent. of fuel was effected over the best attainable ordinary practice. Against this there must be considered the question how soon the apparatus will wear out, and also the increased rapidity with which fire-bars will deteriorate on account of the warm blast. The "abstractors" in question consist of 2-in. ordinary lap-welded iron tubes, expanded into cast-iron tube plates at each end. These tubes are encased within 3-in. tubes of thin iron. The escaping gases and products of combustion pass through the 2-in. tubes, and the air to feed the furnace passes through the annular space formed by the insertion of the 2-in. tubes in the 3-in. tubes. As the extraction of heat from the chimney gases by this device would check the draught, a fan was provided.

We do not think our readers will expect us to follow Mr. Hoadley through the minutiae of his trials and researches, which are so fully set forth in his book. Any experimentalist who may have to go through a similar course will undoubtedly find the work useful, although we

think that even to those most closely identified with such matters, some of the results will seem to be worked out with a minuteness little short of pedantry. To take an instance at random, on p. 49 we find an "Account of the experiment to determine by the third method the heat capacity of the calorimeter." Here we have the steam pressure given with three places of decimals (69.094 lb.), and on this the number of British thermal units in a pound of steam is further calculated to four places of decimals. Of course the British thermal unit is a small unit, and it is necessary to calculate closely, but this over-refinement in the manipulation of figures is useless, unless the data obtained are equally beyond question. Mr. Hoadley, however, only follows the practice of his compatriots.

Mensuration Made Easy; or, the Decimal System for the Million. By CHARLES HOME. Seventeenth Edition. London: Effingham Wilson & Co.

A VERY useful practical little book, giving plain explanations of the working of decimal arithmetic, with a number of "applications to the daily employments of the artisan and mechanic." That it has been found practically useful by those for whom it is intended seems to be indicated by the number of editions it has gone through.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

7,541, Transparent Material for Roofing. MM. Brophy and J. A. Archer.

This invention relates to improved machinery for manufacturing roofing material composed of wire gauze, covered or coated with some transparent mullage or substance, and the machinery described in this specification is designed to effect great economy in its manufacture.

8,576, Fastenings for Doors and Windows. H. W. Hennes.

The improvements which are the subject of this invention are designed to obviate several disadvantages in the form of fastenings of double doors or windows, in which the act of closing the second door automatically fastens the first, which has been already closed, and to cheapen the cost of manufacture. A frame is made, in which works a lever so placed that one of its ends, which is bevelled on both sides, protrudes; the other end is withdrawn into the plate. The bevelled projection is so arranged that it is under the edge of the door which is first closed. Near, or on this edge is a hole of suitable shape and size into which the bevelled projecting end rises, and holds the door when the door is closed. The second door is secured by a catch or lock, and so long as it remains closed, the first door is equally securely fastened.

8,589, Safety Fastenings for Sashes. W. Dryden.

The class of fastener which is the subject of this invention belongs to those for vertical sliding window-sashes, which, while affording security against burglars, allow also for the sashes to be lifted, say six inches or so for ventilation, and secured, whether so open or closed. The fastening is arranged by the use of a horizontal locking sliding bolt, controlled by a weight or spring retaining catch, and a vertical retaining stop slide, case or plate. This is fixed at the side of the sash and frame, with a plate notched or perforated so as to retain the windows in different positions with respect to height.

12,565, Gully for Excluding Sewer Gas. R. Atkinson.

According to this invention a hinged metallic valve, with india-rubber face, working on an inclined plane, is fitted on the end of the gully inside of the trap-box. The action of the valve is such that as soon as a sufficient head of water enters the gully the valve is automatically opened. As the pressure of water is reduced the valve shuts, and no sewer gas can enter the gully from the sewer. The cover is made airtight.

5,204, Sanitary Appliances. G. Price.

The object of this invention is to arrange receivers, &c., and their connexions with the sewer or drain, in such manner that the soil after leaving the receiver shall not come in contact with the sides or surface of the connexions, but shall have a clear fall direct into the water at the bottom of the trap. A vertical pipe is provided, and a sharp edge is formed around the outlet of the basin or receiver. The aforesaid pipe being vertical and parallel slide, it forms a full continuation from the receiver, and allows the soil to fall clear into the water without contact with the sides.

NEW APPLICATIONS FOR PATENTS.

June 10.—8,341, W. Griffiths, Door and Window Fittings.—8,331, H. Belcher, Brick Pressing Machine.—8,375, R. Stanley, Tunnelling Machine.—June 11.—8,406, F. Bluney, Closet Seat Cover.—

8,439, C. Doehring, Street Paving, &c.—8,450, R. Low, Dovetailing Machines.  
June 12.—8,479, G. Newman, Combined Door-spring and Check.—8,483, W. Milton, Fireproof Metallic Plastering.—8,497, C. Hax, Machines for Sharpening Saws, &c.

June 14.—8,509, G. Evans and C. Ford, Wood Block Floors.—8,559, H. Lake, Apparatus for Opening and Closing Windows.—8,563, W. Bradley and Others, Floor Gramp, &c.

June 15.—8,585, H. Johnson and T. Wilson, Exhaust Valve Ventilators.—8,586, H. Johnson and T. Wilson, Exhaust Ventilating Cowls.—8,648, A. Rammage, Fireproof Column and Stanchion combined for Building Construction.

June 16.—8,690, E. Verity and Others, Attaching Combined Springs and Air Checks to Doors, &c.—8,675, A. Caldwell and J. Burnett, Heat Diffusers and Ventilators for Buildings, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

6,265, T. Robson, Falling-in Sliding Window Sashes.—6,649, W. Anderson, Ventilating Sashes.—6,820, W. Gwynett, Eaves Plate for Corrugated Roof and Wall Coverings.—6,990, L. Santer, Water-closets.—7,113, H. G. Hollyman, Warming and Ventilating Houses, &c.—7,217, J. Clarkson and S. Wilkinson, Water-closets.—7,743, J. De Winton, Machinery for Sawing Slate and other Stone.—4,458, W. Barker, Die for Brickmaking Machines.—7,411, A. Busch, Manufacture of Cement.—7,767, A. Clark, Window Sash Fastener.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

10,834, G. Nobes, Door Lock.—4,917, W. Hawkins and W. Fisher, Axle Pulleys for Window Sashes.—6,648, J. and C. Levers, Draught, Dust, and Rain Excluder for Doors or Windows.—6,675, A. Boulton, Hangers for Sliding Doors or Windows.—6,970, T. Kohler and W. Chambers, Kilm Dumping Floors.—10,453, R. Evered and N. Coleman, Flushing Cisterns.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JUNE 7.

By Messrs. COBE.  
Westhanger, Kent—Pond House, and 12a, 2r. 31p., freehold ..... £810  
Two Enclosures of Arable Land, 16a, 3r. 17p., freehold ..... 920

JUNE 9.

By FELLIS, MOON, & FELLIS, at Croydon.  
Croydon, Epsom road—The freehold houses Gleensay and Glenroy ..... 1,709  
51 to 54, Union-street, freehold ..... 115  
102 and 108, Canterbury-road, freehold ..... 430  
Wadde—8, Waddon Marsh-lane, freehold ..... 180

JUNE 10.

By Messrs. COBB.  
Sittingbourne, near—The freehold residence, Little Clarendon, and 1a, 2r. 27p., fruit land ..... 560  
Freehold orchard land, 2a, 0r. 32p. .... 393  
Claxfield Farm, and 96a, 3r. 35p., freehold ..... 3,840  
An enclosure of arable land, 4a, 2r. 30p., freehold ..... 320  
An enclosure of arable land, 65a, 2r. 19p., freehold ..... 3,500  
Two freehold cottages ..... 320

JUNE 13.

By F. SNOCKLE.  
Ladywell—1 and 2, Vicar's Hill, freehold ..... 500  
Kingston-on-Thames—11, 12, and 13, Letchmere-terrace, freehold ..... 160

JUNE 14.

By T. C. LANGRISH.  
St. John's Wood—2, Vicar's Hill, freehold ..... 900  
3, Ordinance-road, 47 years, ground rent 5l. .... 475

JUNE 15.

By H. RETLEY.  
Barashury—61, Copenhagen-street, 34 years, ground-rent 2l. .... 450  
Homerton—18, Churchill-road, 78 years, ground-rent 4l. .... 205

JUNE 16.

By RICHARDSON & BARROW.  
Primrose Hill-road—Improved ground-rent of 77l. 10s., term 77 years ..... 1,680  
Oppidans-road—An improved ground-rent of 10l., term 77 years ..... 215

JUNE 17.

By TURBODD & MARTIN.  
Gray's Inn-road—65, Ampton-street, 35 years, ground-rent 6l. .... 455  
Westbourne Grove—Improved ground-rent of 12l., term 35 years ..... 180

JUNE 18.

By L. FARMER.  
Kilburn—1, Priory Park-road, 78 years, ground-rent, 10l. 10s. .... 410  
Burgess Hill, near—Burgess Hill Farm, and 81a, 2r. 16p., freehold ..... 5,500  
A pair of freehold cottages and garden ..... 310  
Blackbrook Farm, and 31d, 6p., freehold ..... 4,820  
Gallops Farm, and 81a, 2r. 32p., freehold ..... 470  
Ingham's Farm, and 12a, 3r. 4p., freehold ..... 320  
An enclosure of land, 6a, 3r. 8p., copyhold ..... 300  
Hayward's House, near—North Sitgwasch Farm, 24a, 0r. 31p., freehold and copyhold ..... 2,500  
Two enclosures of land, 5a, 1r. 39p., copyhold ..... 270  
Westmore—Upper Borrell's Farm, and 10a, 2r. 37p., copyhold ..... 900  
Spencer's and Cook's Farms, The Bricklayers Arms, cottages, and 60a, 1r. 36p., freehold and copyhold ..... 2,600  
Copyhold cottage, near—Garden and a house, and 1a, 0r. 11p., freehold ..... 300  
North Cottage, and 6a, 1r. 31p., freehold ..... 75  
Novington Lodge, and 44a, 1r. 12p., freehold ..... 7,600  
Stanton's and Chapel Farms, and 38a, 2r. 24p., freehold ..... 7,300

Drew's Farm, and 43a, 2r. 20p., freehold and part copyhold ..... £800  
Plumpton Cottage and 1a, 0r. 29p., and another cottage ..... 515  
Freehold rent charge of 7l. 10s., subject to a payment of 4l. 6s. 8d. .... 60

JUNE 18.

By BEAR, BURNETT, & ELDON.  
Contingent reversion to the freehold residence, Abbeismad, Great Malvern, life aged 66 years, provided a life aged 23 survives, and a policy for 800l. .... 325

By RUSHWORTH STREVES.

Putney—31 and 36, Charlwood-road, 64 years, ground-rent 10l. 10s. .... 795  
Kenilworth—10, and 13 to 18, Newberry Mews, 63 years, ground-rent 35l. .... 480  
Shepherd's Bush—71, Stowe-road, 91 years, ground-rent 7l. 7s. .... 140  
South Acton—1, Kettle-terrace, 94 years, ground-rent 6l. 10s. .... 190

By DAYVE & CO.

Shenley, Herts—Well End Lodge and Farm, 71a, 2r. 31p., freehold ..... 5,000  
Buckett's Land Farm, and 88a, 2r. 0p., freehold, ..... 6,500

JUNE 15.

By ROBINSON & RUTKEN.  
Victoria Park—16, Cadogan-terrace, 67 years, ground-rent 6l. 6s. .... 255

By WOODSAY & WALKER.

Brixton—319, Coldharbour-lane, 35 years, ground-rent 3l. 12s. .... 565

By NEWBERRY & CO.

South Norwood, Howard-road—Wykeham House, 27 years, ground-rent 15l. .... 440  
Crescent-road—The residence Parkhurst, 78 years, ground-rent 25l. .... 1,180

By NAYLOR & MURPHY.

Dalston—27, Pownall-road, 55 years, ground-rent 4l. 6s. .... 250

By DAYVE & CO.

Fimble—An improved rental of 302l., term 34 years ..... 3,000

By HOBSON, RICHARDS, & CO.

Dalston—83, 90, and 92, Broke-road, 66 years, ground-rent 12l. .... 905  
94, 90, and 92, Broke-road, 56 years, ground-rent 12l. .... 885

By J. T. SENFORD & CO.

Canberwell—34 and 36, Havill-street, freehold ..... 910

JUNE 16.

By BRADLE & CO.  
Gbeinsford, near—The residence called Springfield, Dukes, and 3a, 0r. 3p., freehold ..... 2,000  
A plot of land, 1a, 3r. 4p., freehold ..... 400  
Eight plots of freehold land, containing 8 acres ... 1,170  
A plot of land, 1a, 2r. 13p., freehold ..... 200

By T. G. WILKINSON.

Barnes—5 to 8, Stanley-villas, 88 years, ground-rent 14l. 16s. .... 1,000  
Richmond—5 and 6, Maxwell-villas, freehold ..... 695

By G. C. & T. MOORE.

Mill End—73, Litchfield-road, 55 years, ground-rent 3l. 10s. .... 300  
13, Kinmoat-street, 85 years, ground-rent 4l. 4s. .... 240  
142 and 144, Burdett-road, 76 years, ground-rent 18l. .... 600

By J. T. SENFORD & CO.

Poplar—21, Lion-street, 55 years, ground-rent 31l. .... 200  
Forest Gate—98a, 9b, and 100, Forest-lane, 477 years, ground-rent 30l. .... 600  
Mansel Park, Chapel-road—Four houses, 86 years, ground-rent 20l. .... 605

By E. STIMPSON.

Fulham, High-street—Three freehold plots of land 2, 4, 6, and 14, Walham Arden, 32 years, ground-rent 24l. .... 435  
Brixton-road—An improved rental of 34l., term 12 years ..... 280  
10, Tinter-street, 89 years, ground-rent 2s. .... 280  
Kennington—44, 45, and 46, Wacoat-square, 20 years, ground-rent 18l. 18s. .... 760

By NEWBORN & HARRING.

Finsbury Park—94, Isledon-road, 64 years, ground-rent 19l. .... 400  
19, Geborne-road, 86 years, ground-rent 6l. 6s. .... 400  
Barnsbury—243, Milkwood-road, 79 years, ground-rent 5l. .... 255  
Brixton—38 and 39, Copeland-street, 35 years, ground-rent 10l. .... 540

By NEWBORN & HARRING.

Canonbury—3, Canonbury-terrace, 31 years, ground-rent 6l. 6s. .... 310  
Chiswick—131 and 133, Devonshire-road, and 1 to 5, Janes-street, freehold ..... 370  
Stoke Newington—11 and 12, Goldsmith-square, 64 years, ground-rent 8l. .... 355  
Green Lanes—9, Queen's-road, 79 years, ground-rent 9l. .... 335

By DUBENHAM, TEWSON, & CO.

City—14, 15, and 16, St. Swinham's lane, area 2,036 ft. .... Let at 1,180l. a year  
Maldon—The Clock House Farm, and 68a, 2r. 6p., freehold ..... 870  
Farnham Royal, Bucks—The Lodge, and 23a, 2r. 7p., freehold and copyhold ..... 5,600  
West Drayton, near—The freehold residence, Doghurst, and 16a, 1r. 22p. .... 5,000

By RUSSELL & PARKHOUSE.

Corwall—The Goodovers Tin Mine, with all rights, plant, and machinery ..... 100

JUNE 17.

By DAYVE & CO.  
Westminster—17, Page-street, 22 years, ground-rent 8l. .... 300  
Finchley—1 and 2, Davis's cottages, copyhold ..... 700

By ELLIS & BOK.

Soho—4, Church-street, freehold ..... 1,160

By H. STAINES.

Kennington—7, 9, and 11, Cleaver-street, 23 years, ground-rent 12l. .... 275  
Dalston—18, 19, and 29, Temple-street, 32 years, ground-rent 6l. 10s. .... 655  
Hackney-road—731 and odd, Boston-street, 84 years, ground-rent 14l. .... 420

By WHITE & BONS.

Charlwood, Surrey—Freehold brickyard and woodland, 25a, 0r. 17p., freehold ..... 400  
Nowdgate—An enclosure of garden ground ..... 100

|                                                                                                         |        |
|---------------------------------------------------------------------------------------------------------|--------|
| Ockley—Two freehold enclosures of land, 22a, 2r, 31p.....                                               | £1,000 |
| By BAKER & SONS.                                                                                        |        |
| Pinner—Sweetman's Hall, and 4a, Cr. 37p., freehold.....                                                 | 1,800  |
| Six plots of freehold land, 4a, 2r, 7p.....                                                             | 1,245  |
| Tilbury, Essex—Two plots of freehold land.....                                                          | 1,010  |
| By C. & H. WATTS.                                                                                       |        |
| Westminster Bridge-road—No. 78, freehold.....                                                           | 720    |
| Hammersmith—36 and 38, Southerton-road, 78 years, ground-rent 12s.....                                  | 450    |
| 15, Burfield-street, 82 years, ground-rent 7s.....                                                      | 225    |
| 34, 36, and 48, Cambridge-road, 57 years, ground-rent 12s.....                                          | 789    |
| 25, Redmore-road, 81 years, ground-rent 4s. 10s.....                                                    | 200    |
| 69, Nayemith-street, 82 years, ground-rent 5s.....                                                      | 160    |
| By TAYLOR, LOTTENOVY, & CO.                                                                             |        |
| Kensington, Keleop-place—A plot of freehold land.....                                                   | 750    |
| By C. D. FIELD & SONS.                                                                                  |        |
| Bermondsey—121, Weston-street, 27 years, ground-rent 3s.....                                            | 200    |
| 141, Weston-street, 27 years, ground-rent 1 to 18, and 32, Weston-place, 27 years, ground-rent 19s..... | 300    |
| Blackfriars—139, Broadwall, freehold.....                                                               | 3,096  |
| 4 and 6, Brunswick-street, freehold.....                                                                | 330    |
| 14 to 19, Hatfield-place, 84 years, ground-rent 12s.....                                                | 2,010  |
| 69, Great Suffolk-street, freehold.....                                                                 | 1,670  |
| 22 and 24, Red Cross-street, freehold.....                                                              | 345    |
| Stepney—53, 55, and 67, Charles-street, 131 years, ground-rent 24s.....                                 | 270    |
|                                                                                                         | 200    |

MEETINGS.

SATURDAY, JUNE 25.

St. Paul's Ecclesiastical Society.—Visit to Bishop's Stortford, &c. Train leaves Liverpool-street at 2.32 p.m.  
Glasgow Architectural Association.—Visit to Darnley line.

WEDNESDAY, JUNE 29.

Society of Arts.—Annual General Meeting. 4 p.m.

Miscellaneous.

**The New Scandinavian Sailors' Home in London.**—We understand that the building committee of the Scandinavian Sailors' Home in London some time ago succeeded in securing a site for the new building of the Home in the very heart of the locality where it operates. The patrons of the Home are H.R.H. the Princess of Wales, and their Majesties the Queens of Denmark and Sweden and Norway, whilst the building committee consists of Lord Blantyre, Mr. T. A. Denny, and Mr. David Carnegie. During the last seven years the Home has been located at Nos. 88 and 90, Leman-street, but for a long time these buildings have far from sufficed for the requirements, besides being ill adapted to the functions of such an Institution. The lease of these houses expiring in September next, the committee decided upon not renewing the same, but to attempt finding an eligible site for a new building in the same neighbourhood, a task not of the easiest in this crowded locality. They succeeded, however, beyond expectation, having acquired a piece of land from the East and West India Dock Company, close to the East and West India Dock Stations, at a cost of 1,700*l.*, the superficial area being nearly 30,000 square feet. The building will face Garford-street, but the frontage here will only be about 50 ft. in length, due to the peculiar shape of the site. This is, however, considered an advantage by the committee, as only a portion of the rooms will overlook the noisy street with its dust, &c., whilst the majority will face a handsome garden to be laid out at the back of the building. The new Home will contain bedrooms for about 200 sailors, besides some superior apartments for captains and mates, and rooms for entertainments and mission work, a library, restaurant, baths, bowling-alley, in addition to the usual offices, &c. The new Home, which, like the old, will be under the management of Miss Agnes Medenström, a Swedish lady celebrated throughout Scandinavia for her excellent mission work among the thousands of northern sailors who annually visit London, will be conducted on strictly Temperance principles. It is stated that the sum of money towards the cost of the new building, of which we hope to give an illustration on a future occasion.

**Photographs of Lightning.**—The Royal Meteorological Society is desirous of obtaining photographs of flashes of lightning, as it is believed that a great deal of research on this subject can only be pursued by means of the camera.

**A Carved Oak Pulpit.** with freestone base, has been erected in the Parish Church at Burscombe (Devon), as a Jubilee Memorial. The work has been executed by Messrs. Luscombe & Son, carvers and art-workers, of Exeter.

**The New Winchester House Buildings.**—Some interesting statements were made at the meeting of the Winchester House Company last week respecting the prospects of the extensive and costly new buildings in Broad-street in the City, which are scarcely yet completed, although several portions of them are already let and occupied. Mr. John Pender, the chairman, said that the cost of the freehold alone had amounted to no less than 405,000*l.*, but he considered that the Company had secured a most valuable property and that their new building was the finest in the City of London. The original estimate of the cost of the new building had been exceeded, owing to the necessity of acquiring other property besides old Winchester House itself, and also in consequence of their having been advised to sink down to the London clay, the additional cost in carrying out this portion of the work having been 3,000*l.*, and the total cost of the double basement alone was fully 20,000*l.* He added that the lettings already amounted to 21,658*l.* a year, and that the amount receivable from Messrs. Spiers & Pond for the letting of a portion of the halls was likely largely to increase during the present year. It appeared to him that these halls of theirs, which were now constantly occupied, were likely to become popular places for public meetings in the city. They had now completed the safe deposit system, which would utilise one portion of the building, and, as there would be 5,000 safes, it was calculated that that branch of their business would bring in from 11,000*l.* to 12,000*l.* a year, and the inlet portions of the building were estimated to produce about 15,000*l.* a year. Their expenses were estimated at 26,000*l.* a year, of which 21,000*l.* were for ground-rents and interest on mortgages.

**Sale of Building Land at Pinner.**—Amongst the numerous sales of building land which have recently taken place, both in the neighbourhood of the metropolis and more distant localities, fifty plots of this class of property were submitted to competition on Thursday week by Messrs. Baker & Sons. The property offered consisted of the first portion of the Pinner Chase Estate, adjoining the Pinner Station of the Metropolitan Railway, and also within a few minutes' walk of the London and North-Western station. The several lots have frontages to the station road, the Pinner main road, and to Took's memorial fountain. The sale took place in a marquee on the estate, and all the lots were announced to be sold without the slightest reserve. Most of the lots offered consisted of shop plots, having frontages of 18 ft. and 20 ft., and depths varying from 70 ft. to 90 ft. All the lots were readily sold at prices ranging from 15*l.* to 25*l.* each; a corner tavern site, having a frontage to the main road of 54 ft., and a return frontage to the station road of 80 ft., being sold for 65*l.*, the stipulations providing that the cost of the building to be erected on this site must not be less than 500*l.*, and on the other sites not less than 200*l.* and 300*l.* The estate has been laid out for the erection of 136 houses and shops.

**Testing Establishment for Ventilating and Heating Appliances.**—The Technical High School at Berlin is now receiving an addition in the form of an establishment for testing the calorific properties of various kinds of fuel, and thus facilitating estimates of the cost of heating state buildings. Similar experiments will be carried on as to ventilation. The necessary funds for the installation of this establishment are included in the Budget of 1887-8, and provision has also been made for the expenses of maintaining its efficiency. It will be specially advantageous, the *Centralblatt der Bauverwaltung* considers, for senior pupils of the High School and for young architects.

**Building in Berlin.**—Official statistics indicate a marked increase of activity during 1886 in the building trade at Berlin, the works executed having exceeded by 1,000 the number carried out in 1885. Accidents were reported in greater number, but this is attributed to the more complete system of registration now in force. Out of 438 casualties, 16 were fatal, 165 severe, and 257 slight in their effects. In most cases, the *Diamant* remarks, no blame was attributable to any third party, the accidents being due to the inattention or carelessness of the persons injured. The new regulations for building contain a provision for only two-thirds of any site being built over, one-third at least being reserved as a yard or open space.

**Threatened Destruction of the Blue Grotto at Capri.**—According to an Italian journal, the *Vita Napoletana*, the famous Grotto Azurra, or Blue Grotto, at Capri, will shortly be the subject of a lawsuit before the Naples Tribunal, which may result in its destruction. The facts are as follow:—For some years past that part of the island below which the world-famed grotto is situated has been owned by a rich American "gentleman," who now claims "that, as he is the owner of the soil, what is beneath it also belongs to him, viz., the Blue Grotto." But as this from time immemorial has belonged to the little fishing village of Capri, and as the civic authorities charge each visitor to the grotto a small sum, they do not intend to part with their property without a contest. In consequence, the American gentleman has begun a lawsuit against the Capri authorities before the Naples Tribunal in order to obtain the proprietorship of the grotto, and, what is worse, threatens, in the event of his losing the case, to pierce a hole in the ground into the grotto, which would, as is generally known, have the effect of at once destroying the lovely tints of colour for which the grotto is so justly famous. There is, however, some hope of satisfying the American's claim with part of the revenue derived from visitors to the grotto.

**The Sound Tunnel.**—It appears that the negotiations between a French syndicate and the Scandinavian Government for the construction of a tunnel under the Sound, to which we recently referred, were broken off in consequence of the committee appointed to consider the scheme reporting against it. The feasibility of constructing the tunnel was in no way denied, the undertaking being in fact pronounced comparatively simple, but the committee objected chiefly to certain financial proposals of the promoters. Now, however, negotiations have been resumed between the latter and the Danish Government, the promoters having modified their conditions, and it is expected that the Swedish Government will also shortly re-consider the scheme. It should, however, be mentioned that public opinion in Sweden is not in favour of the tunnel, though its advantages are fully recognised.

**The Baltic and White Sea Canal.**—The Society for Promoting Russian Trade and Industry, says the *Novoje Vremja*, has submitted a plan to the Government for the construction of a canal from the Baltic to the White Sea, *via* Lake Ladoga, an undertaking said to have been suggested by Peter the Great. Such a canal, apart from its strategical value, would open up the famous iron deposits in the Government of Olonetz, as well as develop trade in Northern Russia. The cost of the canal is only estimated at about 800,000*l.*, but it is generally believed that this sum is too low. The Emperor of Russia is stated to be much interested in the plan.

**Strikes in the United States.**—During the first five months of this year, 480 strikes were reported in the United States, involving 226,803 wage workers, against 164 strikes during the corresponding period of last year, involving 364,630. During May of the present year, 79,000 men struck, against 216,000 in May, 1886. The building trades show 44,573 men on strike; coal-miners and coke-makers, 18,650; boot and shoe makers, 5,650. The unsettled condition of the American labour-market is not extending at present; but it is stated that about 60,000 workmen will make fresh demands in various branches of trade for higher wages shortly.

**Jubilee Clocks in Kent.**—As a permanent memorial of the Queen's jubilee, the parishioners of Willesborough have placed in the parish church tower a clock specially constructed by J. W. Benson, of Ludgate-hill. Time is shown on two copper dials of 5 ft. diameter, the hours are struck on a bell of 15 cwt., and "ting tang" quarter chimes on two smaller bells. At Horsmonden a suitable turret has been erected on the Working Men's Institute, in which a clock has been fixed by the same maker. There are two copper dials of 3 ft. diameter, and the hours are struck on a bell of 1 cwt.

**Trads Outing.**—On Saturday last the office staff of Messrs. Wm. Brass & Son, of Old-street, E.C., had a most enjoyable trip to the Royal Forest Hotel, Chingford, where a cricket match was played, married & single, which ended in a victory for the latter with 18 runs, after which they sat down to a "high tea," and concluded a most enjoyable outing with a stroll in the Forest.

Improved Method of Preparing Cement.

The Thonindustrie Zeitung lately published the following details as to a recently-patented system for hastening the setting and increasing the resistance of Portland cement. There are taken 100 parts of finely-pulverised hanxite, or in its place 100 parts of any refracting argillaceous earth in powder. These are mixed with 50 parts of sulphuric acid, so as to make a firm paste. After twenty-four hours, the mass is heated in a flaming furnace until it hardens and assumes a light colour. It is then finely pulverised, and baked with water in such a way as to form a liquid paste. There is then added a solution of soda so as to render the liquid alkaline, and afterwards, by decantation, the water is separated from the precipitate, which is carefully dried, pulverised, and sifted. The hydrate of alumen, which is found in the coarsest portions, causes the rapid setting of the cement, while the soluble silicium increases its resistance. If it is desired to change a slow-setting into a quick-setting cement, it is sufficient to mix thoroughly about half to one per cent. of the powder. For making moulded objects, the proportion should be two to four per cent.

PRICES CURRENT OF MATERIALS.

Table with columns for material names (Timber, Metals, Oils, etc.), units, and prices in £, s, d. Includes items like Greenheart, Teak, Spruce, Iron, and various oils.

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Table of contracts with columns: Nature of Work or Materials, By whom required, Architect, Surveyor, or Engineer, Tenders to be delivered, Page. Includes items like Pumping Engines, Stone Ketting, Repairs and Alterations, etc.

PUBLIC APPOINTMENTS.

Table of public appointments with columns: Nature of Appointment, By whom Advertised, Salary, Applications to be in, Page. Includes Inspector and Surveyor's Assistant, Clerk of the Works, etc.

TENDERS.

Table of tenders for various construction projects. Includes sections for ABINGDON (Berks), BIGGLESWADE, BLACKHEATH, BOXFORD (near Newbury), HINCKLEY, LEWISHAM, and MARSTON (Beds). Each section lists the project, the architect/engineer, and the tender amounts.

**NEWPORT PAGNELL.**—For the erection of dwelling-houses at Newport Pagnell, Bucks., for Mr. G. O. Price, Messrs. Usher & Anthony, architects and surveyors, Bedford.—

|                                     |            |
|-------------------------------------|------------|
| Coverley, Newport Pagnell .....     | £1,724 0 0 |
| Henson, Wellichborough .....        | 1,700 0 0  |
| Wilford Bros., Newport Pagnell..... | 1,625 0 0  |
| Harrison, Bedford .....             | 1,603 0 0  |
| White, Bedford .....                | 1,687 0 0  |
| Mitchell, Newport Pagnell .....     | 1,654 0 0  |
| Poster, Kempston .....              | 1,625 0 0  |
| Gaskins, Great Lindford .....       | 1,519 0 0  |
| Shelton, Newport Pagnell .....      | 1,087 0 0  |

**PORTSMOUTH.**—For rebuilding on the site of the old Capital and Counties Bank, Commercial-road, Portsmouth, for Mr. A. Stedall, Mr. George Edwards, architect, 11, Queen Victoria-street. Quantities by Mr. H. Lovegrove.—

|                                     |            |
|-------------------------------------|------------|
| D. W. Lewis, Southsea .....         | £4,339 0 0 |
| Martin Wells & Co., Aldershot ..... | 4,370 0 0  |
| W. Ward, Fratton .....              | 4,188 0 0  |
| Perry & Co., London .....           | 4,150 0 0  |
| J. H. Corke, Southsea .....         | 4,075 0 0  |
| H. Jones, Southsea .....            | 4,068 0 0  |
| T. P. Hall, Southsea .....          | 4,025 0 0  |
| J. Collings, Leamport .....         | 3,973 0 0  |
| J. Bull & Sons, Southampton .....   | 3,947 0 0  |
| Stephens & Bastow, London .....     | 3,877 0 0  |
| W. P. & C. Light, Portsmouth* ..... | 3,768 0 0  |

\* Accepted.

**SANDY (Beds).**—For the erection of two villas, Bedford-road, for Mr. Jos. Triplett, Messrs. Usher & Anthony, architects and surveyors, Bedford.—

|                                    |            |
|------------------------------------|------------|
| Twelvrees, Biggleswade .....       | £1,424 0 0 |
| Battle & Hainsford, Potton .....   | 1,329 0 0  |
| White, Bedford .....               | 1,298 0 0  |
| Pago, Buckden .....                | 1,245 0 0  |
| Poster, Kempston .....             | 1,245 0 0  |
| Harrison, Bedford (accepted) ..... | 1,236 0 0  |

**STRATFORD.**—For the rebuilding of the Blue Bear Public-house, High-street, Stratford, E., and for the erection of a house and shop adjoining, and also three cottages in Station-street, for Messrs. Charrington & Co. Mr. John Hudson, architect, 80, Leman-street.—

|                                 |            |
|---------------------------------|------------|
| T. Little, Whitechapel .....    | £5,014 0 0 |
| A. Reed, Stratford .....        | 4,573 0 0  |
| Norton & Son, Stratford .....   | 4,500 0 0  |
| J. & H. Coles, Mile End .....   | 4,705 0 0  |
| Eaton & Co., Whitechapel .....  | 4,538 0 0  |
| F. & F. J. Wood, Mile End ..... | 4,439 0 0  |
| W. Gladding, Mile End .....     | 4,429 0 0  |
| J. Bentley, Waltham Abbey ..... | 4,386 0 0  |

**WANDSWORTH.**—For steam-pipes, channels, &c., at the new Workhouse, Garratt-lane, for the Guardians of the Wandsworth and Clapham Union, Mr. Thomas W. Aldwinckle, 2, East India Avenue, Leadenhall-street, architect.—

|                             |          |
|-----------------------------|----------|
| E. Bird & Co .....          | £295 0 0 |
| T. Bradford & Co .....      | 642 0 0  |
| W. Hammond (accepted) ..... | 585 10 0 |
| R. Crane .....              | 575 0 0  |
| J. & F. May .....           | 556 0 0  |

**WIMBLEDON.**—For erecting house at Wimbledon. Mr. Gray, architect, Northampton.—

|                               |            |
|-------------------------------|------------|
| Jones .....                   | £5,185 0 0 |
| Mudie .....                   | 4,584 0 0  |
| Hernor .....                  | 4,524 0 0  |
| Copley & Son, Stratford ..... | 4,222 0 0  |
| Ackerman .....                | 4,065 0 0  |
| Chappell .....                | 3,700 0 0  |
| Sabey & Son .....             | 3,667 0 0  |
| Clark .....                   | 3,226 0 0  |

*Alterations, E2, Strand.*—We are asked by Mr. F. A. Dovey, of 231, Burrage-road, Plumstead, to say that he, and not Mr. Banister Fletcher, is the architect for this work, the list of tenders for which was published in our last. We printed the list as we received it.

\* SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.O., not later than 12 Noon on THURSDAYS.

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Addressed to No. 46, Catherine-street, W.O.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

**SPECIAL.**—ALTERATIONS IN STANDING ADVERTISEMENTS OR ORDERS TO DISCONTINUE same, must reach the Office before 8 o'clock on WEDNESDAY morning.  
The Publisher cannot be responsible for DRAWINGS TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that the letter OFFICES ONLY should be sent.

**PASSBOS Advertising in "The Builder."** may have Replies addressed to the Office, 46, Catherine-street, Covent Garden, W.C. Free of charge. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

AN ADDITION Printed on THIN PAPER, for FOREIGN CIRCULATION, is issued every week.

**MAP OF LONDON,** showing Boundaries of Surveyors' Districts. The four Sheets, into which the Map is divided (issued with the numbers of January 1st, 30, 1886, and if sent to the Office direct, or through any Newspaper, can be MOUNTED on the following Terms, viz.—  
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\* Omissions discovered since publication will be corrected before mounting.

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"THE BUILDER" is supplied direct from the Office to residents in any part of the United Kingdom at the rate of 12s. per annum PARAN. To all parts of Europe, America, Australia, and New Zealand, 26s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittance payable to DOUGLAS FOURDRINER, Publisher, No. 46, Catherine-street, W.C.  
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Prices quoted to any Port or Railway Station.  
London Agents—  
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GLAZED BRICKS (White and Coloured), Special Salt-glazed Bricks, Sanitary Tubes, Glazed Earthenware Tiles, Cattle, sheep, and Pig Troughs, Horse Mangers, Patent Automatic Trough Closet, Patent Flank Pan, Ventilating Bricks, Patent Ventilating Gallies and Traps, Patent Chimney Pots for Down Draughts.  
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Lime, Cement, Bricks, Slates, Laths, Hair, Plaster, Wall Copings, Channeled Bricks, Blue and Red Bricks, Red Plain Tiles and Pan Tiles, Closet Pans and Traps, Bends, Junctions, &c. all sizes. Chimney Pots, Red and White. PRICES on APPLICATION.  
**R. CULL & SON'S Store, Railway Arches, London-street, Bethnal Green Station, E.**  
Chief Office—72, Palmerston-buildings, Old Broad-street, E.C.

TO CORRESPONDENTS.

Registered Telegraphic Address, "THE BUILDER, LONDON."

A Query or article cannot be re-opened the subject now; nor, to say truth, can we regard the record of the printer of Solomon as quite conclusive in the matter.—H. S. T.—"Bartolice" (letters cannot be published unless the name and address of writer are enclosed).—B. F. (Baker).—T. M. H. (too late).  
All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication. We are compelled to decline pointing out books and giving addresses.  
None.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.  
We cannot undertake to return rejected communications.  
Letters or communications beyond mere news items which have been duplicated for other journals, are NOT DESIRED.  
All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and not to the Editor.

**Best Bath Stone.**  
**CORSHAM DOWN. | FARLEIGH DOWN.**  
BOX GROUND. | COMBE DOWN.  
WESTWOOD GROUND. | STOKES GROUND.  
**RANDELL, SAUNDERS, & CO., LD.,**  
CORSHAM, WILTS.


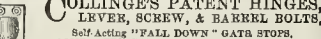
**Bath Stone.**  
Pictor's Monks' Park. Combe Down.  
Corsham Down. Stokes Ground.  
Box Ground. Winsley Ground.  
Farleigh Down. West Wood.  
**PICTOR & SONS, Box, Wilts. [ADVT.]**

**Doubling Freestone and Ham Hill Stone** of best quality, in blocks, or prepared ready for fixing. An inspection of the Doubling Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to **CHARLES TRASK & SONS, Norton-sub-Hamdon, Ilminster, Somerset.**—Agent, Mr. E. WILLIAMS, No. 16, Craven-street, Strand, W.C. [ADVT.]

**Doubling Free Stone** For prices, &c., address S. & J. STAPLE, Quarry Owners, Stone and Lime Merchants, Stoke-under-Ham, Ilminster. [ADVT.]

**Asphalte.**—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.]

**Asphalte.**  
Seyssel, Patent Metallic Lava, and White Asphaltes.  
**M. STODART & CO.**  
Office:  
No. 90, Cannon-street, E.C. [ADVT.]

**MICHELMORE & REAP,**  
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